

curriculum vitae

Personal Information

Surname(s) / First name(s)

Address (es)

Telephone (s)

E-mail

Web-site

Nationality(ies)

Date and Place of birth

Gender

PINTUS PAOLO

PIAZZA GIORDANO BRUNO 6, 09010 SILIQUA (CA) - ITALY

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paolo.pintus5@gmail.com

<https://optoelectronics.ece.ucsb.edu/profile/paolo-pintus>

ITALIAN

February 16th, 1983, Cagliari, Italy

Male

Work experience

Date

Occupation or position held

Main activities and responsibilities

Name and address of employer

Type of business or sector

Date

Occupation or position held

Main activities and responsibilities

Name and address of employer

Type of business or sector

Date

Occupation or position held

Main activities and responsibilities

Name and address of employer

Type of business or sector

Date

Occupation or position held

Main activities and responsibilities

Name and address of employer

Type of business or sector

Date

Occupation or position held

Main activities and responsibilities

Name and address of employer

Type of business or sector

27th April 2016 - onwards

Research Project Scientist

Supervisors: John E. Bowers

Research on nonreciprocal silicon photonic devices and photonic design automation

University of California Santa Barbara - UCSB, Santa Barbara, CA, USA

Research

1st January 2016 - 30th April 2016

Postdoc research fellow ("*Assegno di Ricerca*", Art. 22, 30 Dic. 2010, N. 240)

Supervisors: Fabrizio Di Pasquale

"Analysis, design and characterization of integrated photonic subsystem for sensing"

Scuola di Studi Superiori Universitari e Perfezionamento Sant'Anna, Pisa, Italy

Research

18th March 2015 – 1st September 2015

Assistant Project Scientist

Supervisors: John E. Bowers

Research on nonreciprocal silicon photonic devices

University of California Santa Barbara - UCSB, Santa Barbara, CA, USA

Research

10th February 2014 - 9th February 2016

Independent contractor ("*collaboratore a progetto*") on IRIS FET grant, project no.619194 FP7-ICT

Electromagnetic analysis, design and characterization of ring resonators in silicon photonics for telecom and datacom applications

National Inter-University Consortium for Telecommunications (CNIT), Pisa, Italy

Research

15th January 2011 - 31st December 2015

Postdoc research fellow ("*Assegno di Ricerca*", Art. 51, 27 Dic. 1997, N. 449)

Supervisors: Fabrizio Di Pasquale, Nicola Andrioli

Development of FEM-based software for simulation and design of ring resonators made in CMOS-compatible technology

Scuola di Studi Superiori Universitari e Perfezionamento Sant'Anna, Pisa, Italy

Research

Date	9 th August 2010 - 15 th May 2011
Occupation or position held	Research Assistant
Main activities and responsibilities	Supervisors: John Bowers, Martijn Heck Design, optimization and characterization of mode converters (taper) in hybrid semiconductor optical amplifier (SOA); Design and optimization of integrated optical isolators.
Name and address of employer	University of California Santa Barbara - UCSB, Santa Barbara, CA, USA
Type of business or sector	Research
Date	3 rd September 2007 – 11 th January 2008
Occupation or position held	Visiting student (Leonardo da Vinci's Project). Winner of the scholarship "Bio-informatics and Nano-Biotechnology (BIO-NANO)".
Main activities and responsibilities	Supervisors: Andrea Crisanti and Maria Petrou Malaria data clustering
Name and address of employer	Imperial College, Biology Department, London, United Kingdom
Type of business or sector	Research
Date	November 2006 - September 2007 (127hours)
Occupation or position held	Tutorship activity
Main activities and responsibilities	administrative duties
Name and address of employer	Università degli Studi di Cagliari, Cagliari, Italy
Type of business or sector	Administrative support
Education and training	
Date	15 th January 2008 - 10 th January 2012
Name and type of organisation	Scuola di Studi Superiori Universitari e Perfezionamento Sant'Anna, Pisa, Italy
Title of qualification awarded	Ph.D in Innovative technologies of ICT and robotics, curriculum: Telecommunication Supervisor: Fabrizio Di Pasquale
Thesis	Design of silicon based integrated optical devices using the finite element method
Score	100/100 with honours
Date	June-July 2008
Name and type of organisation	Università degli Studi di Cagliari, Cagliari, Italy
Title of qualification awarded	Professional Qualification to practice as an Engineer
Date	September 2005 – 19 th October 2007
Title of qualification awarded	Laurea Specialistica In Ingegneria Elettronica (Master of Science Degree)
Thesis	Mathematical principles for the design of photonic crystals, Supervisors: Cornelis van der Mee and Sebastiano Seatzu
Score	110/110 with honours
Mean	29.70 / 30
Name and type of organisation	Università degli Studi di Cagliari, Cagliari, Italy
Date	September 2002 – 20 th July 2005
Title of qualification awarded	Laurea in Ingegneria Elettronica (N.O.) (Bachelor of Science Degree)
Score	110/110 with honours
Mean	29,85 / 30
Name and type of organisation	Università degli Studi di Cagliari, Cagliari, Italy
Date	1997 – 2002
Title of qualification awarded	Maturità scientifica
Score	100/100
Name and type of organisation	Liceo Scientifico A.Pacinotti, Cagliari, Italy

Personal skills and competences

Mother tongue(s)

Other language(s)

Self-assessment

European level ⁽¹⁾

ENGLISH

FRENCH

GERMAN

ITALIAN

Understanding		Speaking		Writing
Listening	Reading	Spoken interaction	Spoken production	
C1	C1	C1	C1	C2
B1	B2	B1	A2	A2
A1	A2	A1	A1	A1

⁽¹⁾ Common European Framework of Reference (CEF) level

Certificate of Advanced English, (Level C1) awarded by University of Cambridge, June 2012.
 Certificate of Advanced English, (Level C1) awarded by International House, June 2010, Pisa, Italy.
 First Certificate in English, (Level B2) awarded by University of Cambridge, June 2009.
 First Certificate in English, (Level B2) awarded by International House, June 2008, Pisa, Italy.

Computer skills and competences

Electronic circuits simulators and hardware description languages: Spice and Verilog
 Programming languages: C, C++, Java, Fortran, and Python
 Advanced knowledge of Matlab and Simulink toolbox
 Knowledge of Latex
 Operative system: Linux, Windows,
 Knowledge of the real time systems Shark
 Basic knowledge of SQL
 Basic knowledge of OpenMP and MPI
 Electromagnetic Simulation Software: FIMMWAVE, LUMERICAL
 Multiphysics simulation tool: COMSOL

Main projects and research activities

My research interests are in the field of mathematical modelling and numerical method for silicon photonics and integrated optics.

I am/have been involved in the following research project

- **MOABB**: "Modular Optical Aperture Building Blocks". Project funded by DARPA agency, No. DARPA-BAA-16-13
- **EPDA**: "Electronic and Photonic Design Automation" within **AIM**: "The American Institute for Manufacturing Integrated Photonics". Industry driven public-private partnership for manufacturing leadership in a technology (U.S. grant).
- **Integrated Photonic Optical Circulator**: project funded by the Air Force SBIR under Contract FA8650-15-M-1920 with Morton Photonics.
- **IRIS**: "Integrated Reconfigurable silicon photonic based optical Switch" (FP7, call 2013). Project approved and supported by the European Commission, FET grant, project no.619194 FP7-ICT.
- **MINOS**: "Micro- and Nano-structured photonic devices based on strained silicon for ultrafast Switching in datacom applications" (FIRB Futuro in Ricerca 2012). Project approved and supported by the Italian Ministry of Education, Universities and Research (MIUR).
- **NANO-RODIN**: "Photonic nano-technologies for the production of integrated RODIN systems" ITALY-CANADA project co-founded by the Italian Ministry of Foreign Affairs;
- **ARNO-T3**: "Architectures of Optical Networks and Nodes for high capacity transmission and access-metro-core transport based on integrated photonic technologies" - PAR FAS 2007-2013 Action funded by the Tuscany Region. Reference R&D Strategic Projects on ICT and advanced mechanics, D.D. 3064/2010 and D.D. 3375/2010.

As a Project Scientist at the University of California di Santa Barbara (2015 e 2016-2017) I have been working on three projects: "EPDA", "Integrated Photonic Optical Circulator" and "MOABB".

Within the first two projects, my research activities have been focused on the mathematical modelling and design of integrated optical isolator and circulators. Those devices are among the fundamental building blocks for isolating optical back-reflections and separating counter-propagating signals in optical circuits. They are characterized by having a nonreciprocal permittivity tensor and have been fabricated using magneto-optic garnet bonded on a pre-patterned silicon wafer. An integrated electromagnet is used to induce the nonreciprocal behavior. The design of those components is based

on a finite element method (FEM) developed ad-hoc for the computation of the optical mode in a magneto-optic waveguide. The magnetic field and the thermal heating are computed by a commercial software based on FEM (COMSOL). Combining the multiphysics simulation results (i.e. the modal analysis and the electromagnet behavior), the proposed model provides an accurate design allowing model order reduction. The simulation results show an excellent agreement with the experiments.

The MOABB project consist in the design, fabrication and characterization of an integrated optical beam steering. During this project, I have been collaborating with Lockheed Martin company. In this project, I have been working on modelling and design of optical modulator in heterogeneous platform (silicon and III-V semiconductors). Considering the electro-optic effects in semiconductors (band-filling, bend-shrinkage, plasma, Pockels and Franz-Keldysh effects), the variation of the effective index and the optical absorption has been computed combining electrical simulations and modal analysis through the perturbative approach. The proposed approach provides accurate results reducing the computational complexity.

During 2014-2016 I had been working on the European project IRIS. The project involved 8 partners from 5 countries (2 industrial partners: ERICSSON and ST microelectronics, and 6 research institutes). The main goal of this activity was the design, fabrication and characterization of a reconfigurable optical add and drop multiplexer (ROADM) in silicon photonics. The ROADM consist of a switching matrix with about 400 switches, independently controlled by a local heater. Within this project I worked on modeling, design and optimization of microring based switch element to reduce the total power consumption and increase the total efficiency. The optical resonance, the thermal effect and the fabrication error have been combined to model the switching behavior. The propagation of the light in the switching matrix was performed using the transfer matrix approach, reducing the computational complexity. Finally, the performance of the single element and the one of the whole matrix have been evaluated.

As a Postdoc research fellow at Scuola di Studi Superiori Universitari e Perfezionamento Sant'Anna in Pisa (2012-2016) I had been working on the projects ARNO-T3, NANO-RODIN and MINOS. My research activity was focused on the modelling and design of microring resonator for optical network-on-chip. The light propagation has been modelled using the transfer matrix approach. Bus and ring topology were investigated. Within the MINOS project I had been working on the mathematical modelling of strain-induced electro-optic effect in center-symmetric crystal like silicon. Based on a rigorous symmetry analysis, a general formulation was derived, to the best of my knowledge, for the first time. The outcome of this analysis is a linear relation between the second order susceptibility tensor and the strain gradient tensor. The proposed model greatly simplifies the description of the electro-optic effect in strained materials, providing a powerful and effective tool for design and optimization of optical devices.

As a research assistant at University of California in Santa Barbara (2010-2011) I worked on taper modelling and designing in hybrid semiconductor optical amplifier. I have investigated the main drawbacks and I explored possible improvements concerning the shape and the length of the taper in order to increase the current injected along the device. I also worked on integrated optical isolators based on nonreciprocal phase shift effect designed using ring resonators. Different kinds of configurations were considered and the final structure was optimized in order to improve the device performance.

As a PhD student at Scuola di Studi Superiori Universitari e Perfezionamento Sant'Anna in Pisa (2008-2012) I had been working on a mode solver based on the finite element method for waveguides and microring resonators. I developed a very efficient and accurate tool in the frequency domain based on Arnoldi's method for the computation of the propagation constant and electromagnetic modes. The methods can be used for lossless and lossy materials with a quite generic permittivity and permeability tensors (e.g., anisotropic, magneto-optic and ferromagnetic materials). The code was tested for the modal analysis in several different structures: 1) slot-waveguide and slot-ring resonator designed in silica/silicon, alumina/silicon (high refractive index contrast); 2) waveguide and ring resonator in lithium-niobate (anisotropy); 3) optical insulator with magneto-optical material (Hermitian permittivity tensor with real and complex entries).

Such mode solver had been used for designing lasers and amplifiers in the CMOS compatible technology. My research was focused on the static and dynamic models of slot waveguide lasers considering two different doped glasses: erbium in silica ($\text{Er}^{3+}:\text{SiO}_2$) and erbium in aluminium oxide ($\text{Er}^{3+}:\text{Al}_2\text{O}_3$) for telecommunication and biomedical applications. The potential of these new devices was shown in term of compactness, low pump power threshold and low cost.

During 2007, as a visiting student at the Biological Sciences Department of the Imperial College of London, I was involved in signal processing and pattern recognition in malaria. The final goal was the

identification of potential malaria vaccines. The research activity was focused on the elaboration of sera derived from the malaria medical analysis of 189 subjects; each serum was represented by a binary number in an 18-dimensional feature space. The subjects were divided into three different groups: no malaria, clinical malaria and asymptomatic subjects. I studied the main characteristics of the data and 7 out of the 18 antigens were selected as the most important for group discrimination. Finally, a novel representation of the data was proposed and a higher accuracy for the classification was computed.

During my master thesis (2007) I had been working on a method to determine the band spectrum, band gaps, and discrete energy levels, of a one-dimensional photonic crystal with localized impurities. For one-dimensional crystals with piece wise constant refractive indices, I develop an algorithm to recover the refractive index distribution from the period map. Finally, it was derived the relationship between the period map and the scattering matrix containing the information on the localized modes.

As an under-graduated student at the Department of Electrical and Electronic Engineering (DIEE), of Università degli Studi di Cagliari, I was involved in projecting and manufacturing of an electrocardiograph consisting of: 1) Design and manufacturing of conditioning signal circuit with use of Altium-DXP 2004 software (amplification, filtering, PCB-project); 2) Digital signal processing with a micro-controller (PIC 18F4550 Microchip); 3) Project and design of a graphic user interface and connection to the PC using the parallel port.

Supervising and mentoring activities

PhD co-supervisor (1): Costanza L. Manganelli, PhD at Scuola Superiore Sant'Anna, Italy
Master Thesis supervisor (1): Cristian Zambiasi, University of Trento, Italy
Bachelor Thesis supervisor (1): Andre Merlo, University of Pisa, Italy
I am experienced in tutoring students and teaching.

Publications

- J1. P. Pintus, D. Huang, C. Zhang, Y. Shoji, T. Mizumoto, and J.E. Bowers, "Microring-based Optical Isolator and Circulator with Integrated Electromagnet for Silicon Photonics," in *IEEE/OSA Journal of Lightwave Technology*, vol. 35, no. 8, pp.1429-1437, 2017 (**Highly-Scored, invited paper**).
- J2. C. L. Manganelli, P. Pintus, F. Gambini, D. Fowler, M. Fournier, S. Faralli, C. Kopp, C. J. Oton "Large-FSR thermally tunable double-ring filters for WDM applications in silicon photonics," *IEEE Photonics Journal*, vol. 9, no. 1, pp. 1-10, 2017.
- J3. D. Huang, P. Pintus, C. Zhang, P. Morton, Y. Shoji, T. Mizumoto, and J. E. Bowers, "Dynamically reconfigurable integrated optical circulators," *Optica*, vol. 4, pp. 23-30, 2017.
- J4. D. Huang, P. Pintus, C. Zhang, Y. Shoji, T. Mizumoto, and J.E. Bowers, "Electrically driven and thermally tunable integrated optical isolators for silicon photonics," in *IEEE J. of Selected Topics in Quantum Electronics*, vol. 22, no. 6, pp. 1-8, 2016.
- J5. F. Testa, C. J. Oton, C. Kopp, J.-M. Lee, R. Ortuño, R. Enne, S. Tondini, G. Chiaretti, A. Bianchi, P. Pintus, M.-S. Kim, D. Fowler, J. Á. Ayúcar, M. Hofbauer, M. Mancinelli, M. Fournier, G. B. Preve, N. Zecevic, C. L. Manganelli ; C. Castellan, G. Parès, O. Lemonnier, F. Gambini, P. Labeye, M. Romagnoli, L. Pavesi, H. Zimmermann, F. Di Pasquale, and S. Stracca, "Design and Implementation of an Integrated Reconfigurable Silicon Photonics Switch Matrix in IRIS Project," in *IEEE J. of Selected Topics in Quantum Electronics*, vol. 22, no. 6, pp. 1-14, Nov.-Dec. 2016.
- J6. S. Faralli, F. Gambini, P. Pintus, M. Scaffardi, O. Liboiron-Ladouceur, Y. Xiong, P. Castoldi, F. Di Pasquale, N. Andriolli, I. Cerutti, "Bidirectional Transmission in an Optical Network on Chip with Bus and Ring Topologies," *IEEE Photonics Journal*, vol. 8, no. 2, pp. 1-7, April 2016.
- J7. C. L. Manganelli, P. Pintus, and C. Bonati, "Modeling of strain-induced Pockels effect in Silicon," *Optics Express*, vol. 23, no. 22, pp. 28649-28666, 2015.
- J8. P. Pintus, F. Gambini, S. Faralli, F. Di Pasquale, I. Cerutti, and N. Andriolli, "Ring versus Bus: a Theoretical and Experimental Comparison of Photonic Integrated NoC," *IEEE/OSA Journal of Lightwave Technology*, vol. 33, no. 23, pp. 4870-4877, Dec.1, 1 2015.
- J9. F. Gambini, S. Faralli, P. Pintus, N. Andriolli, and I. Cerutti, "BER evaluation of a low-crosstalk silicon integrated multi-microring network-on-chip," *Optics Express*, vol. 23, pp. 17169-17178, Mar. 2015.
- J10. P. Pintus, "Accurate vectorial finite element mode solver for magneto-optic and anisotropic waveguides," *Optics Express*, vol. 22, pp 15737-15756, June 2014.
- J11. P. Pintus, P. Contu, P. G. Raponi, I. Cerutti, N. Andriolli, "Silicon-based all-optical multi microring (MMR) network-on-chip," *Optics Letters*, vol. 39, no. 4, pp. 797-800, Feb. 2014.
- J12. P. Pintus, P. Contu, N. Andriolli, A. D'Errico, F. Di Pasquale, F. Testa, "Analysis and design of micro-ring based switching elements in a silicon photonic integrated transponder aggregator," *IEEE/OSA Journal of Lightwave Technology*, special Issue on Optical interconnects, vol. 31, no. 24, pp. 3943-3955, 15 Dec. 2013.

- J13. P. Pintus, N. Andriolli, F. Di Pasquale, and J. E. Bowers, "Bidirectional crosstalk and back-reflection free WDM active optical interconnects," IEEE Photonics Technology Letters, vol.25, no.20, pp.1973-1976, Oct.15, 2013.
- J14. S. M. Sher, P. Pintus, and F. Di Pasquale, "Numerical study of novel high-index-contrast Er:LiNbO₃ photonic wire lasers optically pumped at 980nm," Applied Optics, vol. 52, pp. 4438-4445, July 2013.
- J15. G. Kurczveil, P. Pintus, M.J.R. Heck J.D. Peters, and J.E. Bowers, "Characterization of insertion loss and back reflection in passive hybrid silicon tapers," IEEE Photonics Journal, vol. 5, pp. 6600410, April 2013.
- J16. P. Pintus, F. Di Pasquale, and J. E. Bowers, "Integrated TE and TM optical circulators on ultra-low-loss silicon nitride platform," Optics Express, vol. 21, pp.5041-5052, February 2013.
- J17. P. Pintus, F. Di Pasquale, and J. E. Bowers, "Design of TE ring isolators for ultra-low loss Si₃N₄ waveguides based on the finite element method", Optics Letters, vol. 36, pp. 4599-4601, December 2011.
- J18. P. Pintus, M.-C. Tien, and J. E. Bowers, "Design of magneto-optical ring isolator on SOI based on the finite element method", IEEE Photonics Technology Letters, vol. 23, pp. 1670-1672, November 2011.
- J19. P. Pintus, and M. Petrou, "Relational space classification for malaria diagnosis", Pattern Analysis and Application, vol. 14, pp. 261-272, 2011.
- J20. M.-C. Tien, T. Mizumoto, P. Pintus, H. Kroemer, and J.E. Bowers, "Silicon ring isolators with bonded nonreciprocal magneto-optic garnets," Optics Express, vol. 19, pp 11740-11745, June 2011.
- J21. P. Pintus, S. Faralli, and F. Di Pasquale, "Integrated 2.8μm laser source in Al₂O₃:Er³⁺ slot waveguide on SOI", IEEE/OSA Journal of Lightwave Technology, vol. 29, pp. 1206-1212, April 2011.
- J22. S. M. Sher, P. Pintus, F. Di Pasquale, M. Bianconi, G. B. Montanari, P. De Nicola, S. Sugliani and G. Prati, "Design of 980nm-pumped waveguide laser for continuous wave operation in ion-implanted Er:LiNbO₃", IEEE Journal of Quantum Electronics, vol. 47, pp. 526-533, April 2011.
- J23. P. Pintus, S. Faralli, and F. Di Pasquale, "Low threshold pump power and high integration in Al₂O₃:Er³⁺ slot waveguide laser on SOI", IEEE Photonics Technology Letters, vol. 22, pp. 1428-1430, October 2010.
- J24. C. van der Mee, P. Contu, and P. Pintus, "One-dimensional photonic crystal design", Journal of Quantitative Spectroscopy and Radiative Transfer, vol. 111, pp. 214-225, 2010.
- J25. C. van der Mee, P. Pintus, and S. Seatzu, "Mathematical principles in photonic crystals", Rivista Matematica dell'Università di Parma, vol. 7, no. 8, pp. 99-137, 2008.

Patents

- P1. U.S. provisional patent no. 62/290341, "Reconfigurable Integrated-Optics-Based Non-Reciprocal Devices", Inventors: John E. Bowers, P. Pintus, D. Huang, ownership University of California Santa Barbara, filing date: 2nd February 2016.
- P2. Italian Patent RA2013A000001, "Dispositivo Ottico", Inventors: P. Pintus, F. Di Pasquale, J.E. Bowers, ownership Scuola Superiore Sant'Anna and University of California Santa Barbara, filing date: 8th January 2013.
- P3. European Patent Application - P36731, "Optical Routing apparatus and method". Inventors: F. Testa, P. Pintus, F. Di Pasquale, A. D'Errico, ownership CNIT- Italian National Consortium for Telecommunications ERICSSON S.p.A., filing date: 8th June 2012.

Conferences and presentations

- C1. Y. Xiong, N. Andriolli, S. Faralli, F. Gambini, P. Pintus, M. Chiesa, R. Ortuño, O. Liboiron-Ladouceur, and I. Cerutti, "Demonstration of a Packaged Photonic Integrated Network on Chip controlled by an FPGA-based scheduler," in Optical Fiber Communication Conference (OFC) 2017, paper W1A.3, Los Angeles, California, USA, March 19th-23rd, 2017.
- C2. D. Huang, P. Pintus, C. Zhang, Y. Shoji, T. Mizumoto, J. E. Bowers, "Multiple-port integrated optical circulators," IEEE Photonics Conf. (IPC) 2016, Waikoloa, HI, USA, October 2nd-6th, 2016.
- C3. S. Faralli, N. Andriolli, F. Gambini, P. Pintus, G. B. Preve, M. Chiesa, R. Ortuno, O. Liboiron-Ladouceur, I. Cerutti, "Bidirectional transmissions in a ring-based packaged optical NoC with 12 add-drop microrings", IEEE Photonics Conf. (IPC) 2016, Waikoloa, HI, USA, October 2nd-6th, 2016.
- C4. S. Faralli, I. Cerutti, F. Gambini, P. Pintus, G. B. Preve, M. Chiesa, R. Ortuno, N. Andriolli, "Characterization of a Packaged Network on Chip based on Multi-Microrings", 42nd European Conference on Optical Communication (ECOC), pp. 1145-1147, Düsseldorf, Germany, September 19th-23rd, 2016.
- C5. P. Pintus, D. Huang, C. Zhang, Y. Shoji, T. Mizumoto, J. E. Bowers, "Novel nonreciprocal devices with integrated electromagnet for silicon photonics", 42nd European Conference on Optical Communication (ECOC), pp. 704-706, Düsseldorf, Germany, September 19th-23rd, 2016 (**speaker**).

- C6. P. Pintus, C. L. Manganelli, F. Gambini, F. Di Pasquale, M. Fournier, O. Lemonnier, C. Kopp, C. J. Oton, "Optimization of Integrated Silicon Doped Heaters for Optical Microring Resonators", 42nd European Conference on Optical Communication (ECOC), pp. 698-700, Düsseldorf, Germany, September 19th-23rd, 2016 (**speaker**).
- C7. C. J. Oton, P. Pintus, C. L. Manganelli, F. Gambini, F. Di Pasquale, S. Tondini, C. Castellan, M. Mancinelli, L. Pavesi, M. S. Kim, J. M. Lee, D. Fowler, M. Fournier, C. Kopp, and F. Testa, "Silicon Photonics for Matrix Switching Applications: Ingredients and Recipes," in Advanced Photonics Conference 2016, Integrated Photonics Research (IPR), Silicon, and Nano-Photonics, paper ITu3B.6, Vancouver, British Columbia, Canada, 18th - 20th July, 2016 (**invited**)
- C8. P. Pintus, C. Manganelli, F. Gambini, F. Di Pasquale, C.J. Oton, S. Tondini, M. Mancinelli, C. Castellan, L. Pavesi, F. Testa, " Silicon Photonic Toolkit for Integrated Switching Matrices," Fotonica 2016, 18th National Meeting on Photonic Technologies, Rome, Italy, 6th-8th June 2016.
- C9. D. Huang, P. Pintus, C. Zhang, Y. Shoji, T. Mizumoto, J.E. Bowers, "Reconfigurable integrated optical circulator," Conference on Lasers and Electro-Optics (CLEO) 2016, paper SM3E.1, San Jose, California, USA, June 5th-10th, 2016 (**invited**).
- C10. C. L. Manganelli, P. Pintus, F. Gambini, D. Fowler, M. Fournier, C. Kopp, F. Di Pasquale and C. J. Oton, "Design of coupled micro-ring resonators for silicon photonic switching matrices," pp. 84-85, IEEE Optical Interconnects Conference (OI) 2016, San Diego, CA, May 9th-11th, 2016
- C11. D. Huang, P. Pintus, C. Zhang, Y. Shoji, T. Mizumoto, J.E. Bowers, "Silicon microring isolator with large optical isolation and low loss," Optical Fiber Communication Conference (OFC) 2016, paper Th1K.2, Anaheim, California, USA, March 20th-24th, 2016.
- C12. D. Huang, P. Pintus, S. Srinivasan and J.E. Bowers, "*Increasing the sensitivity of optical current sensors*," SPIE Photonic West 2016, San Francisco (USA), February 13th- 18th, 2016 (**invited**)
- C13. C. L. Manganelli, P. Pintus, C. Bonati, and F. Di Pasquale, "*Analysis of Stress-induced Pockels Effect in Silicon Waveguides*", COMSOL Conference 2015 Grenoble, October 14th-16th, 2015.
- C14. S. Faralli, F. Gambini, P. Pintus, O. Liboiron-Ladouceur, P.Castoldi, N.Andriolli, and I.Cerutti, "*Experimental Demonstration of Bidirectional Transmissions in a Photonic Integrated Network on Chip with Bus Topology*," Photonics in Switching Conference 2015, Florence, Italy, September 22nd-25th, 2015.
- C15. P. Pintus, D. Huang, S. Srinivasan, and J. E. Bowers, "*Full Vectorial Mode Solver for Design and Optimization of Magneto-optic Devices*" International Conference on Electromagnetics in Advanced Applications (ICEAA) Conference, Torino, Italy, Sep. 7th-11th, 2015. (**invited, speaker**)
- C16. I. Cerutti, N. Andriolli, P. Pintus, S. Faralli, F. Gambini, P. Castoldi, and O. Liboiron-Ladouceur, "*Fast Scheduling based on iterative Parallel Wavelength Matching for a Multi-wavelength Ring Network-on-Chip*," 19th Optical Networks Design and Modelling (ONDM) Conference, paper We8.30, Pisa, Italy, May 11th-14th, 2015.
- C17. S. Faralli, F. Gambini, P. Pintus, I. Cerutti and N. Andriolli, "*Ring Versus Bus: A BER Comparison of Photonic Integrated Networks-on-Chip*," Optical Interconnect Conference, paper MC6, San Diego, California, USA, April 20th-22nd, 2015.
- C18. F. Gambini, P. Pintus, S. Faralli, N. Andriolli, I. Cerutti, "*A Photonic Integrated Network-on-chip with Multi Microrings*," Optical Fiber Communication Conference 2015, paper W3D.6, Los Angeles, California, USA, March 22th-26th, 2015.
- C19. C. Manganelli, P. Pintus, M.B. Casu, N. Andriolli and F. Di Pasquale, "*Modeling of $\chi^{(2)}$ in strained silicon based on crystal symmetry*," The 11th International Conference on Group IV Photonics, Paris, France, 27th-29th August 2014.
- C20. P. Pintus, "*Full-vectorial finite element mode solver for lossy and non-reciprocal ring resonators*," The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Madrid, Spain, July 7th - 11th, 2014. (**invited, speaker**)
- C21. P. Pintus, "*Design of silicon based integrated optical devices using the finite element method*," The 18th European Conference on Mathematics for Industry, Taormina, Italy, 9th-13th June 2014, (**key note, invited**)
- C22. N. Andriolli, I. Cerutti, P. Pintus, M. Scaffardi, D. Marini, G. B. Montanari, F. Mancarella, M. Ferri, R. Balboni, G. Bolognini, "*Challenges and progress toward a silicon-based multi-microring optical network-on-chip*," European Conference on Networks and Communications (EuCNC) 2014, Bologna, Italy, 23rd-26th June 2014.
- C23. P. Pintus, F. Gambini, V. Soriano, P. Velha, M. Romagnoli, and F. Di Pasquale, "*Design and optimization of integrated thermal heater for large switching fabric based on micro-ring resonators*," Fotonica 2014, 16th National Meeting on Photonic Technologies, Napoli, Italy, 12th-14th May 2014.
- C24. P. Pintus, "*Modal analysis in nonreciprocal waveguide based on the finite element method*", Nonlinear Evolution Equations and Linear Algebra, Cagliari, Italy, 2nd-5th September 2013 (**speaker**).
- C25. J.E. Bowers, P. Pintus, M.J.R. Heck, and F. Di Pasquale, "*Integrated optical circulators and isolators on a ultra-low-loss silicon nitride platform*," IEEE Summer Topicals 2013, Hilton Waikoloa Village, Waikoloa, Hawaii, USA, 8th-10th July 2013 (**invited plenary**).

- C26. P. Pintus, N. Andriolli, F. Di Pasquale, and J.E. Bowers, “Crosstalk and back-reflection free active interconnects for intra-card WDM bi-directional communication,” Fotonica 2013, 15th National Meeting on Photonic Technologies, Milan, Italy, 21st-23rd May 2013 (**speaker**).
- C27. P. Contu, P. Pintus, F. Testa, A. D’Errico, and F. Di Pasquale, “Analysis and design of micro-ring based switch elements in silicon photonics for optical interconnection”, IEEE Optical Interconnects Conference, Santa Fe, New Mexico, USA, 5th-8th May 2013 (**speaker**).
- C28. P. Pintus, N. Andriolli, F. Di Pasquale, and J.E. Bowers, “Integrated bidirectional optical amplifier for crosstalk-free WDM communication”, IEEE Optical Interconnects Conference, Santa Fe, New Mexico, USA, 5th-8th May 2013 (**speaker**).
- C29. P. Pintus, P. Contu, N. Andriolli, I. Cerutti, and P. Raponi, “Modeling a multi microring (MMR) network-on-chip”, IEEE Optical Interconnects Conference, Santa Fe, New Mexico, USA, 5th-8th May 2013 (**speaker**).
- C30. P. Pintus, “Design of silicon based integrated optical devices using the finite element method”, Workshop SIMAI Giovani 2013, Italian Society for Industrial and Applied Mathematics, Roma, Italy, 11th March 2013 (**invited, speaker**).
- C31. P. Pintus, “Full vectorial finite element method for integrated optical device design”, SIMAI Biannual Congress 2012, Meeting of the Italian Society for Industrial and Applied Mathematics, Torino, Italy, 25th-28th June 2012 (**invited, speaker**).
- C32. P. Pintus, N. Andriolli, F. Di Pasquale, M. C. Tien, H. Kroemer, J. E. Bowers, T. Mizumoto, “Progettazione e fabbricazione di un isolatore integrato per il modo TM realizzato mediante bonding di micro-ring in Silicio e strato di materiale magneto-ottico”, Fotonica 2012, 14th National Meeting on Photonic Technologies, Firenze, Italy, 15th-17th May 2012 (**speaker**).
- C33. P. Pintus and F. Di Pasquale, “Modelling of ring resonators with magneto-optic materials using the finite element method,” Scientific Computing 2011 (SC2011), S. Margherita di Pula, Cagliari, Italy, October 10th-14th, 2011 (**speaker**).
- C34. P. Pintus, M. J. R. Heck, G. Kurczveil, and J. E. Bowers, “Low-loss hybrid silicon tapers”, IEEE International Conference on Group IV Photonics, The 8th International Conference on Group IV Photonics, Royal Society, London, England, 14th-16th September 2011 (**speaker**).
- C35. P. Pintus, S.M. Sher, S. Faralli, V. Toccafondo, F. Di Pasquale, A. D’Errico, and F. Testa, “Progetto in tecnologia silicon on insulator di un laser in guida d’onda di tipo slot drogata con Ioni Er³⁺ e pompata otticamente”, Fotonica 2010, 12th National Meeting on Photonic Technologies, Pisa, Italy, 25th-27th May 2010 (**speaker**).
- C36. R. Agarwal, R. Gangopadhyay, G. Prati, S. Gupta, and P. Pintus, “Optimally apodized ring-resonator filter for DPSK demodulation”, The 4th International Conference on Computers and Devices for Communication (CODEC-09), Institute of Radio Physics and Electronics, University of Calcutta, Kolkata, India, 14th-16th December 2009.
- C37. P. Pintus, S. Faralli, V. Toccafondo, F. Di Pasquale, A. D’Errico, and F. Testa, “Design of optically pumped Er³⁺ doped silicon-on-insulator slot waveguide lasers”, The 22nd annual meeting of the IEEE Photonics Society, LEOS 2009, Belek-Antalya, Turkey, 4th-8th October 2009 (**speaker**).
- C38. C. van der Mee, P. Pintus, and S. Seatzu, “Mathematical principles for the design of photonic crystals”, Integral Equations: recent developments and new applications, Parma, Italy, September 27th-28th, 2007 (**speaker**).

Reviewer activity for international journals

I have been a scientific reviewer for the following journals and conferences

- Nature Communications
- Nature Scientific Reports
- Laser & Photonics Reviews;
- IEEE Journal of Selected Topics in Quantum Electronics;
- IEEE Photonics Technology Letters;
- IEEE Transactions on Magnetics - Conferences;
- IEEE International Conference on Photonics 2013;
- PIER Journal of ElectroMagnetic Waves and Applications;
- Optics Express;
- Optics Letter;
- Applied Optics;
- Applied Physics Letter;

Teaching activities

Erasmus Mundus Master on Photonic NETworks Engineering and PhD in Emerging Digital Technologies at Scuola di Studi Superiori Universitari e Perfezionamento Sant’Anna, Pisa, Italy. Academic year 2015/16. 10 hours teaching within the “Electromagnetic Fields and Propagation- Part 2” class.

Erasmus Mundus Master on Photonic NETWORKS Engineering and PhD in Emerging Digital Technologies at Scuola di Studi Superiori Universitari e Perfezionamento Sant'Anna, Pisa, Italy. Academic year 2015/16. 10 hours teaching within the "Photonic Integrated Circuits" class.

Master on Photonic NETWORKS Engineering and PhD in Emerging Digital Technologies at Scuola di Studi Superiori Universitari e Perfezionamento Sant'Anna, Pisa, Italy. Academic year 2014/15. 10 hours teaching within the "Electromagnetic Fields and Propagation- Part 2" class.

Master on Photonic NETWORKS Engineering and PhD in Emerging Digital Technologies at Scuola di Studi Superiori Universitari e Perfezionamento Sant'Anna, Pisa, Italy. Academic year 2014/15. 10 hours teaching within the "Photonic Integrated Circuits" class.

Erasmus Mundus Master on Photonic NETWORKS Engineering (MaPNET), PhD in Innovative Technologies and PhD in Emerging Digital Technologies of the Scuola Superiore Sant'Anna, Pisa, Italy. Academic year 2013/14. 6 hours teaching within the "Electromagnetic Fields and Propagation- Part 2" class.

Master on Photonic NETWORKS Engineering, Graduate Program in Information and Communication Technologies, PhD in Tecnologie Innovative at Scuola di Studi Superiori Universitari e Perfezionamento Sant'Anna, Pisa, Italy. Academic year 2013/14. 10 hours teaching within the "Photonic Integrated Circuits" class.

Graduate Program in Information and Communication Technologies, PhD in Tecnologie Innovative, PhD in Emerging Digital Technologies at Scuola Superiore Sant'Anna, Pisa, Italy. Academic year 2012/13. 6 hours teaching within the "Electromagnetic Fields and Propagation - Part 2" class.

Master on Photonic NETWORKS Engineering, Graduate Program in Information and Communication Technologies, PhD in Tecnologie Innovative at Scuola Superiore Sant'Anna, Pisa, Italy. Academic year 2011/12. 6 hours teaching within the "Electromagnetic Fields and Propagation - Part 2" class.

Talks & Seminars

"The role of mathematical modelling and numerical simulation in the nanotechnologies" (1 hour)
Within the program "New didactics for the School," organized by the "Accademia dei Lincei"
Liceo Scientifico A. Pacinotti, Cagliari, 29th February, 2016

"Silicon Photonics: State of the Art and Future Perspective" (1 hour)
Electrical and Electronic Dep. (DIEE), University of Cagliari, Cagliari, Italy, January 9th, 2015

"Couple mode theory based on FEM analysis" (2 hours)
CEIICP, Scuola Superiore Sant'Anna, Pisa, Italy, May 6th, 2010

"Finite Element Methods" (2 hours)
CEIICP, Scuola Superiore Sant'Anna, Pisa, Italy, May 5th, 2010

"Design of optically pumped Er^{3+} doped silicon-on-insulator slot waveguide for lasers and optical amplifier" (2 hours)
LNM Institute of Information Technology, Jaipur, Rajasthan, December 19th, 2009

"Eigenvalue problem for a longitudinal homogeneous waveguide" (2 hours)
CEIICP, Scuola Superiore Sant'Anna, Pisa, Italy, May 22nd, 2009

"Finite Element Methods" (2 hours)
CEIICP, Scuola Superiore Sant'Anna, Pisa, Italy, May 21st, 2009

"Electroencephalogram, Signal Analysis and Pattern Recognition"
Presentation of a work about the Prediction of epileptic seizure deriving from the study of electroencephalogram.
Microsoft Research in Redmond, Seattle, WA, USA February 9th, 2007,

Social skills and competences

I have good communications skills and I have often had the opportunity to interact with people from European and non-European countries. I have team spirit and I work proficiently in a group.

Organisational skills and competences

I have participated in many cultural activities such as "Science week", "Open Monuments" and others. I organized the work of teams made of up to 5 people.

Artistic skills and competences

I won a contest announced by the Municipality of Siliqua (Cagliari, Italy) for which I wrote an essay titled "From the origins to the Savoia's coming".

I won a drawing contest announced by the Liceo Scientifico A. Pacinotti, Cagliari, Italy (2002).

Attended Courses and Summer Schools

"Semiconductor device processing B" (ECE 220B), University of California Santa Barbara, Santa Barbara, California, USA, Winter quarter 2017, Prof. Dr. Chris Palmstrom, 40 hours, grade A+.

"Semiconductor device processing A" (ECE 220A), University of California Santa Barbara, Santa Barbara, California, USA, Fall quarter 2016, Prof. Dr. Chris Palmstrom, 40 hours, grade A.

European School on Nanoscience and Nanotechnologies (ESONN'14), August 24th - 13th, 2014, Grenoble, France, organized by Université Joseph Fourier (UJF), Grenoble Institut National Polytechnique (Grenoble INP) and co-organized by the Centre national de la recherche scientifique (CNRS) and Commissariat à l'énergie atomique et aux énergies alternatives (CEA).

"Semiconductor Lasers" (ECE 227A), University of California Santa Barbara, Santa Barbara, California, USA, Fall quarter 2010, Prof. Dr. Milan L. Mashanovitch, 40 hours, grade A-.

18th Summer School on Parallel Computing, Casalecchio di Reno, Bologna, September 7th-18st, 2009 organized by consortium CINECA, Casalecchio di Reno, Bologna.

"Metodi numerici per le equazioni differenziali", Scuola Normale Superiore, Pisa, Italy, March-June 2009, Prof. Giancarlo Sangalli, 50 hours. Mark 30/30.

5th Optoelectronic and Photonic Winter School, Fai della Paganella, Trento, March 15th-21st, 2009 organized by Department of Physics, University of Trento (Italy) and Institut d'Electronique Fondamentale, CNRS, University of Paris Sud XI (France).

Main sponsor: European Project Helios (FP7-ICTprogram).

Alma Graduate School, *BEST 2008 (Bologna Experience for Superior Talents)- "The merit, the rules"*, Bologna (Italy), September 27th - October 1st, 2008.

Selection of 50 best graduated Italian students among more than 4100 applications. Master lectures, seminars and conferences on the importance of "The merit, the rules". Principal lecturer Romano Prodi, Pier Luigi Celli, Angelo Tantazzi and Roger Abravanel.

European Mathematical Society –Scuola Matematica Interuniversitaria, Cortona Summer School, *Mathematical and Numerical Models for the Cardiovascular System*, Cortona (Italy), August 16th-31st, 2008, Prof. Dominique Chappelle, Prof. Piero Colli-Franzone, Prof. Alfio Quarteroni, grade A+.

SIAG/LA-SIMUMAT *International Summer School on Numerical Linear Algebra*, CIEM Castro Urdiales (Spain), July 21st-25th, 2008, organized by the SIAM Activity Group on Linear Algebra.

International Summer University Wolfenbüttel on Digital Signal Processing and Applications, Fachhochschule Braunschweig/Wolfenbüttel (Germany), May 13rd-26th, 2007, organized by Fachhochschule Braunschweig/Wolfenbüttel, University of Applied Sciences, Department of Electrical Engineering Wolfenbüttel, Germany.

Honors and Awards

Winner of the European Anile-ECMI Prize for Mathematics in Industry (III Edition, 2014). This biannual prize was announced by the Associazione Angelo Marcello Anile (AssoAma) and the European Consortium for Mathematics in Industry (ECMI) for an excellent PhD theses successfully submitted in a European University in 2012-2014

http://www.ecmi-indmath.org/?page_id=281

Winner of biannual Italian National Contest "Ingegnere Giuseppe Pedriali" (XXIII Edition, 2013). The prize is addressed to the Italian citizen who has effectively contributed to the progress of applied science, physics, chemistry, and electricity in order to improve the Italian industrial production. Award established by the Provincia di Forlì-Cesena in 1967, in accordance with the will of the engineer Giuseppe Pedriali (Cannuzzo di Cervia, 1867 - Firenze, 1932).

<http://servizi-uffici.provincia.fc.it/web/ricercainnovazione/xxiii-edizione>

Winner of the 2011/2012 INDAM-SIMAI's biannual prize for the best PhD thesis on applied mathematics (III Edition). The prize was announced by the Italian National Institute of High Mathematics (INdAM) and the Italian Society of Industrial and Applied Mathematics (SIMAI).

<http://www.altamatematica.it/it/node/239>

Finalist in the selection process for the 2011 ECCOMAS PhD Award, announced by European Community on Computational Method in Applied Science.

<http://www.eccomas.org/>

Poster Paper Presentation Award – Second place, The 4th International Conference on Computers and Devices for Communication (CODEC-09), Institute of Radio Physics and Electronics, University of Calcutta, Kolkata, India, 14th-16th October 2009.

Winner of the Meucci-Marconi's prize for the best national master thesis on telecommunication and electromagnetic field, obtaining the second place. The prize was announced by "Fondazione Guglielmo Marconi", "Fondazione Ugo Bordini" and "Associazione per la Tecnologia dell'Informazione e della Comunicazione – AICT", Padova, Italy, October 29th, 2008.

<http://www.fgm.it/en/foundation-en/prizes/marconi-junior-prize.html>

Winner of a scholarship for a Master organized by Alma Graduate School, *BEST 2008 (Bologna Experience for Superior Talents)- "The merit, the rules"*, Bologna, Italy, Sept. 27th - Oct. 1st, 2008.

http://www.almaweb.unibo.it/all/doc/upl/s1/comunicati/02_10_08.pdf

Winner of a PhD scholarship 2008-2011 at Scuola Superiore San'Anna, Pisa, Italy.

Winner of the scholarship "Bio-informatic and Nano-Biotechnology (BIO-NANO)" announced by the University of Studies of Cagliari and "Consorzio TUCEP" of Perugia for the year 2006/07 obtaining the first place (Leonardo da Vinci -fellowship).

Winner of the scholarship "Excellence Award" announced by the University of Studies of Cagliari for the year 2005/06 obtaining the first place in the list for bachelor degrees.

<http://www.unica.it/pub/7/show.jsp?id=1747&iso=96&is=7>

Driving licence

Driving licence type B

Hobbies and interests

Modelling, amateur cycling. Travelling.

Groups and Associations

IEEE Membership (Member since 2010, id: 90716469),
IEEE Photonic Society membership (Member since 2010, id: 90716469),
Italian Society for Industrial and Applied Mathematics (SIMAI) membership,
National Group of Scientific Computing (GNCS).

I give the authorization to use my personal data as written in the art.10/11 of the Italian Law 675/96. I am aware of the consequences of making false statements, falsehood of acts and use of false facts, punishable by law according to art. 76 D.P.R. n. 445/2000 and art. 496 of the Italian Penal Code.

Santa Barbara, CA, USA
28th May, 2017

Paolo Pintus