

# Curriculum Vitæ et Studiorum

Isabella Cerutti

## 1 Personal Information

Contact information:

- Home address: via Giuseppe Ferrari 12, 56121 Pisa (PI), Italy.
- Work address: Scuola Superiore Sant'Anna, Institute of Communication, Information, and Perception Technologies (TeCIP), via G. Moruzzi, 1, 56124 Pisa (PI), Italy.
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## 2 Academic Degrees

- 2002: Ph.D. in Electrical Engineering, major in Telecommunications, University of Texas at Dallas, dissertation title: "Hybrid wavelength division multiplexing networks," advisor: prof. A. Fumagalli.
- 1998: Laurea in Electrical Engineering, Politecnico di Torino, 110/110 cum laude, dissertation title: "Optimal self-healing ring protection and routing in WDM survivable networks," advisors: prof. F. Neri, prof. A. Fumagalli.

## 3 Positions Held

- 15 February 2007–present: Assistant Professor, Institute of Communication, Information, and Perception Technologies (TeCIP), Scuola Superiore Sant'Anna.
- September 2005–February 2007: Researcher, Center of Communications Network Engineering, Scuola Superiore Sant'Anna.
- January 2005–August 2005: Research Scientist, Erik Jonsson School of Engineering and Computer Science, Electrical Engineering Department, The University of Texas at Dallas.
- 2002–2004: Research Associate, Erik Jonsson School of Engineering and Computer Science, Electrical Engineering Department, The University of Texas at Dallas.
- 1999–2002: Research Assistant, Erik Jonsson School of Engineering and Computer Science, Electrical Engineering Department, The University of Texas at Dallas.

## 4 Current Research Topics and Interests

- Energy-efficient and Scalable Interconnection Networks.
- Energy-efficient Optical Networks.
- Energy-efficient Cellular Networks.
- Network Control Planes (Generalized) Multi-Protocol Label Switching (GMPLS/MPLS Networks).
- Network Optimization and Planning.

- Performance Analysis of Computer Networks.
- Network Architectures and Protocols.
- Wavelength Routing and Protection Switching.
- Cooperative Wireless Network Architecture and Protocols.
- Integrated Wireless and Optical Network Architecture and Protocols.
- Optical and Wireless Network Simulators.

## 5 Contributions to Grants and Fundings

### 5.1 Current

- High Relevance Project “NANO-RODIN - Réseaux Optiques D’INterconnexion extensible à haute efficacité énergétique,” (Nanotecnologie per Reti Ottiche di Interconnessione Scalabili ed Energeticamente Efficienti), with the Italy-Québec Bilateral Program 2010-2012, Italian Ministry of Foreign Affairs, from 1/1/2013 to 31/12/2014: *Principal Investigator*.
- “MIcro- and NanO-structured photonic devices based on strained silicon for ultrafast Switching in datacom applications (MINOS),” Italian Ministry of Education, University and Research, FIRB program, from 1/3/2013 to 28/2/2016.
- “DÉMO-RODIN: Développement et Mise en Oeuvre d un système RODIN (Réseaux Optiques D’INterconnexion extensibles à haute efficacité énergétique),” (DÉMO-RODIN: development and realization of RODIN system), Programme de soutien de la recherche (PSR), volet Soutien à des initiatives internationales de recherche et d’innovation (SI-IRI), Ministry of the economic development, innovation and export of Québec,” from 01/10/2011 to 30/9/2014: *foreign co-Principal Investigator*.
- “Dependability of the High-Speed High-Capacity Technological System,” Rete Ferroviaria Italiana (Italian Railways), 2013.
- “ARNO T3: Architectures of Networks and optical nodes for high-capacity transmission, the access-metro-core transport based integrated photonic technologies,” Tuscany Region, from 1/10/2010 to 31/3/2014.

### 5.2 Completed

- “ High Relevance Project “RODIN - Réseaux Optiques D’INterconnexion extensibles à haute efficacité énergétique,” (Scalable and Energy-efficient Optical Interconnection Networks) with the Italy-Québec Bilateral Program 2010-2012, Italian Ministry of Foreign Affairs, from 1/1/2011 to 31/12/2013: *co-Principal Investigator*.
- “Investigation on grid technology suitable to enhance the NATO Network Enabled Capabilities (NNEC): Market survey and validation of Grid Technologies,” NATO, from 1/4/2011 to 30/9/2011.
- “Building the Future Optical Network in Europe (BONE),” European Commission through the 7th ICT-Framework Programme, from 1/1/2008 to 31/12/2010:
  - *leader of the joint activity (JA)* on “Traffic Engineering and topology design in metro networks” nel work-package (WP) su “Network Technologies and Engineering”.
  - *coordinator at the Scuola Superiore Sant’Anna of the JA* “Energy Efficient Optical Network Design” and JA “Energy Saving Potential by Selective Switch-off of Network Elements“ in the WP su “Green Optical Networks” and on the JA “GMPLS-based RWA algorithms for optical protection/restoration” in the WP “MPLS, GMPLS and routing”.

- “Optical Networks: Towards Bandwidth Manageability and Cost Efficiency (e-Photon/ONe+),” European Commission through the 6th ICT-Framework Programme, from 1/3/2006 to 29/2/2008.
- “Traffic and terminal self-configuration in integrated mesh optical and broadband wireless networks (TOWN),” Italian Ministry of Education, University and Research, PRIN program, from 1/1/2006 to 31/12/2007.
- “Software and Communication Platforms for High-Performance Collaborative Grid,” Italian Ministry of Education, University and Research, FIRB program, from 1/1/2006 to 31/12/2008.
- “NeTS-NR: Collaborative Research: High-Speed Self-Configuring Networks Based on Cost-Effective Plug-and-Play Optical (PPO) Nodes,” U.S. National Science Foundation, from 1/10/2004 to 30/9/2010.
- “NeTS-NR: Protocols and Algorithms for Cooperative Wireless Networks,” U.S. National Science Foundation, from 1/10/2004 to 30/9/2009.
- “Enabling Platforms for High Performance Computational GRID oriented to Scalable Virtual Organizations,” Italian Ministry of Education, University and Research, FIRB program, from 01/01/2003 to 31/12/2005.
- “Generic Autonomous Platform for Sensor Systems,” U.S. National Science Foundation, from 01/09/2002 to 31/08/2005.
- “Advanced Radars and Electro-optical Sensors (ARES),” US Army Space and Missile Defense Command, from 01/07/2002 to 30/06/2003.
- “Differentiated Reliability in an Optical Test-bed,” Brazilian CPqD research center, from 01/08/2001 to 31/07/2004.
- “Differentiated Reliability (DiR) in Multi-Layer Optical Networks,” U.S. National Science Foundation NSF-CISE, from 01/01/2001 to 31/12/2004.
- “Network Synthesis,” private company, from 01/01/2000 to 31/12/2000.
- “Optical Pseudo Channels: Using the Optical Layer to Minimize Queuing Delays for Real-Time Traffic,” Advance Research Program of the Texas Higher Education Coordinating Board, from 01/01/2000 to 31/12/2001.

## 6 Professional Activities and Affiliations

### 6.1 Conference Organization Activities

- Technical Program Committee Member for the following conferences:
  - IEEE International Communications Conference (ICC) conference in 2014, 2013, 2012, 2010, 2008.
  - Optical Network Design and Modeling (ONDM) in 2014, 2013, 2011.
  - IEEE International Conference on Computing, Networking and Communications, Optical and Grid Networking Symposium (ICNC-OGN) in 2014.
  - IEEE International Conference on Photonics (ICP) in 2014.
  - IEEE Region 10 Technical Symposium (TENSYP) in 2014.
  - ITU-T Kaleidoscope conference in 2013, 2012, 2011, 2010.
  - IEEE International Conference on Advanced Information Networking and Applications (AINA) in 2011, 2009.
  - International Conference on Computer Communications and Networks (ICCCN) in 2010, 2009, 2008.

- IEEE Global Telecommunications (GLOBECOM) conference in 2009.
- International Symposium on Advance Networks and Telecommunication Systems (ANTS) in 2008, 2007.
- IEEE Workshop on High Performance Switching and Routing (HPSR) in 2008, 2004.
- IEEE AccessNets in 2007.
- Session chair for the following conferences:
  - Optical Networks and Systems Symposium at IEEE International Communications Conference (ICC) conference, Ottawa, Canada, June 2012.
  - IEEE High Performance Switching and Routing, Torino, Italy, June 2003.
  - Optical Network Design and Modeling, Torino, Italy, February 2002.
  - SPIE Photonics East, Boston, USA, November 2000.

## 6.2 Refereeing Experience

- Technical evaluator for a project proposal submitted for funding to the “National Sciences and Engineering Research Council” (NSERC) of Canada, program “Discovery Grant”, 2013/2014, 2012/2013.
- Technical reviewer for European projects (FP6 & FP7 ICT) in the area of “Future Networks,” in 2014, 2011, 2010, 2009.
- Technical evaluator for a project proposal submitted for funding to the Research Promotion Foundation of Cyprus (framework programme for research, technological development and innovation), 2011.
- Referee for: IEEE Transactions on Communications, IEEE Transactions on Wireless, IEEE/ACM Transactions on Networking, IEEE Journal on Selected Areas in Communications, IEEE Photonics Technology Letters, IEEE/OSA Journal of Lightwave Technology, IEEE Network Magazine, IET Communications, OSA Journal of Optical Networking, Computer Networks, SPIE/Baltzer Optical Networks Magazine, ITU-T Kaleidoscope, INFOCOM, GLOBECOM, ICC, ICCCN, ONDM, HPSR, Opticomm, Networking, OFC, AINA, AccessNets, SoftCOM and a number of other journals and conferences.

## 6.3 Other Professional Activities

- Web-master for IEEE/ACM Networking Networking Women (N<sup>2</sup> Women) community, 2011-2012.
- Involved in the ITU-T Study Group 5 on “Environment and Climate Change” to realize a “Toolkit on Environmental Sustainability for the ICT sector (ESS)” (<http://www.itu.int/ITU-T/climatechange/ess/index.html>).

## 6.4 Professional Affiliations

- Member of GTTI (National Telecommunications and Information Technology Group).
- Affiliated to CNIT (National Inter-University Consortium for Telecommunication).

## 7 Awards and Scholarships

- Erasmus Mundus visiting scholarship for visiting Osaka University in Japan within the Masters on Photonic Networks Engineering (MAPNET), September-October 2013.

- As a co-PI, “Premio Venezia” awarded to the RODIN project, by the Italian Chamber of Commerce in Canada, to recognize the excellence in partnerships between Italy and Québec, 2011.
- Recipient of the “Electrical Engineering Dissertation of The Year Award,” Erik Jonsson School of Engineering and Computer Science, University of Texas at Dallas, 2002.
- Recipient of the “Texas Telecommunications Engineering Consortium (TxTEC) Fellowship,” 2000 and 2001.
- Recipient of the “Erasmus scholarship” (not claimed), 1998.
- Recipient of Politecnico di Torino scholarship, 1994 and 1995.

## 8 List of Publications

### 8.1 Theses

1. I. Cerutti, “*Hybrid WDM networks*,” Ph.D. thesis, The University of Texas at Dallas, August 2002.
2. I. Cerutti and M. Tacca, “*Optimal self healing ring protection and routing in WDM survivable networks*,” Laurea’s thesis, Politecnico di Torino, December 1998.

### 8.2 Book Chapters

3. O. Liboiron-Ladouceur, N. Andriolli, I. Cerutti, P. Castoldi, and P. G. Raponi, “Energy-Efficient Photonic Interconnects for Computing Platforms,” book chapter of *High-Speed Photonics Interconnects (Devices, Circuits, and Systems)*, edited by L. Chrostowski and K. Iniewski, CRC Press, ISBN: 1466516038, 2013.
4. I. Cerutti, L. Valcarenghi, P. Castoldi, D. Marabissi, F. Meucci, L. Pierucci, E. Del Re, L. S. Ronga, R. Tka, and F. Kamoun, “Enhanced operation modes in IEEE 802.16 and integration with optical MANs,” book chapter of *Current Technology Developments of WiMax Systems*, edited by Maode Ma, Springer, ISBN: 978-1-4020-9299-2, 2009.

### 8.3 Articles in Refereed Journals

5. P. Pintus, P. Contu, P. G. Raponi, I. Cerutti, N. Andriolli, “Silicon-based all-optical Multi Microring (MMR) Network-on-chip,” *OpticsLetter*, accepted for publication.
6. P. G. Raponi, N. Andriolli, I. Cerutti, D. Torres, O. Liboiron-Ladouceur, P. Castoldi, “Heterogeneous Optical Space Switches for Scalable and Energy-Efficient Data Centers,” *IEEE/OSA Journal of Lightwave Technology*, 31(11):1713–1719, June 2013.
7. Y. Pointurier, B. Uscumlic, I. Cerutti, J.-C. Antona, “A Comparison of Elastic and Mixed Line Rate Optical Slot Switching WDM Metro Rings,” *IEEE Photonics Technology Letter*, 25(15):1416–1419, August 2013.
8. F. Paolucci, I. Cerutti, F. Cugini, L. Valcarenghi, P. Castoldi, “Optimal K-survivable backward-recursive path computation (BRPC) in multi-domain PCE-based networks,” *Photonic Network Communications*, 1–12, June 2013.
9. I. Cerutti, P. G. Raponi, N. Andriolli, P. Castoldi, O. Liboiron-Ladouceur, “Designing Energy-Efficient Data Center Networks Using Space-Time Optical Interconnection Architectures,” *IEEE Journal of Selected Topics in Quantum Electronics*, 9(2), 3700209–3700209, March–April 2013.
10. L. Valcarenghi, I. Cerutti, P. Castoldi, “Energy efficient multicasting in TDMA PONs,” *Journal of High Speed Networks*, 18(4), 213–222, 2012.

11. Y. Pointurier, B. Uscumlic, I. Cerutti, A. Gravey, J. C. Antona, "Dimensioning and energy efficiency of multi-rate metro rings," *IEEE/OSA Journal of Lightwave Technology*, 30(2), 3552–3564, November 2012.
12. I. Cerutti, N. Andriolli, P.G. Raponi, M. Scaffardi, O. Liboiron-Ladouceur, A. Bogoni, and P. Castoldi "Power and scalability analysis of multi-plane optical interconnection networks," *IET Optoelectronics*, 6(4), 192–200, August 2012.
13. F. Meucci, L. Pierucci, and I. Cerutti, "Cross-Layer Modeling of Dynamic Service Addition Performance in IEEE 802.16 Networks," *IEEE Transaction on Vehicular Technology*, 61(4):1823–1831, May 2012.
14. A. Manolova, I. Cerutti, R. Muñoz, S. Ruepp, A. Giorgetti, N. Andriolli, N. Sambo, P. Castoldi, R. Martínez, R. Casellas "Distributed Sharing of Functionalities and Resources in Survivable GMPLS-controlled WSONs," *IEEE/OSA Journal of Optical Communications and Networking*, 4(3): 219–228, March 2012.
15. B. Ušćumlić, I. Cerutti, A. Gravey, P. Gravey, D. Barth, M. Morvan, P. Castoldi, "Optimal Dimensioning of the WDM Unidirectional ECOFRAME Optical Packet Ring," *Photonic Network Communications*, 22(3):254–265, 2011.
16. I. Cerutti, N. Sambo, P. Castoldi, "Sleeping Link Selection for Energy-Efficient GMPLS Networks," *IEEE/OSA Journal of Lightwave Technology*, 19(15):2292–2298, Aug. 2011.
17. [INVITED] O. Liboiron-Ladouceur, P. Giorgio Raponi, N. Andriolli, I. Cerutti, M. Shafiqul Hai, and P. Castoldi, "A Scalable Space-Time Multi-Plane Optical Interconnection Network using Energy Efficient Enabling Technologies," *IEEE/OSA Journal of Optical Communications and Networking*, 3(8):A1–A11, Aug. 2011.
18. F. Farahmand, I. Cerutti, A. N. Patel, J. P. Jue, J. Rodrigues "Performance of vehicular delay-tolerant networks with relay nodes," *Wireless Communications and Mobile Computing*, 11(7):929–938, July 2011.
19. O. Liboiron-Ladouceur, I. Cerutti, P. G. Raponi, N. Andriolli, P. Castoldi, "Energy Efficient Design of a Scalable Optical Multi-Plane Interconnection Architecture," *IEEE Journal of Selected Topics in Quantum Electronics*, special issue on "Green Photonics: Energy Efficiency in Quantum Electronics," 17(2):377–383, April 2011.
20. P. G. Raponi, N. Andriolli, I. Cerutti, P. Castoldi, "A Two-Step Scheduling Framework for Space-Wavelength Modular Optical Interconnection Networks," *IET Communications*, 4(18):2155–2165, December 2010.
21. K. Prince, M. Presi, A. Chiuchiarelli, I. Cerutti, G. Contestabile, I. Monroy, E. Ciaramella, "Variable Delay with Directly-modulated R-SOA and Optical Filters for Adaptive Antenna Radio-fiber Access," *IEEE/OSA Journal of Lightwave Technology*, 7(22):5056–5064, Nov. 2009.
22. N. Sambo, N. Andriolli, A. Giorgetti, F. Cugini, L. Valcarenghi, I. Cerutti, P. Castoldi "GMPLS-Controlled Dynamic Translucent Optical Networks," *IEEE Network*, 23(3):34–40, May-June 2009.
23. A. Giorgetti, N. Sambo, I. Cerutti, N. Andriolli, and P. Castoldi, "Label preference schemes for lightpath provisioning and restoration in distributed GMPLS networks," *IEEE/OSA Journal of Lightwave Technology*, 27(6):688–697, March 2009.
24. I. Cerutti and P. Castoldi, "Label swapping versus label preserving in packet switched networks: impact on the label space size," *Elsevier Optical Switching and Networking (OSN)*, Elsevier Optical Switching and Networking, 6(1):55–63, January 2009.
25. N. Sambo, I. Cerutti, A. Giorgetti, and P. Castoldi, "Impact of routing and wavelength selection strategies on GMPLS-controlled distributed restoration," *OSA Journal of Optical Networking*, 7(5):388–399, May 2008.

26. I. Cerutti, A. Fumagalli, P. Gupta, “Delay models of single-source single-relay cooperative ARQ protocols in slotted radio networks with Poisson frame arrivals,” *IEEE/ACM Transactions on Networking*, 16(2):371–382, April 2008.
27. N. Sambo, A. Giorgetti, I. Cerutti, and P. Castoldi, “A Contention detection scheme for lighpath restoration in GMPLS networks,” *IEEE Communications Letters*, 11(10):820–823, October 2007.
28. I. Cerutti, A. Fumagalli, R. Hui, P. Monti, A. Paradisi, and M. Tacca, “Plug and play optical nodes: network functionalities and built-in fiber characterization techniques,” *OSA Journal of Optical Networking*, 6(6):642–653, June 2007.
29. I. Cerutti and A. Fumagalli, “Traffic grooming in static wavelength division multiplexing networks,” *IEEE Communications Magazine*, 43(1):101–107, Jan. 2005.
30. A. Fumagalli, I. Cerutti, and M. Tacca, “Optimal design of survivable mesh networks based on line switched WDM self-healing rings,” *IEEE/ACM Transactions on Networking*, 11(3):501–512, June 2003.
31. I. Cerutti, M. R. X. De Barros, A. Fumagalli, R. Rajagopalan, and S. M. Rossi, “Impact of polarization mode dispersion in multi-hop and multi-rate WDM rings,” *Kluwer Photonic Network Communications*, 5(3):259–271, May 2003.
32. I. Cerutti, A. Fumagalli, and M. J. Potasek, “Effects of chromatic dispersion and self-phase modulation in multi-hop multi-rate WDM rings,” *IEEE Photonics Technology Letters*, 14(3):411–413, March 2002.
33. G. Boggio, M. Burzio, N. Portinaro, J. Cai, I. Cerutti, A. Fumagalli, M. Tacca, L. Valcarengi, A. Carena, and R. Gaudino, “NetworkDesigner - Artifex - OptSim: a suite of integrated software tools for synthesis and analysis of high speed networks,” *Optical Networks Magazine*, 2(5), September 2001.
34. I. Cerutti, A. Fumagalli, M. Tacca, A. Lardies, and R. Jagannathan, “The multi-hop multi-rate wavelength division multiplexing ring,” *IEEE/OSA Journal of Lightwave Technology -special issue on “Optical Networks”*, 18(12):1649–1656, December 2000.
35. C. Blaizor, I. Cerutti, A. Fumagalli, M. Garnot, R. Jagannathan, A. Lardies, M. Tacca, and L. Valcarengi, “Design and planning of transport networks based on SDH/SONET and WDM optical networks: methods, tools and applications,” *Optical Networks Magazine*, 1(3), July 2000.
36. D. Montgomery, R. Brooks, M. Tacca, I. Cerutti, and L. Valcarengi, “CAD tools in optical network design,” *Optical Networks Magazine*, 1(2), April 2000.

#### 8.4 Articles in Refereed Conferences

37. P. Liao, C. Zhang, X. Lu, M. Mir Shafiei, I. Cerutti, N. Andriolli, O. Liboiron-Ladouceur, “Gain Effect of Scalability of SOA-based Optical Space Switches,” *Proceedings of Optical Fiber Conference (OFC)*, Los Angeles, CA, USA, Marzo 2014.
38. [INVITED] P. Castoldi, I. Cerutti, P. G. Raponi, N. Andriolli, O. Liboiron-Ladouceur, “Energy-Efficient Space-Time Optical Interconnection Architectures for Data Centers,” *Proceedings of IEEE International Conference on Transparent Optical Networks (ICTON)*, Cartagena, Spain, June 2013.
39. P. Pintus, P. Contu, N. Andriolli, I. Cerutti, P. G. Raponi, “Modeling a Multi Microring (MMR) Network-on-Chip,” *Proceedings of IEEE Optical Interconnects*, Santa Fe, NM, USA, May 2013.
40. O. Liboiron-Ladouceur, X. Lu, C. Zhang, P. Liao, P.G. Raponi, I. Cerutti, N. Andriolli, “RODIN – Energy-proportional SOA-based Optical Interconnect for Large Computing Platforms,” *Proceedings of IEEE Optical Interconnects*, Santa Fe, NM, USA, May 2013.

41. I. Cerutti, K. Abdallah, P. G. Raponi, and P. Castoldi, "Modeling and Optimizing the Delay-Energy Tradeoff in TDM Systems with Sleep Mode," *Proceedings of IEEE High Performance Switching and Routing (HPSR)*, Belgrade, Serbia, June 2012.
42. K. Abdallah, I. Cerutti, P. Castoldi, "Energy-Efficient Coordinated Sleep of LTE Cells," *Proceedings of IEEE International Conference on Communications (ICC)*, Ottawa, Canada, June 2012.
43. P. G. Raponi, N. Andriolli, I. Cerutti, P. Castoldi and O. Liboiron-Ladouceur, "Heterogeneous Space Switches for Power-Efficient Optical Interconnection Networks," *Proceedings of IEEE International Conference on Communications (ICC)*, Ottawa, Canada, June 2012.
44. Y. Pointurier, B. Uscumlic, I. Cerutti, A. Gravey, and J.-C. Antona, "Dimensioning and energy efficiency of optical metro rings," *IEEE/IFIP Conference on Optical Network Design and Modelling (ONDM)*, Colchester, United Kingdom, June 2012.
45. P. G. Raponi, N. Andriolli, I. Cerutti, P. Castoldi, O. Liboiron-Ladouceur, "Physical Layer Scalability of Energy-Efficient Heterogeneous Optical Space Switches," *Proceedings of IEEE Optical Interconnects*, Santa Fe, NM, USA, May 2012.
46. [INVITED] P. Castoldi, N. Andriolli, I. Cerutti, O. Liboiron-Ladouceur, P. G. Raponi, "Energy Efficiency and Scalability of Multi-plane Optical Interconnection Networks for Computing Platforms and Data Centers," *Proceedings of Optical Fiber Conference (OFC)*, Los Angeles, CA, USA, March 2012.
47. B. Ušćumlić, A. Gravey, P. Gravey, M. Morvan, I. Cerutti, "Network Planning and Traffic Engineering in ECOFRAME Optical Packet Ring," *IEEE Telecommunications Forum (TELFOR)*, Belgrade, Serbia, Nov. 2011.
48. B. Ušćumlić, A. Gravey, I. Cerutti, P. Gravey, M. Morvan, P. Castoldi, "Packet-aware design of slotted WDM optical packet rings," *IEEE International Conference on Telecommunications in Modern Satellite, Cable and Broadcasting Services (TELSIKS)*, Niš, Serbia, October 2011.
49. A.V. Manolova, I. Cerutti, N. Andriolli, N. Sambo, A. Giorgetti, P. Castoldi, S. Ruepp, "Signaling-based Joint Selection of Wavelengths and Regenerator Points in GMPLS-controlled WSONs," *IEEE Global Telecommunications (GLOBECOM) conference*, Houston, USA, Novembre 2011.
50. [INVITED] P. Castoldi, P. G. Raponi, N. Andriolli, I. Cerutti, O. Liboiron-Ladouceur, "Energy-Efficient Switching in Optical Interconnection Networks," *Proceedings of IEEE International Conference on Transparent Optical Networks (ICTON)*, June 2011.
51. [INVITED] P. Monti, A. Muhammad, I. Cerutti, C. Cavdar, L. Wosinska, P. Castoldi, A. Tzanakaki, "Energy-efficient Lightpath Provisioning in a Static WDM Networks with Dedicated Path Protection," *Proceedings of IEEE International Conference on Transparent Optical Networks (ICTON)*, June 2011.
52. F. Farahmand, I. Cerutti, M. Hasan, J. P. Jue, "Energy-efficiency of Drop-and-Continue Traffic Grooming," *Proceedings of Optical Fiber Conference (OFC)*, Los Angeles, USA, Febbraio 2011.
53. F. Farahmand, M. Masud Hasan, I. Cerutti, J. Jue, J.J.P.C. Rodrigues, "Differentiated Energy Savings in Optical Networks with Grooming Capabilities," *IEEE Global Telecommunications (GLOBECOM) conference*, Miami, USA, November 2010.
54. A. Manolova, S. Ruepp, R. Muñoz, R. Martínez, R. Casellas, I. Cerutti, N. Sambo, A. Giorgetti, N. Andriolli, P. Castoldi, "Wavelengths and Regenerators Sharing in GMPLS-controlled WSONs," *IEEE Global Telecommunications (GLOBECOM) conference*, Miami, USA, November 2010.



55. A. Muhammad, P. Monti, I. Cerutti, L. Wosinska, P. Castoldi, A. Tzanakaki, "Energy-Efficient WDM Network Planning with Dedicated Protection Resources in Sleep Mode" *IEEE Global Telecommunications (GLOBECOM) conference*, Miami, USA, November 2010.
56. I. Cerutti, N. Sambo, P. Castoldi, "Distributed Support of Link Sleep Mode for Energy Efficient GMPLS Networks," *Proceedings of European Conference and Exhibition on Optical Communication (ECOC) conference*, Torino, Italy, Sept. 2010.
57. O. Liboiron-Ladouceur, I. Cerutti, P. G. Raponi, N. Andriolli, P. Castoldi, "Multi-Plane Optical Interconnection for Energy-Proportional Network Architectures," *Proceedings of LEOS Summer Topicals conference*, Playa del Carmen, Mexico, July 2010.
58. [INVITED] L. Valcarenghi, I. Cerutti, P. Castoldi, "Energy efficient Optical Access and Metro Networks," *Proceedings of IEEE International Conference on Transparent Optical Networks (ICTON)*, Monaco, Germany, June 2010.
59. A. Manolova, S. Ruepp, R. Muñoz, R. Martínez, R. Casellas, I. Cerutti, N. Sambo, A. Giorgetti, N. Andriolli, P. Castoldi "Shared Path Protection in GMPLS Networks with Limited Wavelength Conversion Capability," *IEEE International Conference on High Performance Switching (HPSR)*, Dallas, USA, 2010.
60. F. Meucci, L. Pierucci, I. Cerutti, P. Castoldi, and E. Del Re, "Performance of Dynamic Service Addition in Mobile WiMAX Networks," *IEEE International Symposium on Wireless Pervasive Computing (ISPWC)*, Modena, Italia, May 2010.
61. A. Giorgetti, N. Sambo, I. Cerutti, N. Andriolli, P. Castoldi, "Suggested Vector Scheme with Crankback Mechanism in GMPLS-controlled Optical Networks," *IEEE/IFIP Conference on Optical Network Design and Modelling (ONDM)*, Kyoto, Japan, 2010.
62. I. Cerutti, L. Valcarenghi, P. Castoldi, "Quality of Activation (QoA) for Dynamic Service Flows in IEEE 802.16 Networks," *IEEE Global Telecommunications (GLOBECOM) conference*, Hawaii, USA, November 2009.
63. N. Sambo, I. Cerutti, A. Giorgetti, N. Andriolli, P. Castoldi, R. Muñoz, S. Ruepp, R. Casellas, R. Martínez, A. V. Manolova "Restoration in GMPLS-based Wavelength Switched Optical Networks with Limited Wavelength Converters," *Proceedings of Photonics in Switching (PS)*, Pisa, September 2009.
64. B. Ušćumlić, A. Gravey, I. Cerutti, P. Gravey, M. Morvan "The Impact of Network Design on Packet Scheduling in Slotted WDM Packet Rings," *Proceedings of Photonics in Switching (PS)*, Pisa, September 2009.
65. [INVITED] I. Cerutti, L. Valcarenghi, P. Castoldi, "Designing Power Saving WDM Ring Networks," *Proceedings of ICST GridNets*, Athens, Greece, September 2009.
66. B. Ušćumlić, A. Gravey, P. Gravey, I. Cerutti, "Traffic Grooming in WDM Optical Packet Rings," *Proceedings of 21st International Teletraffic Congress (ITC 21)*, Paris, France, September 2009.
67. [INVITED] L. Valcarenghi, P. Monti, I. Cerutti, P. Castoldi, L. Wosinska "Issues and solutions in mobile WiMAX and wired backhaul network integration," *Proceedings of IEEE International Conference on Transparent Optical Networks (ICTON)*, Azorre, Portugal, July 2009.
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clustering approach for large network design,” *Proceedings of Optical Fiber Communication Conference (OFC)*, volume 2, pages 378–380, Baltimore, USA, March 2000.

98. A. Lardies, R. Jagannathan, A. Fumagalli, I. Cerutti, and M. Tacca, “A flexible WDM ring network design and dimensioning methodology,” *Proceedings of Optical Network Design and Modeling (ONDM) conference*, Athens, Greece, February 2000.
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100. A. Fumagalli, M. Tacca, and I. Cerutti, “Minimizing the number of optical crossconnect ports in mesh networks based on bidirectional line-switched WDM self-healing ring protection,” *Proceedings of IEEE International Conference on Computer Communication and Networks (ICCCN)*, pages 398–403, Boston, USA, October 1999.
101. A. Fumagalli, I. Cerutti, M. Tacca, F. Masetti, R. Jagannathan, and S. Alagar, “Survivable networks based on optimal routing and WDM Self-Healing Rings,” *Proceedings of IEEE Conference on Computer Communications (INFOCOM)*, volume 2, pages 726–733, New York, USA, March 1999.

## 8.5 Patents

99. M. Scaffardi, N. Andriolli, A. Bogoni, I. Cerutti, P. Castoldi, “Multi-layer interconnection network based on optical angular momentum multiplexing and wavelength division multiplexing switching,” under filing.
100. P. G. Raponi, N. Andriolli, I. Cerutti, P. Castoldi, O. Liboiron-Ladouceur, M. S. Hai, “Method and Apparatus For Energy Efficient Implementation of Scalable Optical Interconnection Architectures,” US Patent Application number 61657067, Filing Date: 08/06/2012.
101. P. Castoldi, F. Cugini, N. Sambo, I. Cerutti, A. Giorgetti, L. Valcarenghi “A restoration scheme for an optical network and method of using such scheme,” International Filing Date: 19/09/2008, International Application No. PCT/EP2008/062533, Publication Date: 25/03/2010, Pub. No.: WO/2010/031443.

## 9 Invited Presentations and Seminars

- Invited presentation on “Multi-plane optical interconnection networks for computing platforms,” University of Osaka, Japan, October 2013.
- Invited presentation on “Energy efficient and energy proportional wavelength-switched optical networks (WSON),” IEEE Photonics Society Montreal Chapter, McGill University, Montreal, Canada, June 2012.
- Invited presentation on “Energy-Proportional Optical Networking,” University of Texas at Dallas, Richardson, TX, USA, June 2010.
- Invited presentation on “Optimal Design of Energy Saving WDM Networks,” KTH university, Stockholm, Sweden, October 2009.
- Invited presentation on “Designing Power-Saving WDM Ring Networks,” ICST GridNets conf., Athens, Greece, September 2009.
- Seminar “An overview of IEEE 802.16 Standard,” Pisa, May 2008.
- Seminar on SONET/SDH Protocol and Next Generation Optical Networks, Pisa, March 2006.

- Seminar on Wavelength Routing and Switching in WDM Networks, *E-Photon1 Summer School*, Cesenatico, August 2005.

## 10 Teaching Experience

- Academic year 2012/13: “Network Optimization - advanced topics,” 30 hours of lessons (3CFU), Scuola Superiore Sant’Anna, integrative course for PhD students of Scuola Superiore Sant’Anna and course module for students of the “Laurea Magistrale” in Embedded Computing Systems (joint program between Scuola Superiore Sant’Anna and University of Pisa).
- Academic year 2012/13: “Wireless Communication Networks,” 20 hours of lessons (2CFU), Scuola Superiore Sant’Anna, integrative course for PhD students of Scuola Superiore Sant’Anna and for students of the “International Master on Communication Networks Engineering (IMCNE)”.
- Academic year 2011/12: “Network Optimization - advanced topics,” 30 hours of lessons (3CFU), Scuola Superiore Sant’Anna, integrative course for PhD students of Scuola Superiore Sant’Anna and course module for students of the “Laurea Magistrale” in Computer Science and Networking (joint program between Scuola Superiore Sant’Anna and University of Pisa).
- Academic year 2011/12: “Wireless Communication Networks,” 20 hours of lessons (2CFU), Scuola Superiore Sant’Anna, integrative course for PhD students of Scuola Superiore Sant’Anna and for students of the “International Master on Communication Networks Engineering (IMCNE)”.
- Academic year 2010/11: “Network Optimization,” 30 hours of lessons (2CFU), Scuola Superiore Sant’Anna, integrative course for MS and PhD students of Scuola Superiore Sant’Anna and course module for students of the “International Master on Communication Networks Engineering (IMCNE)”.
- Academic year 2010/11: “Wireless Communication Networks,” 20 hours of lessons (2CFU), Scuola Superiore Sant’Anna, integrative course for MS and PhD students of Scuola Superiore Sant’Anna and course module for students of the “Laurea Magistrale” in Computer Science and Networking (joint program between Scuola Superiore Sant’Anna and University of Pisa) and for students of the “International Master on Communication Networks Engineering (IMCNE)”.
- Academic year 2009/10: “Network Optimization,” 12 hours of lessons (1CFU), Scuola Superiore Sant’Anna, integrative course for MS and PhD students of Scuola Superiore Sant’Anna and course module for students of the “Laurea Magistrale” in Computer Science and Networking (joint program between Scuola Superiore Sant’Anna and University of Pisa).
- Academic year 2009/10: “Wireless Communication Networks,” 20 hours of lessons (2CFU), Scuola Superiore Sant’Anna, integrative course for MS and PhD students of Scuola Superiore Sant’Anna and course module for students of the “International Master on Communication Networks Engineering (IMCNE)”.
- Academic year 2008/9: “Network Optimization,” 20 hours of lessons (2CFU), Scuola Superiore Sant’Anna, integrative course for MS and PhD students of Scuola Superiore Sant’Anna and course module for students of the “International Master on Communication Networks Engineering (IMCNE)”.
- Academic year 2008/9: “Wireless Communication Networks,” 28 hours of lessons (3CFU), Scuola Superiore Sant’Anna, integrative course for MS and PhD students of Scuola Su-

periore Sant'Anna and course module for students of the "International Master on Communication Networks Engineering (IMCNE)".

- Academic year 2007/8: "Network Optimization," 20 hours of lessons (2CFU), Scuola Superiore Sant'Anna, integrative course for MS and PhD students of Scuola Superiore Sant'Anna and course module for students of the "International Master on Communication Networks Engineering (IMCNE)".
- Academic Year 2007/8: course on "Optical Internet" for students of the "International Master on Communication Networks Engineering": 7 hours of lessons, Scuola Superiore Sant'Anna.
- Summer 2004: course "EE6340: Introduction to Telecommunications Networks" (online course): online course update, online interaction with students.
- Spring 2004: course "EE3302: Signals and Systems": problem solving sessions.
- Spring 2004: course "EE6340: Introduction to Telecommunications Networks (online course)": online course update, online interaction with students.
- Fall 2003: course "EE4360: Digital Communications": problem solving sessions.
- Spring 2003: course "EE6340: Introduction to Telecommunications Networks (online course)": online course update, online interaction with students.
- Fall 2002: course "EE6340: Introduction to Telecommunications Networks (online course)": online course update, online interaction with students.
- Fall 1999: course "EE 3101 Electrical Network Analysis Laboratory": lab. experiments.
- Fall 1999: course "EE 3302 Signals and Systems": homework grading.

## 11 Advising Experience

- Advisor of the following MS and PhD students of Scuola Superiore Sant'Anna: Francesca Martinelli (MS 2013), Piergiorgio Raponi (PhD 2012), Sjiva Pradhan (MS 2012), Dolcey Torres (MS 2012), Ion Popescu (MS 2012), Kassim Abdallah (PhD candidate).
- External examiner in dissertation defense committee for a MS student at the University of Pisa and a PhD student at the Politecnico di Milano, 2012.

### 11.1 Academic Activities

- Member of the committees for the selection of students to be admitted to "Laurea Magistrale" in Computer Science and Networking (joint program between Scuola Superiore Sant'Anna and University of Pisa) in the academic years: 2012/2013, 2011/2012, 2010/2011, 2009/2010.
- Member of two PhD dissertation defense committees at the Scuola Superiore Sant'Anna: 2009, 2012.
- Member of the dissertation defense committees for MS programs "Erasmus Mundus Master on Photonic Networks Engineering (MAPNET)" and "International Master on Communication Networks Engineering", at the Scuola Superiore Sant'Anna, in the academic years: 2011/2012, 2010/2011.
- Member of the committees for the selection of a postdoc ("assegni di ricerca") at the Scuola Superiore Sant'Anna in: 2009, 2010, 2011, 2012.

## 12 Languages

- Italian: native language.
- English: fluent.
- French: good.
- German: basic (A1+ level).
- Spanish: basic.

## 13 Software Skills

- Operating systems: Unix/linux, Windows.
- Event-driven simulators: custom-made event driven simulator, basic knowledge of NS-2 and Opnet.
- Programming languages: C/C++ (expert level), matlab.
- Software tools: Microsoft Office Tools, matlab, CPLEX, latex, and many others.

Characterization, formation and evolution of counter-rotating components in galaxies: from large-scale counter-rotating stellar disks to kinematically decoupled cores. L. Coccato "Curriculum Vitae. 2. Main duties and responsibilities at ESO. Teaching, tutoring, and supervision activity. Invited tutor at workshops and schools. L. Coccato "Curriculum Vitae. 3. May 29-31, 2019. Book Chapter and collections. Other. Curriculum Vitae et Studiorum. Giuseppe Filippone November 9, 2016. Contents. 1 Personal information and research activity 1.1 Personal information . . . 1.2 Current position . . . 1.3 Previous positions . . . 1.4 Research interests . . . 4 curriculum vitae et studiorum. 2) Combinatorial and geometric methods for studying arithmetic invariants, PN-II-ID-PCE-2012-4-0640; 2013, 2014, 2015, 2016. Director Prof. 6 curriculum vitae et studiorum. 37) R. Caddeo, C. Oniciuc, P. Piu. Explicit formulas for non-geodesic biharmonic curves of the Heisenberg group.