

# **CURRICULUM VITAE**

## ***of Ernesto CIARAMELLA***

### **Expertise**

Ernesto Ciaramella has more than twenty-five years research experience in optical communications, focused on various issues (components, propagation impairments, systems and networks). He has been working with various companies and research centers in optical communication, including the Telecom Italia Lab, where he was part of the working group on optical transmission systems, including field trials.

Since Nov. 2002 he is Professor at Scuola Superiore Sant'Anna University (SSSA) where he originated and is leading a research group on optical systems and innovative devices. At SSA he served also in the internal evaluation board of SSSA and, since 2020, is a member of the Academic Senate.

He supervised several PhD students (M. Presi, A. D'Errico, R. Proietti, G. Meloni, E. Matarazzo, A. Chiuchiarelli, L. Banchi, P. Choudhury, G. Cossu, AM Khalid , F. Bottoni, A. Wahajat, A. Sturniolo, M. Rannello), most of whom now have leading positions in industry or Academia.

### **Research**

His main research interests include design and experiments on high capacity transmission systems, nonlinear propagation effects, advanced optical functionality, optical packet switching, high speed optical access systems and optical wireless systems. Among his most relevant research achievements, he proposed a new optical fiber regenerator, and a new scheme for coherent detection; with his team, he realized various world-record experiments in optical wireless communications.

### **Research Projects**

He was acting as scientific coordinator of the European STREP Project **COCONUT** ("*COst-effective COhereNt Ultra.dense WDM PON for lambda to the user access*", [www.ict-coconut.eu/](http://www.ict-coconut.eu/), Nov.2012- Febb. 2016), on optical coherent systems for ultra-dense WDM optical access networks. In the past, he had taken part into several European Projects (OPEN, PHOTOS, ATLAS, NOBEL 1 and NOBEL II). He was the scientific contact person of SSSA Unit in FP7 ITN INFIERI ("*INtelligent, Fast, Interconnected and Efficient devices for Frontier Exploitation in Research and Industry*") and in FP7 FIRE Project **SUNRISE** ("*Sensing, monitoring and actuating on the UNderwater world through a federated Research InfraStructure Extending the Future Internet*").

Since 2019 he is the Principal Investigator of **TOWS** ("*Transmission of Optical Wireless signals on telecom Satellites*"), a Research Project funded by ESA on the development of optical wireless systems for spacecraft

applications. Since Sept. 2019 he is also coordinator of Project **FOCS** (“*Free-space Optical Communications for Space applications*”), funded by ASI, on exploratory research of Visible Light Communications for space applications.

He had been the national coordinator of the Italian MIUR-PRIN project **TOSCA** (Transmission of Optical Signals using Competitive Amplification) and the scientific coordinator of Sant’Anna Research Unit in the Italian PRIN Project **ROAD-NGN** (Optical Access Network based on frequency and / or wavelength division multiplexing solutions for Next Generation Network).

In the framework of multi-year collaboration of Scuola Sant’Anna with the industry Ericsson, he was responsible for several internal industrial projects. He was also responsible for various industrial contracts on optical wireless technology and case studies, with several Italian companies.

### **Editorial and Reviewer Roles**

In 2012-2018, he has been serving as Associate Editor of IEEE Photonics Technology Letters, on systems for optical access networks and on optical wireless systems. Since 2018 he is serving as Associate Editor of OSA Journal Optical Communications and Networking. He is also a reviewer for IEEE and OSA leading-edge journals.

He has been as a member of the Technical Program Committee (TPC) of the IEEE/OSA Optical Communication Conference (OFC), of the European Optical Communication Conference (ECOC), of the Asian Pacific Optical Communication conference (APOC) and of Photonics in Switching. He served as Chair of Sub-Committee G (Optical Processing and Analog Subsystems) for OFC 2010, held in San Diego, USA, March 2010. In 2012, he was lead co-chair of the TPC of the IEEE conference Photonics in Switching (PS2012) and lead co-chair of OSA sub-conference SC3 (Optical Transmission Systems, Subsystems, and Technologies) of the Asia Communications and Photonics Conference (ACP 2012). In 2012 he was the lead organizer of the first IEEE International Workshop on Optical Wireless (IWOW 2012).

### **Research Impact**

He published more than 250 international papers and is co-author of 24 international patents.

His current bibliographical parameters, as estimated from Google Scholar database, are: H-index: 36, G-index: 62, citations: 5077.

He was included among the top-100’000 high-impact worldwide authors of all research areas. He is listed among the top-italian scientists in Engineering.

## EXPERIENCE

Since Nov. 2002: he is Professor in Telecommunication at Scuola Superiore Sant'Anna ([www.sssup.it](http://www.sssup.it)). He joined Scuola Superiore Sant'Anna on Nov. 2002, as Associate Professor in Telecommunication. Since May 2014, he is now Full Professor in Telecommunication and leads the research area "Optical Systems", which he started in 2002, at Istituto TeCIP (around 70 people), one of the six Institutes of Scuola Superiore Sant'Anna.

His current research interests include optical systems for access and transport networks, optical wireless systems, transmission impairments in optical fibres, optical system modelling.

He has been the scientific representative of Scuola Superiore Sant'Anna Research Unit in the European Integrated Project (IP) NOBEL ("*Next generation Optical networks for Broadband European Leadership*", <https://www.ist-nobel.org>). He was the general coordinator of the Italian MIUR project TOSCA ("*Transmission of Optical Systems using Competitive Amplification*") and was also the scientific coordinator of Sant'Anna Research Unit in the Italian PRIN Project ROAD-NGN ("*Optical Access Network based on frequency and / or wavelength division multiplexing solutions for Next Generation Network*").

In 2005-2008 he was serving as a member of the Internal Evaluation Committee of Scuola Superiore Sant'Anna. He was serving as a member of the Technical Program Committee of the Optical Fiber Communication Conference (OFC, in 2007-2009 as member, and in 2010, as subcommittee chair), of the European Optical Communication Conference (EOCC, in 2007, 2008, 2011 and 2012) and of the Asia Communications and Photonics Conference (ACP, originally APOC, since 2008).

Since 2012, he is serving as Associate Editor of IEEE Photonics Technology Letters, on systems for optical access networks and on optical wireless systems.

He has been the coordinator of EU-funded project COCONUT ("*COst-effective COhereNt Ultra.dense WDM PON for lambda to the user access*", STREP category, overall budget around 4 Million Euros, 2012-2016), on hyperdense WDM-PON systems for photonic access networks. Currently he is also coordinating the scientific activities of Sant'Anna group in the FP7 International Training Network INFIERI (INtelligent, Fast, Interconnected and Efficient devices for Frontier Exploitation in Research and Industry, <http://infieri-network.eu/>) and in FP7 FIRE Project SUNRISE ("*Sensing, monitoring and actuating on the UNderwater world through a federated Research InfraStructure Extending the Future Internet*").

In the framework of the multi-year collaboration between Sant'Anna University and Ericsson, he has been responsible for several internal projects based on industrial contracts about photonic communications.

He was recently responsible for various industrial contracts on optical wireless communication systems.

Since January 2019 he is the Principal Investigator of TOWS (*Transmission of Optical Wireless signals for telecom Spacecrafts*) Project, funded by ESA, on developments of optical wireless systems for spacecraft applications.

Since September 2019, he is the Principal Investigator of FOCS (Project, funded by ASI, on exploratory research of Visible Light Communications for space applications).

2001-2002: research manager at CNIT ([www.cnit.it](http://www.cnit.it)) Photonic Networks National Lab in Pisa. He worked on high capacity optical transmission systems, including theory, numerical modelling and experiments. He has been also coordinating advanced research activities aimed to demonstrate innovative applications of nonlinear fibre optics in OTDM (Optical Time Division Multiplexing) systems.

2000-2001: Coordinator of the theoretical team at QPlus Networks Italia, in Rome. He has been involved in optical system modelling for long haul optical communications, including system design and propagation issues. Among his results, he has proposed an innovative scheme to achieve 40 Gbit/s transmission with very high spectral efficiency.

1998-2000: Researcher at Fondazione Ugo Bordoni (FUB, [www.fub.it](http://www.fub.it)), in Rome. His main activity was on modelling and experiments of high-capacity systems: this research was also performed in the frame of the ATLAS IST project (WDM soliton transmission at 40 Gbit/s). He was also involved with theoretical issues of optical networking. His interests were in nonlinear impairments, design of optical cross-connects, dimensioning of WDM optical networks, optical packet switching and "IP over WDM" issues. He proposed and demonstrated an innovative all-optical reshaping scheme, based on nonlinear fiber optics, and a new architecture for Optical Cross Connects, exploiting wavelength bundling. At that time, he started giving occasional lectures on optical systems at SSGRR (the IT school branch of Telecom Italia, [www.ssgrr.it](http://www.ssgrr.it)).

1997-1998: Researcher at CSELT (presently, Telecom Italia Labs) in Turin, Optical System Department. He was responsible for numerical and analytical modelling of high-capacity systems. He continued the ongoing activity with Telecom Italia, including field trials of new WDM/TDM systems. He also took part into two European research projects (OPEN, Optical Pan European Network, and PHOTOS, Photosensitive Technologies for Optical Systems).

1994-1997: Researcher at CSELT (presently, Telecom Italia Labs, [www.telecomitalialab.com](http://www.telecomitalialab.com)) in Turin, Fiber Plants Department. His research work, both experimental and theoretical, was on signal impairments due to propagation in optical fibres. At the same time, he was a consultant in the CSELT-Telecom Italia working group for the deployment of the new optical transmission systems, namely WDM and 10 Gbit/s.

1992-1994: Junior Researcher at Fondazione Ugo Bordon, in Rome (www.fub.it), Optical Communication Division. He experimentally worked on transverse effects, namely the pattern formation in the transverse intensity profile of a laser beam due to nonlinear propagation effects. In this period he was also lecturer at "La Sapienza" University, in Rome.

1992: Junior Project Manager at Telesoft, in Rome. There he attended the telecommunication advanced course.

1992 (Jan-June): Scholarship at Alcatel Telettra, on coherent optical system. He was involved in characterisation of optoelectronic components and the realisation of a PSK (phase shift keying) transmitter-receiver pair for optical fibre communications.

## **EDUCATION**

1991: Laurea degree in Physics, 110/110 *cum laude*. His experimental thesis was about "Color centres in KCl:Tl and their laser emission at 1.55  $\mu\text{m}$ ", carried out at the ENEA Research Center in Frascati. He first obtained KCl:Tl laser-active crystals, for the 1<sup>st</sup> time in Europe, and then successfully used those crystals to make a laser.

1985: High school degree in the Italian "Liceo Classico", marked 60/60.

## PROJECT ROLES

National and International Research Projects, successfully funded

Call	Project Name	Duration (months)	Role
PRIN 2004	TOSCA: trasmissione di segnali ottici con l'impiego di tecniche di amplificazione non convenzionali,	24	Project Coordinator
FP6-2002-IST-1	NOBEL: Next generation Optical network for Broadband in Europe	26	Coordinator of S.Anna Research Unit
FP6-2004-IST-4	NOBEL-2: Next generation Optical network for Broadband European Leadership phase 2	24	Coordinator of S.Anna Research Unit
FP7-ICT-2011-8	COst-effective COhereNt Ultra-dense-WDM-PON for lambda-To-the-user access networks (COCONUT)	36	Project Coordinator
PRIN 2010-2011	Rete Ottica di Accesso a Divisione di frequenza e/o lunghezza d'onda per soluzioni Next Generation Network (ROAD-NGN)	36	Coordinator of S.Anna Research Unit
FP7	SUNRISE: Building the Internet of Underwater Things	18	Coordinator of S.Anna Research Unit
ESA-ITT	TOWS: Transmission of Optical Wireless for telecom Spacecrafts	30	Project Coordinator
ASI	FOCS: Free space Optical Communications for Satellites	24	Project Coordinator

## EVALUATOR ROLES

National and International roles involving research and organization evaluation, carried out in the past or currently ongoing.

### INTERNAL ROLES

- Member of internal "Nucleo di Valutazione" (Evaluation Committee) of Scuola Superiore Sant'Anna (2005-2008)
- Member of Research Board (Commissione ricerche) Scuola Superiore Sant'Anna (2009-2010)

### EXTERNAL ROLES

- Associate Editor of IEEE Photonics Technology Letters
- Associate Editor of OSA Journal of Optical Communication and Networking
- Member of Technical Program Committee of most relevant conferences in optical communications (OFC, ECOC; ACP, Globecom)
- Organizer and co-chair of 1<sup>st</sup> IEEE International Workshop on Optical Wireless (IWOW 2012, Pisa)
- Evaluator of Research Project proposals with National Agencies (Belgium, Canada, Romania)
- Evaluator of ERC starting Grant
- Evaluator of PRIN Proposals
- Evaluator of PhD students (Techn. Univ Eindhoven, Univ. Rennes, Politecnico di Torino)