Personal information

Surname(s) / First name(s)	**Lo Cigno, Renato**
Address(es)	Via Fontanelle 15, 38049, Altopiano della Vigolana (TN), Italy
Email(s)	renato.locigno@unibs.it
Nationality(-ies)	Italian

Work history

Sept. 2019 - ongoing	Full Professor
Employer	Department of Information Engineering (DII), University of Brescia
Nov. 2002 - Aug. 2019	Associate Professor
Employer	Department of Information Engineering and Computer Science (DISI), University of Trento
Feb. 2001 - Oct. 2002	Assistant Professor
Employer	Politecnico di Torino
June 1998 - Feb. 1999	Research Scholar
	CS Dept. University of California Los Angeles (UCLA)
Jan. 1991 - Jan. 2001	Research Engineer
Employer	Politecnico di Torino
Sept. 1988 - Dec. 2000	Consultant
Employer	Olivetti; Studio Torta (Patent Office); Politecnico di Torino

Periods in International Research Centers

2001: Jul-Aug (8 weeks), Computer Science Dept. University of California, Los Angeles (UCLA), USA, invited by Prof. Mario Gerla

2006: Jul-Aug (8 weeks), Computer Science Dept. University of California, Los Angeles (UCLA), USA, invited by Prof. Mario Gerla

2013: Jul-Aug (8 weeks), NEC EU Research Laboratories, Heidelberg, Germany, invited by Dr. Saverio Niccolini

Academic Services and Roles

January 2020 – ongoing:	Representative in the Members' Assemby ("Assemblea dei Soci") of CNIT (Consorzio Nazionale Interuniversitario delle Telecomunicazioni), for the University of Brescia)
May 2020 – ongoing:	DRII PhD (DII – UniBS) School Member (Collegio dei Docenti)
2002 – April 2020:	ICT PhD (DISI – UniTN) School Member (Collegio dei Docenti)

2016 – 2019: Member, for the University of Trento, of the council (“assemblea consortile") of CINECA, the software house of the Ministry of Education and Research and most Italian public Universities.

2009 – 2019: “Delegato del Rettore per i servizi e le tecnologie informatiche” Rector ICT Delegate: Responsibility of the University policies in ICT infrastructure and services, including the interface with GARR and control on de-materialization administrative procedures. The delegation was given by Rector Bassi and has been confirmed by Rector de Pretis and Rector Collini.

2009 – 2019: Dept. ICT Coordinator: Supervision and coordination of the ICT technical staff of the department.

2009 – 2018: ICT PhD (DISI – UniTN) School Executive Committee Member: Elected Member of the Executive Committee of the ICT PhD School to support the coordinator activities.

2003-2009 Dept. Representative in the committee for the guidance of the policies in ICT services for the Faculty of Science.

2005-2012 Dept. Library Delegate: Coordination and approval of Department library policies and acquisitions.

2004-2010 Dept. Seminars Management: Organization and financial management of scientific seminars with general interest for the entire Department given by invited speakers.

Education & Languages

July 1988 “Laurea in Ingegneria Elettronica con indirizzo Telecomunicazioni", Politecnico di Torino, Italy

Mother tongue(s) **Italian**

Other language(s) English, German

Self-assessment *European level*(*)	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user
German	A1 Basic user	A1 Basic user	A1 Basic user	A1 Basic user	A1 Basic user

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

I have passed the Cambridge Certificate of Proficiency in English (CPE), the highest certification of the Cambridge exams for non mother tongue; I have passed the ‘Zertifikat Deutsch als Fremdsprache’ of the Goethe Institut

PhD Students Supervision

Thang Le Nat 2001–2006; Thesis title: “QBD Processes in Modeling Telecommunications Networks"

Damiano Carra 2003–2007; Thesis title: “Performance Evaluation of Overlay Content Distribution Systems"; Damiano Carra is currently associate professor at the University of Verona

Viet-Thang Nguyen 2004–2007; Thesis title: “Fractional Lambda Switching: Node Design and Time-blocking Analysis"

Zoltán Zsóka 2001–2006; Thesis title: “Performance modelling and analysis of IP over WDM networks." This PhD has been supervised together with Prof. Lászloó Jereb at the Department of Telecommunications of the Budapest University of Technology and Economics (BUTE), today the the University is called BME

Csaba Kiraly 2005–2012; Thesis title: “Some Performance and Design Aspects of Overlay Networks." This PhD has been supervised together with Prof. Tien Van Do at the Department of Telecommunications of the Budapest University of Technology and Economics (BUTE), today the University is called BME

Alessandro Russo 2008–2013; Thesis title: “Cooperative Push/Pull Protocols for Live Peer-assisted Streaming"

Raihana Ferdous 2009–2014; Thesis title: “Analysis and Protection of SIP based Services"

Alexandre Kandalintsev	2010–2016; Thesis title “Application Interference in Multi-Core Architectures: Analysis and Effects"
Michele Segata	2012–2016; Thesis title; “Safe and Efficient Communication Protocols for Platooning Control." This PhD was jointly supervised with Prof. Falko Dressler and lead to a double degree with the University of Innsbruck. Michele Segata received the award for the best PhD Thesis of the ICT school in the years 2015–2016
Luca Baldesi	2013–2017; Thesis title; “Distributed live streaming on mesh networks"
Lorenzo Ghiro	2017–ongoing; Topic “Centrality Metrics in Routing and BlockChain applications to distributed networks"

PhD Evaluation Committees (outside Trento and Brescia)

Foroogh Mohammadnia; Politecnico di Torino, Italy	2020; Thesis title: “Adaptive Network Densification with Small Cell Mobile Base Stations Carried by Vehicles." Supervisor: Prof. Marco Ajmone Marsan
Waqar Hassan; Politecnico di Torino, Italy	2019; Thesis title: “Smartphone based applications for Road Traffic Telematics." Supervisor: Prof. Guido Albertengo
Chetan Belagal Math; Eindhoven University of Technology, The Nederlands	2019; Thesis title: “Decentralized congestion control for reliable vehicular communication." Supervisor: Prof.dr.ir. Sonia M. Heemstra - de Groot
Ali Safari Khatouni; Politecnico di Torino, Italy	2018; Thesis title: “Experimentation and Characterization of Mobile Broadband Networks." Supervisor: Prof. Marco Mellia
Bastian Bloessl; Heinz Nixdorf Institute, Universität Paderborn, Germany	2018; Thesis title: “A Physical Layer Experimentation Framework for Automotive WLAN." Supervisor: Prof. Falko Dressler
Iñaki Úcar Marqués; Universidad Carlos III de Madrid, Spain	2018; Thesis title: “Energy Efficiency in Wireless Communications for Mobile User Devices." Supervisor: Prof. Arturo Azcorra
Ilias Chatzidrossos; KTH, Stockholm, Sweden	2012; Thesis title: “Live Streaming Performance of Peer-to-Peer Systems." Supervisors: Prof. György Dán, Prof. Viktória Fodor
Matti Juutilainen; Lappeenranta University of Technology (LUT), Finland	2009; Thesis title: “Towards Open Access Networks – Prototyping with the Lappeenranta Model." Supervisors: Prof. Jari Porras, Prof. Jouni Ikonen

Research Interests

My research interests are in computer and communications networks, with a broad and interdisciplinary approach. I have worked in several different fields, from routing to congestion control, from protocol design to applications architectures and many others, including optical networks and protection mechanisms. Also from the methodological point of view I have used and contributed to different techniques, from simulation to analytic modeling to measures and experimental approaches. The next three paragraphs summarize the three main field of research that I’m currently pursuing more actively.

Wireless Hot-Spots, Meshes, and Community Networks

The support of short range mobility and nomadic computing and communications is one of the enabling factors of the 21st century ICT, overruling the traditional dichotomy between fixed and cellular networks. In this context we can find many different traditional topics interacting one another, but also topics that are entirely new and span across different disciplines. My research here covers several different aspects, from the application of centrality metrics to improve routing protocols and applications placement, to the analysis of the topological properties of networks that evolve following constraints that come both from the environment (propagation, terrain etc.), but also from the socio-economic background of area where they develop. Within this research line, Community Networks are extremely interesting as a novel emerging phenomenon where disciplines as different as communication networks, law, sociology and political economy come together to shape and mold the future evolution of the Internet.

P2P Networks and Systems

Peer-to-Peer communications and systems have entirely changed the scenario of content production and service provisioning in networks. They are mainly known for file sharing and distributed storage (DHTs), but they are indeed contributing also, sometimes with a sort of side-pollution, to the general field of distributed systems as well as technologies like Content Distribution Networks and Content Centric Networking. My activity here has been mainly focused on live P2P streaming, with the realization, through several research projects, of an advanced open-source platform for real-time audio and video communications that is entirely distributed and do not require the support of any centralized ore cloud-based service. More information on this project and the related research can be found at http://peerstreamer.org/.

Vehicular Networking for Safety Applications

This is the most recent research line of research I opened with an interdisciplinary approach that has brought interesting and important results. The goal and focus is autonomous and cooperative driving, with special attention to techniques and technologies that can improve safety and increase the infrastructure usage, thus reducing fuel consumption and helping to reduce the need for building additional roads. Together with my collaborators, we mix together research on short-range communications (DSRC – Direct Short Range Communications) together with control techniques and finally advanced simulation capabilities and models that allows the joint evaluation of the network performance and its impact on the application, i.e., the capacity to reduce the accidents and casualties, and increase vehicle flows to reduce consumption and increase the infrastructure efficiency. The tool we developed, PLEXE (http://plexe.car2x.org/) is one of the most used in the community for research on cooperative driving.

Funding

Only projects won since 2010 are reported in the list below, separated between EU, National, and other projects.

European Projects

METAsurfaces for ultraFAst light STructuring (METAFAST)

Role: Member (UniBS Coord. Prof. Costantino De Angelis); a FET project; *2020–2023, duration 36 Mo.*

METAFAST targets the design and realization of meta-surfaces to reflect and switch structured light beams for free space optical communications, a technology that may support future, beyond-5G mobile communications as well as ultra-fast short range communications.

UniBS funding: 350 kEU

Experimental analysis of CSI based anti-sensing techniques (CSI-MURDER)

Role: Member (Coord. Prof. Francesco Gringoli); a project in Open Call 3 of ORCA https://www.orca-project.eu/; *2019–2020, duration 6 Mo.*

CSI-MURDER targets one of the hottest topics that is emerging in relation to advanced 802.11 (Wi-Fi) PHY layers: The ability to perform environment sensing and the threats to people privacy and safety related to it (unauthorized surveillance). These attacks have been already documented in the literature, but their verification in a realistic environment like the ORCA testbeds is still a scientific challenge and will empower further measurement-based research. Furthermore, CSI-MURDER deals with techniques to prevent unauthorized surveillance based on this technique.

UniBS funding: 50 kEU

Internet on FIRE (IoF): Experimenting with dynamic BGP routing

Role: Experiment Coordinator and PI; a project in Open Call 5 of FED4FIRE+ https://www.fed4fire.eu/; *2019–2019, duration 6 Mo.*

The Border Gateway Protocol (BGP) is the only Inter-AS (Autonomous System) protocol of the Internet, i.e., it is the glue that binds pieces of the Internet and keeps global communications in tune. BGP has a slow convergence: two configuration parameters (timers) have a high impact on BGP convergence speed, but there is no consensus on how to change their default value to a better one. Centrality-based networking is a new paradigm that exploits graph centrality metrics to improve the scalability of routing protocols, with a technique we called Pop-Routing. The goal of IoF is to use centrality to tune the MRAI parameter to reduce BGP convergence time.

UniTN funding:	53 kEU
Home page	https://iof.disi.unitn.it/
H2020 Network Infrastructure as Commons (netCommons)	Role: Project Coordinator and PI https://cordis.europa.eu/project/rcn/199879_en.html; *2015–2018, duration 36 Mo.* netCommons follows a novel transdisciplinary methodology on treating network infrastructure as commons, for resiliency, sustainability, self-determination, and social integration. Project partners have expertise in engineering, computer science, economics, law, political science, urban, media, and social studies; and close links with successful Community Networks like guifi.net, ninux.org, and sarantaporo.gr. Community networks are complex systems that require multiple skills to thrive: technical, legal, socio-economic, and political. They face many challenges and they also need abstractions, models and practical tools to grow and produce a higher beneficial impact on our society.
UniTN funding:	651 kEU
Home page	https://netcommons.eu/
H2020 Pop-Routing On WiSHFUL (POPROW	Role: Coordinator and PI; a project in Open Call 3 of WiSHFUL http://www.wishful-project.eu/; *2016–2017; duration 8 Mo.* The goal of POPROW is to test and enhance "Pop-Routing", a technique for wireless mesh link-state routing protocols that tunes the generation frequency of control messages independently for each node of a wireless mesh network as the result of real-time graph analysis performed on the network topology. Pop-Routing is backward-compatible and allows the reduction of the routing tables convergence time after a failure by a factor of up to 60%, or, conversely, it can keep the same convergence speed and reduce the total amount of control messages, thus reducing overhead and increasing the scalability of the protocol.
UniTN funding:	50 kEU
EIT Information-aware data plane for programmable networks	Role: UniTN coordinator. An activity in the Future Networking Solutions (FSN) EIT action line; *2015, duration 12 months* The goal of the activity is to contribute to the deployment of a high-quality/cost-effective network infrastructure via an enhanced data-plane, which is able to serve the increasing traffic demand generated by applications. Carrier Projects have shown that Information Centric Networking (ICN) paradigm is beneficial to achieve this goal, and have proposed a set of ICN mechanisms and algorithms.
UniTN funding:	80 kEU
FP7 Open Source P2P Streaming (OSPS)	Role: Coordinator and PI; a project in Open Call 2 of CONFINE http://confine-project.eu/; *2013–2014; duration 15 Mo.* The goal of OSPS is demonstrating that Community Networks can support advanced multimedia services such as real-time video and TV distribution. The project will also leave to the community a new service to increase the value of the network and better serve the community.
UniTN funding:	65 kEU
Home page	http://osps.disi.unitn.it/
EIT Smart, Ubiquitous Contents (SmartUC)	Role: Coordinator and PI; *2013; duration 12 Mo.* This is a large EIT Activity within the Future Networking Solutions (FNS) action Line. The Activity seeks to create a small ecosystem for the transferring competences among groups and build a fertile soil for novel, efficient and economic systems to store and distribute multimedia contents, with special attention to streaming and real-time delivery.
UniTN funding:	105 kEU
FP7 Network-Aware P2P-TV Application over Wise Networks (NAPA-WINE)	Role: Coordinator of Trento Research Unit and WP Leader; *2008–2011, duration 36+3 Mo.*

Focussed on P2P-TV distribution the project provided: i) a careful analysis of the impact that a large deployment of P2P-TV services may have on the Internet; ii) guidelines for P2P-TV developers regarding the design of systems that minimize the impact on the underlying transport network while optimizing the user perceived quality; iii) a road map for Internet Service Providers to better exploit the network bandwidth by showing simple and minimum cost actions that can be taken in presence of P2P-TV traffic.

UniTN funding: 400 kEU

Local and Industrial Projects

Electrolux WiFi device testing Techno-Legal Approach

Role: PI and coordinator *2019–2020, duration 6 Mo.*

A project whose details are under NdA focused on automatic end-of-the-line testing of WiFi communication devices.

UniTN funding: 30 kEU

Wireless Community Networks: A Novel Techno-Legal Approach

Role: Co-PI with Prof. Roberto Caso (JUS) *2015–2016, duration 18 Mo.*

An interdisciplinary project funded by the University of Trento (Progetti di Ricerca 2014) exploring the relationship between regulations and law on the one hand and technology on the other on the evolution of difference communication networks, with special attention to bottom-up broadband networks and reduction of the digital divide.

Internal UniTN funding: 100 kEU

Privacy Aware content Filtering for Future Pervasive Environments (PAF-PFE)

Role: Scientific Supervisor *2010–2013, duration 36 Mo.*

Trentino/Marie Curie programme of research, training and mobility of post-doctoral researchers, incoming Post-docs 2010, CALL 1, PCOFUND-GA-2008-226070. Grant recipient : Leonardo Maccari. The objective is the design and development of a privacy-aware content filtering platform focused on future pervasive wireless networks like mesh networks or ad-hoc social networks over smartphones.

UniTN funding: 150 kEU

Editorial Activity

Editor: IEEE Transactions on Networking; July 2017–Ongoing

Associate Editor: Computer Networks, Elsevier; 2005–2011

Steering Committee Chair: IEEE/IFIP Conference on Wireless On-demand Network Systems and Services (WONS); 2008–Ongoing

General Chair:

- IEEE/IFIP Conference on Wireless On-demand Network Systems and Services (WONS), 2016
- IEEE International Conference on Peer-to-Peer Computing (P2P'13), 2013
- IEEE/IFIP Conference on Wireless On-demand Network Systems and Services (WONS), 2007
- ACM International Workshop on Wireless Mobile Applications and Services on WLAN HotSpots (WMASH), 2006

TPC Chair	– IEEE Mediterranean Communication Networks (MedComNet), 2020
	– IEEE Vehicular Networking Conference (VNC), 2017
	– ACM/IEEE International Symposium on Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM), 2006
	– ACM International Workshop on Wireless Mobile Applications and Services on WLAN HotSpots (WMASH), 2005
	– IFIP Conference on Wireless On-demand Network Systems and Services (WONS), 2004
Publications Chair	– ACM 17th International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc), 2016
	– IEEE 32nd International Conference on Computer Communications (INFOCOM), 2013
Technical Societies Membership	– IEEE Senior Member
	– ACM Senior Member

Awards

Best Paper Award	*10th IEEE Vehicular Networking Conf. (VNC 2017).* "A LiDAR Error Model for Cooperative Driving Simulations," M. Segata, **R. Lo Cigno**, R.K. Bhadani, M. Bunting, J. Sprinkle
Best Paper Award	*12-th IEEE International Conference on Peer-to-Peer Computing (P2P'12).* "Experimental comparison of neighborhood filtering strategies in unstructured P2P-TV systems," S. Traverso, L. Abeni. R. Birke, C. Kiraly, E. Leonardi, **R. Lo Cigno**, M. Mellia
Best Paper Award "SPOTS Track"	*10-th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN 2011).* "Is there light at the ends of the tunnel? Wireless sensor networks for adaptive lighting in road tunnels," M. Ceriotti, M. Corraà, L. D'Orazio, R. Doriguzzi, D. Facchin, S. Guna, G. P. Jesi, **R. Lo Cigno**, L. Mottola, A. L. Murphy, M. Pescalli, G. P. Picco, D. Pregnolato, C. Torghele
Best Paper Award	*3-rd IEEE International Conference on Internet Multimedia Systems Architecture and Applications (IMSAA-2009).* "Scheduling P2P Multimedia Streams: Can We Achieve Performance and Robustness?", L. Abeni, C. Kiraly, **R. Lo Cigno**
Best Paper Award	*3-rd IEEE/IFIP Wireless On-Demand Network Systems and Services (WONS 2006).* "Scheduling in 802.11e: Open-Loop or Closed-Loop?", P. Larcheri, **R. Lo Cigno**
Best "Runner-up" Award	*IEEE Globecom 2010 (Demo Session).* "Demonstrating the Impact of P2P Streaming on Video Quality," L. Abeni, C. Kiraly, **R. Lo Cigno**, R. Birke, E. Leonardi, S. Traverso
Best Student Paper Award in the category "Communication Services"	*IEEE Globecom 2006.* "Content Delivery in Overlay Networks: a Stochastic Graph Processes Perspective," D. Carra, **R. Lo Cigno**, E. W. Biersack

Citation Indexes (September 2020)

Google Scholar	citations 4087; h-index = 35; i10-index = 100
Scopus (Author ID: 56502415700)	citations 1979; h-index = 26; i10-index = 58
ORCID identifyer	http://orcid.org/0000-0002-4755-2844

List of publications

The complete list of my publications can be retrieved from the University repository at https://iris.unibs.it/, ORCID, and Google Scholar at https://scholar.google.com/citations?user=mZcNDSEAAAAJ

Patents

European Patent No. EP2224308

Inventors: A. Bondi, M. Pescalli, G.P. Picco, R. Lo Cigno, M. Nardelli, N. Vernesoni; Title: "A system and a method for controlling the light intensity in a tunnel"; Patent No. EP2224308, Assigned to SIEMENS SPA, Filing Date: Febrary 26, 2009, Grant Date: October 24, 2012

Italian Patent No. 1.245.550

G. Albertengo; F. Borgnonovo; P. Civera; C. D'Orio; L. Fratta; R. Lo Cigno; G. Masera; G. Panizzardi; G. Piccinini; M. Ruo Roch; M. Zamboni; Title: "Procedimento per l'instradamento di pacchetti da un nodo di una rete di comunicazione a commutazione di pacchetto, nodo di rete e rete a commutazione di pacchetto per l'attuazione di tale procedimento"; Italian Patent No. 1.245.550, Assigned to CEAT Cavi Industrie and CNR, Filing and Grant Date: September 29, 1994

I authorise the use of my personal data in compliance with the Italian Legislative Decree number 196/2003. The information contained in this document are made pursuant to and for the purposes of articles 46 and 47 of Presidential Decree 455/2000.

Altopiano della Vigolana (TN), 02/10/2020 Renato Lo Cigno