

Curriculum Vitae

PERSONAL INFORMATION

Alessandro Brighente



📍 Via Facciabella 16, Casaleone (VR), 37052, Italy

☎ 3408707084

✉ alessandro.brighente@unipd.it

Sex Male | Date of birth 29/01/1992 | Nationality Italian

WORK EXPERIENCE

- 05/10/2022 – now **Ricercatore a Tempo Determinato - A**
Dept. of Mathematics, University of Padova, Padova (IT)
- 28/07/2022 – 18/08/2022 **Visiting Researcher at University of Washington (Seattle)**
UW Department of Electrical & Computer Engineering
- 01/10/2020 – 04/10/2022 **Postdoc at Department of Mathematics**
Dept. of Mathematics, University of Padova, Padova (IT)
- 01/06/2019 – 30/11/2019 **Internship (During Ph. D.)**
Nokia Bell Labs, Stuttgart (DE)
- Study and Development of Link Adaptation Algorithms for Ultra Reliable Low Latency Communications
- 06/01/2017 – 30/09/2017 **Research Fellowship (Pre-Ph. D.)**
University of Padova, Padova (IT)
- Research funding on Intel project on Resource Allocation for Millimeter Wave Communications

EDUCATION AND TRAINING

- 01/10/2017 – 30/09/2020 **Ph. D. in Information Engineering**
University of Padova, Padova (IT)
- Thesis Title: Physical Layer Techniques for Millimeter Wave Communications
 - Advisor: Prof. Stefano Tomasin
- 16/12/2014 – 12/12/2016 **Master Degree in Telecommunication Engineering**
University of Padova, Padova (IT)
- Thesis Title: Message Passing Algorithms for Cloud Radio Access Network in Cellular Systems
- 19/09/2011 – 21/11/2014 **Bachelor Degree in Information Engineering**
University of Padova, Padova (IT)

SUMMER SCHOOLS AND TUTORIALS

- 01/2019 5G Italy, Seminar series on 5G wireless communications, Rome (IT)
- 08/2017 SSIE-2018: Summer School of Information Engineering, Brixen (IT)
- 08/2017 SSIE-2017: Summer School of Information Engineering, Brixen (IT)

Research Activities

Publications

Publications on international journals

- J11** M. El-Zawawy, A. Brighente, M. Conti, "Authenticating Drone-Assisted Internet of Vehicles Using Elliptic Curve Cryptography and Blockchain", **IEEE Transactions on Network and Service Management**, Oct. 2022
- J10** A. Brighente, M. Conti, D. Donadel, F. Turrin, "EVScout2.0: Electric Vehicle Profiling Through Charging Profile", **ACM Transactions on Cyber-Physical Systems**, Sept. 2022
- J9** A. O. Bang, U. P. Rao, A. Visconti, A. Brighente, M. Conti, "An IoT Inventory Before Deployment: A Survey on IoT Protocols, Communication Technologies, Vulnerabilities, Attacks, and Future Research Directions" **Elsevier Computers and Security**, Sept. 2022
- J8** A. Brighente, J. Mohammadi, P. Baracca, S. Mandelli, S. Tomasin, "Interference Prediction for Low-Complexity Link Adaptation in Beyond 5G Ultra-Reliable Low-Latency Communications", **IEEE Transactions on Wireless Communications**, Apr. 2022
- J7** A. Kalita, A. Brighente, M. Khatua, M. Conti, "Effect of DIS Attack on 6TiSCH Network Formation", **IEEE Communication Letters**, Feb. 2022.
- J6** M. El-Zawawy, A. Brighente, M. Conti, "SETCAP: Service-Based Energy-Efficient Temporal Credential Authentication Protocol for Internet of Drones", **Elsevier Computer Networks**, Jan. 2022.
- J5** S. Sullivan, A. Brighente, S. Kumar, M. Conti, "5G Security Challenges and Solutions: A Review by OSI Layer", **IEEE Access**, Aug. 2021.
- J4** A. Brighente, M. Cerutti, M. Nicoli, S. Tomasin, U. Spagnolini, "Estimation of Wideband Dynamic mmWave and THz Channels for 5G Systems and Beyond", **IEEE Journal on Selected Areas in Communications**, special issue on Multiple Antenna Technologies for Beyond 5G, Jun. 2020
- J3** A. Brighente, J. Gambini, S. Tomasin "Modular Hybrid Beamforming for mmWave Fixed Wireless Access", **IEEE Transactions on Communications**, May 2020
- J2** A. Brighente, S. Tomasin, "Power Allocation for Non-Orthogonal Millimeter Wave Systems With Mixed Traffic" **IEEE Transactions on Wireless Communications**, Volume: 18, Issue: 1, Jan. 2019
- J1** A. Brighente, F. Formaggio, G. M. Di Nunzio, S. Tomasin, "Machine learning for in-region location verification in wireless networks" **IEEE Journal on Selected Areas in Communications**, Volume: 37, Issue: 11, Nov. 2019

Publications on conference proceedings

- C20** A. De Vos, A. Brighente, M. Conti, "Threat Sensitive Networking: on the Security

- of IEEE 802.1CB and (un)Effectiveness of Existing Security Solutions“, in Proc. of **8th Workshop on the Security of Industrial Control Systems and of Cyber-Physical Systems (CyberICPS 2022)**, in conjunction with **ESORICS 2022**.
- C19** S. Soderi, A. Brighente, F. Turrin, M. Conti, “VLC Physical Layer Security through RIS-aided Jamming Receiver for 6G Wireless Networks”, in Proc of **19th IEEE International Conference on Sensing, Communication, and Networking (SECON 2022)**
- C18** A. Brighente, M. Conti, H. Vasudev, “SWAP: Secure Warning Messages Authentication and Propagation in Internet of Vehicles”, in Proc. of **30th International Conference on Software, Telecommunications, and Computer Networks (SoftCOM2022)**.
- C17** A. Brighente, M. Conti, H. Vasudev, “MeLSeC: A Method for Lightweight and Secure Communication in Internet of Vehicles”, in Proc. of **20th IEEE International Conference on Dependable, Autonomic & Secure Computing (DASC2022)**.
- C16** A. Brighente, M. Conti, S. Sciancalepore, "Hide and Seek: Privacy-Preserving and FAA-compliant Drones Location Tracing", in Proc of 4th **Workshop on Security, Privacy, and Identity Management in the Cloud (SECPID 2022)**, in conjunction with **ARES 2022**
- C15** A. Brighente, M. Conti, R. Ganbari, G. Kumar, R. Saha, "Stopping Floods with Buckets: Attack and Countermeasure for IOTA Autopeering", in Proc. of 6th **IEEE International Symposium on Measurement and Networking (M&N) 2022**
- C14** E. Bout, A. Brighente, M. Conti, V. Loscri, "FOLPETTI: A Novel Multi-Armed Bandit Smart Attack for Wireless Networks", in Proc. of **17th International Conference on Availability, Reliability and Security (ARES 2022)**
- C13** A. Brighente, M. Camaioni, M. Conti, E. Olivastri, “Should I Mine or Should I Break: On the Worthiness of Brute-Forcing Cryptocurrency Addresses”, in Proc. of 3rd **Workshop on Blockchain theoRy and ApplicatioNs (BRAIN) 2022**, in conjunction with **IEEE PERCOM 2022**.
- C12** A. Brighente, M. Conti, R. Ghanbari, G. Kumar, R. Saha, “Knocking on IOTA’s Doors: Security Analysis of IOTA Ports”, in Proc. of **IEEE Workshop on Blockchain Security, Application, and Performance (BSAP-2021)**, IEEE Blockchain, 2021
- C11** R. Saha, G. Kumar, A. Brighente, M. Conti, “Towards An Enhanced Reputation System for IOTA’s Coordicide “ in Proc. of The Third **IEEE International Conference on Blockchain Computing and Applications (BCCA 2021)**.
- C10** A. Bighente, M. Conti, I. Sadaf, “Tell me how you charge I will tell you where you drove to: Electric Vehicles Profiling Based on Charging-Current Demand”, in Proc. of 26th **European Symposium on Research in Computer Security (ESORICS 2021)**.
- C9** F. Moretto, A. Brighente, S. Tomasin “Adaptive Coordinated Random Access for MTC With Correlated Traffic and Data Freshness”, in Proc. of 2021 **IEEE 22nd International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), 2021**.
- C8** F. Moretto, A. Brighente, S. Tomasin “Greedy Maximum-Throughput Grant-Free Random Access For Correlated IoT Traffic”, in Proc. of **IEEE Vehicular Technology Conference (VTC) fall, 2021**.

- C7** A. Brighente, P. Baracca, J. Mohammadi, "Interference Distribution Prediction for Link Adaptation in Ultra-Reliable Low-Latency Communications", *IEEE 91st Vehicular Technology Conference (VTC2020-Spring)*, pp. 1-7, May 2020
- C6** A. Brighente, F. Formaggio, G. Ruvoletto, S. Tomasin, "Ranking-Based Attacks to In-Region Location Verification Systems", *IEEE International Workshop on Information Forensics and Security (WIFS)*, Mar. 2020
- C5** A. Brighente, F. Formaggio, M. Centenaro, G. M. Di Nunzio, S. Tomasin, "Location-Verification and Network Planning via Machine Learning Approaches", *International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOPT)*, Jun. 2019
- C4** A. Brighente, S. Tomasin, "Beamforming and scheduling for mmWave downlink sparse virtual channels with non-orthogonal and orthogonal multiple access" *IEEE 86th Vehicular Technology Conference (VTC-Fall)*, pp. 1-6, Feb. 2018
- C3** A. Brighente, S. Tomasin "Centralized and Distributed Sparsification for Low-Complexity Message Passing Algorithm in C-RAN Architectures" 2017 *IEEE 86th Vehicular Technology Conference (VTC-Fall)*, pp. 1-6, Feb. 2018
- C2** A. Badan et al, "Keyword-based access to relational data: To reproduce, or to not reproduce?" in Proc. of **15th Italian Symposium on Advanced Database Systems (SEBD)** 2017
- C1** A. Badan et al, "Towards Open-Source Shared Implementations of Keyword-Based Access Systems to Relational Data" in Proc. of **EDBT/ICDT Workshop**, 2017

List of other publications (books, book chapters)

- B3** A. Brighente, M. Conti, F. Mohammadnia "Physical Layer Security Challenges and Solutions for Beyond 5G Fog Computing Networks", *Security Issues in Fog Computing from 5G to 6G: Architectures, Applications and Solutions*, Springer Nature.
- B2** A. Brighente, M. Conti, A. De Salve, "The Ethereum Blockchain: Implementation and Security Aspects", *Blockchains: A Handbook on Fundamentals, Applications and Security*, Springer.
- B1** S. Tomasin, A. Brighente, F. Formaggio, G. Ruvoletto "Physical-Layer Location Verification by Machine Learning", *Machine Learning for Future Wireless Communications*, John Wiley & Sons, Ltd, Dec. 2019

Patents

- P2** A. Brighente, M. Conti "Sistema e metodo per la protezione da overvoltage in wireless power transfer", Italian Patent
- P1** A. Brighente, S. Tomasin, J. Gambini, "A Beamformer Arrangement for Signal Beamforming", International Patent

European projects

- LAZARUS, Horizon CL3-2021, research and innovation grant no. 101070303
Main person in the research team working on the project objectives
- Ontochain, Horizon 2020 research and innovation grant no. 957338, Jan 2021-Mar 2021
Project writing and main person in the research team working on the project objectives
- NATO Science for Peace Multi-Year Project SPS MYP G5884, Unipd. Aug. 2021 – Sept. 2021
Read and review work during the project duration

Italian Projects

- Quantum Safe Randomness (Quasar) funded by CaRiPaRo, Department of Mathematics, Unipd. Jan. 2021 - now
Part of the research team working on the project objectives

Services: Organization of Conferences and Events/

Special Session Chair

- Special Session on “Cybersecure Digital Transformation”, Italian Conference on Cybersecurity (ItaSec) 2022, Rome, IT
- Special Session on “ Security and Privacy in Cyber-Physical Systems”, IEEE Measurements and Networking (M&N) 2022, Padova, IT

Summer Schools

- Arqus cybersecurity summer school, 2021. University of Padova, Italy. Part of the organization team

Technical Program Committee

- Technical Program Committee for 2023 International Conference on Metaverse Computing, Networking and Applications (MetaCom 2023)
- Technical Program Committee for IEEE Conference on Standards for Communications & Networking (CSCN 2022)
- Technical Program Committee for Security, Privacy, and Trust at TheWebConf 2023 (TheWebConf 2023)
- Technical Program Committee for Global Information Infrastructure and Networking Symposium (GIIS 2022)
- Technical Program Committee for the third Joint Workshop on CPS & IoT Security and Privacy (CPS&IoTSec), co-located with CCS 2022
- Technical Program Committee for 6th International Workshop on Security and Forensics of IoT (IoT-SECFOR), co-located with ARES 2022
- Technical Program Committee of 1st Workshop on Security and Privacy of Mobile IoT (SP-MIoT 2022), co-located with ESORICS 2022
- Technical Program Committee Member of IEEE Measurements and Networking (M&N 2022)
- Technical Program Committee Member of Wireless Sensors & Drones in IoT (Wi-DroIT 2022), co-located with 18th International Conference on Distributed Computing in Sensor Systems (DCOSS2022)
- Technical Program Committee for the 4th International Workshop on Application Intelligence and Blockchain Security (AIBlock 2022), in conjunction with International Conference on Applied Cryptography and Network Security (ACNS) 2022
- Technical Program Committee for the Second International Symposium on Advanced Security on Software and Systems

- (ASSS 2022), in Conjunction with IEEE EuroS&P 2022
- Technical Program Committee for 8th IEEE International Smart Cities Conference (ISC2) 2022
- Technical Program Committee for Automotive Cyber Security Workshop (ACSW 2022)
- Technical Program Committee for IEEE Vehicular Technology Conference (VTC) 2022
- Technical Program Committee for IoT-Secfor 2021 (ARES2021)
- Technical Program Committee for International Conference on Cryptology and Network Security (CANS) 2021
- Technical Program Committee for Globecom2021

Organizing Committee

- Conference and Labs of the Evaluation Forum 2022 (CLEF2022)

Publicity Chair

- Publicity Chair for 7th ACM Cyber-Physical System Security Workshop (CPSS 2021)
- Publicity Chair for International Conference on Applied Cryptography and Network Security (ACNS) 2022
- Publicity Chair for International Symposium on Cyberspace Safety and Security (CSS) 2021
- Publicity Chair for International Conference on Cryptology and Network Security (CANS) 2021

Publication Chair

- Publication chair for International Conference on Cryptology and Network Security (CANS) 2021
- Publication Chair for 7th ACM Cyber-Physical System Security Workshop (CPSS 2021)

Services: Editorial Activities

- Guest editor for IEEE Transactions on Industrial Informatics (TII). "Cyber-Physical Threats and Solutions for Autonomous Transportation Systems" 2021
- Editorial Review Board for International Journal of Blockchain Applications and Secure Computing (IJBASC)

Awards

- My **Marie-Curie** Postdoctoral Individual Fellowship has been awarded with the European **Seal of Excellence** (scored: 88,60%)
- Bando per contributi dipartimentali per lo sviluppo di attività di Terza Missione - TM – Anno 2021 – I Edizione. My project was funded for the filing of a patent on Overvoltage Protection Methods for Wireless Power Transfer.
- Ph.D. Scholarship from University of Padova (2018-2021).

Teaching Activities

- Professor in charge for "Cyber-Physical Systems and IoT Security",
Master's degree in Cybersecurity
Responsible for designing and teaching the course
University of Padova, First Semester 2022/2023
- Professor in co-charge for "Ethical Hacking",
Master's degree in Cybersecurity
Responsible for designing and teaching half of the course
University of Padova, First Semester 2022/2023
- Professor in charge for "Blockchain and Smart Contracts",
Bachelor's degree in Law and Technology,
Responsible for the design and teaching of the whole course
University of Padova, Second semester 2021/2022
- Professor in co-charge for "Ethical Hacking",
Master's degree in Cybersecurity

Responsible for designing and teaching half of the course
University of Padova, Second Semester 2021/2022

- Professor in charge for “Informatics and Bioinformatics”, *Responsible for reviewing the existing material and teaching half of the course*, Bachelor’s degree in Biology, University of Padova, First Semester 2021/2022
- Teaching assistant for “5G Systems”, Master Degree in Information and Communication Technology, Department of Information Engineering, University of Padova, 2018/2019
- Teaching assistant for “5G Systems”, Master Degree in Information and Communication Technology, Department of Information Engineering, University of Padova, 2017/2018

Student Supervision

Master’s Degree

- Alessandro Lotto, Master’s Degree in Cybersecurity, University of Padova
- Lorenzo Costantini, Master’s Degree in Cybersecurity, University of Padova
- Claudio Stefani, Master’s Degree in Cybersecurity, University of Padova
- Zeinab Shahbazi, Master’s Degree in Information and Communication Technology University of Padova
- Tommaso Bianchi, Master’s Degree in Information and Communication Technology University of Padova
- Sitora Salaeva, Master’s Degree in Cybersecurity, University of Padova
- Christian Cattai, Master’s Degree in Cybersecurity, University of Padova
- Rayyan Hassan, Master’s Degree in Cybersecurity, University of Padova

Bachelor’s Degree

- Enrico D’Alborton, Bachelor’s Degree in Computer Engineering, University of Padova
- Matteo Casonato, Bachelor Degree in Computer Science, University of Padova

Student Co-Supervision

Master’s Degree

- Adriaan De Vos, Faculty of Electrical Engineering, Mathematics and Computer Science, TU Delft (NL)
- Menno Bezema, Faculty of Electrical Engineering, Mathematics and Computer Science, TU Delft (NL)
- Martina Camaioni, Master’s Degree in Information and Communication Technology University of Padova
- Federico Moretto, Master’s Degree in Information and Communication Technology University of Padova
- Gabriele Ruvoletto, Master’s Degree in Information and Communication Technology University of Padova

Bachelor’s Degree

- Andrea Polato, Bachelor’s Degree in Computer Science, University of Padova
- Antonio Osele, Bachelor’s Degree in Computer Science, University of Padova

Participation in Industrial Innovation/ Industry Internship

- **IOTA Foundation:** Validation of the Coordicide security. Department of Mathematics, University of Padova, Oct. 2020 - now
- **Adant Technologies:** Design of Initial Access and Handover Solutions for mmWave 5G networks. Department of Information Engineering, University of Padova, Jan. 2020 – Jul. 2021

Presentations and Talks

- **Nokia Bell-Labs**: design of link adaptation scheme for Ultra-Reliable Low-Latency communications, Nokia Bell-Labs, Stuttgart (DE), Jun. 2019 - Dec. 2019
- **Huawei**: Resource allocation for millimeter wave networks. Department of Information Engineering, University of Padova., Jan. 2017-Sep. 2017
- “ Good machines and bad machines: on the use of machine and deep learning for security and privacy purposes”
Invited lecturer at IEEE CIS Summer School at MNIT Jaipur, India, Dec. 2022
- Automotive Security: Connected Autonomous Vehicles and Electric Vehicles.
Lecture for Computer and Network Security course, Cybersecurity master’s degree, University of Padova. Oct. 2022.
- “Ride the lightning: Security and Privacy Issues of Electric Vehicles”
Invited Talk at AppSec and Cybersecurity Governance 2022, Venice, Italy, Oct. 2022
- “5G Security: Industry 4.0 and Drones Applications”
Invited lecturer at Caucasus University, Tbilisi, Georgia. Sept. 2022
- “Security of Cyber-Physical Systems”,
invited lecturer at TU Delft, Delft, The Netherlands, Jul. 2022
- “Security and Privacy of Drones”,
Invited lecturer at ICEA Master on “Logistica della Sicurezza e dell’Emergenza”
- “Attacks to Electric-Vehicle”,
lecturer for Silk-FAW and Reinova
- “IoT Security and Privacy”,
Invited lecturer at IoT Summer Course, Linnéuniversitetet (online), Jun 2022
- Presentation at Workshop on Blockchain theORy and ApplicatIoNs (BRAIN) 2022, in conjunction with IEEE PERCOM 2022
- Electric Vehicles Tracking and Profiling.
Invited talk at TU Delft, the Netherlands. March 2022.
- Presentation of “ Towards An Enhanced Reputation System for IOTA’s Coordicide “ at Third IEEE International Conference on Blockchain Computing and Applications (BCCA 2021)
- Automotive Security,
talk for Cybersecurity Workshop organized by IMT Lucca, National Taiwan University and Unipd. Oct. 2021.
- Blockchain foundations and security aspects.
Presentation at NEXT the festival of engineering. Padova, Oct. 2021.
- Presentation of “Tell me how you charge I will tell you where you drove to: Electric Vehicles Profiling Based on Charging-Current Demand”, at 26th European Symposium on Research in Computer Security (ESORICS) 2021
- Automotive Security: Connected Autonomous Vehicles and Electric Vehicles.
Lecture for Computer and Network Security course, Cybersecurity master’s degree, University of Padova. Oct. 2021.
- Workshop on Semantic web and Blockchain
European Blockchain Week, Ljubjana, Slovenia. Sept. 2021.
- Electric vehicles chagrin infrastructure security
Invited talk at Workshop on Automotive Security, **Politecnico di Milano**, Milano, Italy Sept. 2021.
- Cyber-Physical System Security
Arqus cybersecurity summer school. University of Padova, Italy, 2021.
- Presentation of "Interference Distribution Prediction for Link Adaptation in Ultra-Reliable Low-Latency Communications", 2020

- IEEE 91st Vehicular Technology Conference (VTC2020-Spring)
- Nokia Student Poster Competition, Nokia, Stuttgart (DE), 2019
- Presentation of "Centralized and Distributed Sparsification for Low-Complexity Message Passing Algorithm in C-RAN Architectures" at IEEE 86th Vehicular Technology Conference (VTC-Fall)
- Presentation of "Beamforming and scheduling for mmWave downlink sparse virtual channels with non-orthogonal and orthogonal multiple access" at IEEE 86th Vehicular Technology Conference (VTC-Fall)

In compliance with the Italian legislative Decree no. 196 dated 30/06/2003, I hereby authorize you to use and process my personal details contained in this document

CV of Paolo Villorosi - Apr. 2019

Full Professor of Physics (Professore Ordinario)
Department of Information Engineering - University of Padova
Affiliated to:
INFN, Sezione di Padova
CNR, Istituto di Fotonica e Nanotecnologie



Career track

- Born in Treviso, Italy, 12/11/1962.
- Degree in Physics in 1987, University of Padova.
- *Istituto Veneto di Scienze Lettere ed Arti* Fellowship during 1988 at the Risoe National Laboratory (Denmark).
- Post graduated *Perfezionamento* in Applied Mathematics, University of Padova, 1990/1991.
- Fellowships at the University of Padova from 1990 to 1994
- Permanent position as Researcher, University of Padova, 1994.
- Permanent position as Professor of Experimental Physics (II f.), University of Padova, 2005.
- Permanent position as Professor of Experimental Physics (I f.), University of Padova, 2015.

Roles

- Member of the Board of Stakeholders of the European Technological platform Photonics21
- National delegate for Action COST Nanoscale Quantum Optics
- Deputy National Delegate for COST Action Quantum Physics in Space
- Associate Editor of Scientific Reports (Nature Pub.)
- Coordinator of the Study Group for Quantum Communication in Space in Europe
- Member of the Executive Board of Department of Information Engineering, UniPD.

Research activities and research coordination:

My scientific activity has ever addressed frontier research topics. I endeavored to realize experimental investigations of the essence of the interaction between radiation and matter, as in the case of absorption spectra of transient ionic species exploiting laser-produced plasma (1990-2000), the underlying mechanism of multiphoton photoionization using few-femtosecond pulse excitation, published in Nature in 2001 (1999-2003), the laser harmonic generation of very high order, and the mutual phase relations which has allowed us to arrive in 2006 to generate the shortest artificial event ever produced, 130 attoseconds, limit unsurpassed for over two years, that appeared in Science (1994-2010).

Since 2003 I have proposed, carried out and coordinated researches aimed at extending the limits of the Quantum Communication and its protocols. In the period 2003-2008 I coordinated the work that has shown the first exchange to single photon from a satellite. I then coordinated the investigation of the exchange of quantum states along the longest link on ground, between two Canary Islands, in order to study the characteristics of very long and turbulent paths, as well as the realization of quantum protocols as the exchange of quantum key using Quantum-Key-Distribution (QKD).

Since 2010, I am coordinating the investigation on the Quantum Communication from a transmitter in orbit to a telescope on Earth. The first ever demonstration is reported by our group in Physical Review Letters on July 2015. Further researches covered the first demonstration in Space of the superposition principle using temporal (2016) and the realization in Space of the test of the wave-particle duality in Space (Wheeler Gedankenexperiment of the delayed choice), in 2017.

My activity as research coordinator was focused in the recent years to realize the scientific program of the Strategic Research Project of Padova University QuantumFuture, and developing what the Strategic Project of Department of Information Engineering QUINTET for the formation of new research teams, for both of which I had the role of coordinator.

This required different actions: establish the new Quantum Communication Laboratory and provide it with most advanced equipment, conceive and implement operational programs of research, integrating the Project four Units in common research subjects, promote an effective didactical activity in the field of Quantum Information at the level of PhD School, of the Galilean School of Higher Studies and enhancing the content in the course of Quantum Electronics and also start to PhD a significant group of motivated and

capable students. As a result, QuantumFuture supported research training for more than 35 man-years, not counting undergraduates.

Coordination activities also included the organization of two Quantum Communications Graduate Schools in Asiago in 2011 and 2013, two public demonstrations of the themes of Quantum Communication, at the Palazzo della Ragione in 2011 and at the Centro Altinate in 2013 and finally the organization in Padua in 2012 the Italian Fifth Quantum Information Science Conference, in Padova and on a School for Quantum Communication within a Marie-Curie-ITN in 2018.

For the **INFN-CSN2**, since 2015 I coordinate the Padova Unit on the MoonLIGHT-2 Project (2013-2018) with National Coordinator Dr. Simone Dell'Agnello, aiming at the study of the Laser Ranging system for accurate measurements of the Earth-Moon distance.

I also lead the INFN/Univ-Padova participation in the INFN-NASA/SSERVI Affiliation.

I have investigated novel laser processes of interest in Medicine and material processing, including using of femtosecond CPA (chirped-pulse-amplification) sources in nanotechnology, high power semiconductor and fiber laser for photovoltaics technology, adaptive optics for nonlinear interaction optimization, advanced optical systems for semiconductor lasers, laser surgery of lung, laser dentistry.

I am author of publications on several scientific journals including Science, Nature, Nature Physics, Nature Communications, on encyclopaedia and congresses in the areas of Quantum Communication, Quantum Optics, laser-matter interaction and Atomic and Plasma Physics. I gave invited talks in Europe, Asia and Americas, as well as referee for international journals and international research projects.

I served as coordinator in several national and international research projects, including the area of high order harmonics generation, space quantum communication, application of laser in Medicine and Industry.

I was member of the Board of the Institute for Photonics and Nanotechnology of the CNR from the foundation to 2014.

I am co-author of 11 patents or PCT.

I am teaching Course in Physics and Quantum Information, Electronics and Communications since 1990. I supervised 13 PhD Theses, and over 110 *Laurea* Thesis.

I was appointed by the United Nation organization **UNIDO** to organize a Course and to give lectures in Spanish in Guatemala on laser technologies, for small and medium enterprises in the Central America region.

Representing the Ministry of Education, I took part in the December 2013 to the negotiating table on Scientific Cooperation between the United States and Italy, at the US Department of State in Washington. My action has led to the inclusion, for the first time, the theme of Communication and Quantum Information of the topics included in the treaty signed at the end of the negotiations. In order to implement the agreement, I met in 2014 the respective representatives of the National Science Foundation (Arlington, VA) and NIST (Gaithersburg MD). As a result, in June 2015 I co-organized at the Italian Embassy in Washington the first Workshop *The Quantum Network: Promoting a US-Italy Scientific Cooperation on Quantum Information and Communications* fostering the strengthening of the bilateral networking.

From 2013, I represented the University of Padua at meetings with the National Delegates to the European Commission for Horizon 2020 in the areas ICT, Secure Societies and Transports, as well as meeting with Members of European Parliament in Brussels.

I am co-organizing the workshop with title *Quantum Information on a Chip*, to be held in Oct. 2015 in Padova, to establish the 10-years future roadmap in the area of Integrated Quantum Information, sponsored by the US National Science Foundation.

Research record - Apr. 2019

Overall citations on Scholar (Google): 7779 - H-index on Scholar (Google): 41

Awards and Prizes

1. Winner of the first prize, with team VIVA, of **STARTCUP 2002 - L'idea diventa impresa** (now *Premio Nazionale dell'Innovazione*), the first competition among Italian Universities on best proposal that exploits for business a research idea, July 4, 2002.
2. Selected for one of the **20 Ideas of national relevance** for the 2-nd National Day for the Resarch, Rome, Oct. 1, 2003.
3. Winner of the first prize ex-aequo, with SISMA spa Schio (Vi), of the **4th Premio Regionale per l'Innovazione**, sponsored by Veneto Innovazione, on July 7, 2004.
4. Winner as supervisor of the prize **InTesi** for research thesis of industrial interest by Camera di commercio Vicenza, for the years 2005 and 2006, and of Premio InTesi sponsored by the Parco Scientifico e Tecnologico GALILEO, for the years 2005 and 2006.
5. Winner of the third prize with team Think Laser of the 1st **Premio Nazionale Il talento delle idee**, sponsored by Unicredit Banca - Fondazione La Fornace dell'Innovazione - IBAN - FinancIdea, on Nov. 27, 2007.

Publication extract

1. M. Avesani, D. G. Marangon, G. Vallone, and P. Villoresi, *Source-device-independent heterodyne-based quantum random number generator at 17 Gbps*, Nat. Commun., vol. 9, no. 1, p. 5365, Dec. 2018.
2. F. Vedovato, C. Agnesi, M. Tomasin, M. Avesani, J.-Å. Larsson, G. Vallone, and P. Villoresi, *Postselection-Loophole-Free Bell Violation with Genuine Time-Bin Entanglement*, Phys. Rev. Lett., vol. 121, no. 19, p. 190401, Nov. 2018.
3. F. Vedovato, C. Agnesi, M. Schiavon, D. Dequal, L. Calderaro, M. Tomasin, D. G. Marangon, A. Stanco, V. Luceri, G. Bianco, G. Vallone, and P. Villoresi, *Extending Wheeler's delayed-choice experiment to space*, Sci. Adv., vol. 3, no. 10, p. e1701180, Oct. 2017.
4. G. Vallone, D. Dequal, M. Tomasin, F. Vedovato, M. Schiavon, V. Luceri, G. Bianco, and P. Villoresi, *Interference at the Single Photon Level Along Satellite-Ground Channels*, Phys. Rev. Lett., vol. 116, no. 25, p. 253601, Jun. 2016.
5. G. Vallone, D. Bacco, D. Dequal, S. Gaiarin, V. Luceri, G. Bianco, and P. Villoresi, *Experimental Satellite Quantum Communications*, Phys. Rev. Lett., vol. 115, no. 4, p. 040502, Jul. 2015.
6. G. Vallone, V. D'Ambrosio, A. Sponselli, S. Slussarenko, L. Marrucci, F. Sciarrino, and P. Villoresi, *Free-Space Quantum Key Distribution by Rotation-Invariant Twisted Photons*, Phys. Rev. Lett., vol. 113, no. 6, p. 060503, Aug. 2014.
7. P. Villoresi, T. Jennewein, F. Tamburini, M. Aspelmeyer, C. Bonato, R. Ursin, C. Pernechele, V. Luceri, G. Bianco, A. Zeilinger, and C. Barbieri, *Experimental verification of the feasibility of a quantum channel between space and Earth*, New J. Phys., vol. 10, no. 3, p. 33038, 2008.
8. G. Sansone, E. Benedetti, F. Calegari, C. Vozzi, L. Avaldi, R. Flammini, L. Poletto, P. Villoresi, C. Altucci, R. Velotta, S. Stagira, S. De Silvestri, and M. Nisoli, *Isolated Single-Cycle Attosecond Pulses*, Science vol. 314, no. 5798, pp. 443-446, 2006.
9. G. G. Paulus, F. Grasbon, H. Walther, P. Villoresi, M. Nisoli, S. Stagira, E. Priori, and S. De Silvestri, *Absolute-phase phenomena in photoionization with few-cycle laser pulses*, Nature, vol. 414, no. 6860, pp. 182-184, 2001.
10. P. Villoresi, P. Ceccherini, L. Poletto, G. Tondello, C. Altucci, R. Bruzzese, C. De Lisio, M. Nisoli, S. Stagira, and G. Cerullo, *Spectral features and modeling of high-order harmonics generated by sub-10-fs pulses*, Phys. Rev. Lett., vol. 85, no. 12, p. 2494, 2000.

Andrea Zanella is Full Professor in Telecommunications Engineering at the Department of Information Engineering (DEI) of the University of Padua (UNIPD). Since October 1, 2021, he also holds the position of Vice Rector for Information and Communication Systems (ICT).

He received the M.S. degree in Computer Engineering in 1998, and the Ph.D. in Electronic and Telecommunications Engineering in 2002 from the University of Padova. At the turn of 2000-2001 he spent 9 months as a researcher at the University of California, Los Angeles - UCLA (USA), where he collaborated with Prof. Mario Gerla, one of the pioneers of the modern Internet.

His research activity is mainly concerned with the design of communication networks and digital services in different areas, such as 5G and 6G Cellular Networks, Smart City, Internet of Things, and Vehicular Networks. He has provided significant contributions to the fields of wireless network modelling (WiFi, LoRa, Bluetooth, 4G), machine learning approaches for multimedia services, and resource management in dynamic networks. His methodology combines mathematical modeling of the system/protocol to allow for an analytical study, performance analysis based on that model in order to identify the limitations of the system and/or understand the effectiveness of proposed ameliorative solutions, and finally verification of the theoretical study by means of simulations or experiments. His scientific production has obtained a total of 14.000+ citations according to Scholar, with an h-index of 41, and 220+ scientific papers most of which have been published in top-ranking journals and conference proceedings. He is also co-inventor of 6 international patents.

He has numerous collaborations with some of the major companies and universities engaged in research on new communications technologies and ICT systems, such as INTEL, Nokia, Telenor Research, Toyota Research, King's College of London, Aalborg University, Politechnical University of Madrid, etc. In addition, he has a long and solid experience in coordinating and participating in research projects funded by the European community and other international organizations (e.g., NiST, ARO).

He is IEEE senior member and served as Technical Area Editor for the IEEE Internet of Things Journal, and still serves as Associate Editor for the IEEE Transactions on Cognitive Communications and Networking, the IEEE Communications Surveys and Tutorials and the Digital Communications and Networks (DCN), by Elsevier. He was Guest Editor for several Special Issues as, e.g., the SI on the SI on "Smart Cities: vision

and reality" of the Sensor Journal (MDPI), the S.I. on "Imaging in Internet of Things" for Journal of Imaging (MDPI) in 2017.

He took part in the panel for the definition of the National Research Plan 2021- 2027, and is a member of the board of the Doctoral School of Information Engineering, the Board of the Department of Information Engineering, the National Telecommunications Consortium, and the Board of Directors of the Human Inspired Technologies (HIT) research center of the University of Padua. Since 2021, he is Vice Rector at the University of Padova, with responsibility for the ICT.

Finally, Andrea Zanella is one of the coordinators of the SIGnals and NETworking (SIGNET) research lab, is board member of the PhD School on Information Engineering and a member of the Board of Directors of the Human Inspired Technologies (HIT) research center.