Ion Turcanu

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Employment History

- **Luxembourg Institute of Science and Technology** — Luxembourg
  EDGE Group Leader — *09.2022-present*
  - Head of the Edge Computing & Networks (EDGE) group;
- **Luxembourg Institute of Science and Technology** — Luxembourg
  Research and Technology Associate — *10.2021-08.2022*
  - Carrying out research on the following topics: 5G/6G, Multi-Technology Vehicular Networks, Connected and Autonomous Vehicles, Cooperative Intelligent Transportation Systems, In-Vehicle Networks (Automotive Ethernet, CAN), Time-Sensitive Networking;
  - Acquiring new projects;
- **University of Luxembourg** — Luxembourg
  Postdoc/Research Associate — *09.2017-09.2021*
  - Deputy head of VehicularLab (https://vehicularlab.uni.lu/)
  - Working on several European- and national-funded projects;
  - Acquiring new projects;
  - Teaching and supervising students.

Education

- **University of Rome Sapienza** — Rome, Italy
  Ph.D. — *2014 - 2018*
  - Domain: Information and Communications Technologies (ICT)
  - Thesis: Integrated Wireless Access and Networking to Support Floating Car Data Collection in Vehicular Networks
  - Supervisor: Prof. Andrea Baiocchi
- **University of Rome Sapienza** — Rome, Italy
  M.Sc. — *2012 - 2014*
  - Domain: Engineering in Computer Science
  - Thesis: Design and performance analysis of data dissemination and collection scheme for VANET in real urban scenarios
- **University of Rome Sapienza** — Rome, Italy
  B.Sc. — *2007 - 2011*
  - Domain: Engineering in Computer Science
  - Thesis: Web Server Traffic Analyzer

Project Acquisition & Participation

- **Project name:** LEONE–Low-Latency Command and Control via LEO Satellites
  Funding: Ministry of Foreign and European Affairs (MFA), Directorate of Defence (DoD), the Ministry of Economy (MECO) and the Luxembourg National Research Fund (FNR), 497 k€
  Duration: 01.05.2023 – 30.04.2026
  My role: Co-Author, PI
  Description: This project will focus on a specific research question: how to command and control autonomous vehicles (both ground and aerial) that are operating in areas with no terrestrial network coverage via LEO satellite-based communication?

- **Project name:** CANDI–Cellular Ad Hoc Networking for Decentralized IoT Architectures
  Funding: French National Research Agency (ANR) and Luxembourg National Research Fund (FNR), 300 k€
  Duration: 01.05.2023 – 30.04.2025
  My role: Co-Author, Co-PI
  Description: The objective of the CANDI project is to develop the foundations of cellular ad hoc networking as a support for next-generation distributed applications that require direct communication between devices in proximity of each other over multiple hops.

- **Project name:** BISTWIN–Mobility Digital Twin of Bissen's Um Rouscht Industrial Zone
  Funding: Luxembourg Institute of Science and Technology (LIST) and The Luxembourg Government – Ministry of the Economy (MECO), 352 k€
  Duration: 15.04.2023 – 14.04.2024
  My role: Author, PI
  Description: The objective of the BISTWIN project is to build a mobility digital twin (MDT) of the "Um Rouscht" industrial zone in Bissen to serve as basis for RDI activities, including planning, development, and validation of mobility solutions by various stakeholders while targeting economic transformation.

- **Project name:** SETICA–SEcuring TIme Critical traffic in (next gen) Automotive networks (link)
  Funding: Luxembourg National Research Fund (FNR) and Honda R&D Europe Germany, 567 k€
  Duration: 01.06.2021 – 31.05.2024
  My role: Co-author, WP leader, PhD student co-supervisor, Participant
  Description: The goal of the SETICA project is to develop a realistic in-vehicle security-enabled TSN testbed and evaluate security-related issues in gPTP and TSN. The impact of successful attacks against gPTP is severe because many safety-critical applications depend on timing guarantees. The project will research novel approaches that go beyond 802.1DG, among them leveraging SDN for gaining even more flexibility and security.

- **Project name:** Evaluating Practical Attacks against TSN in a TSN-enabled Testbed
  Funding: Honda R&D Europe Germany, 25 k€
  Duration: 01.01.2020 – 31.03.2020
  My role: Co-author, WP leader, Participant
  Description: In this project we mounted and analyzed a number of practical attacks against TSN in a TSN-enabled testbed.

- **Project name:** Building an In-Car Ethernet Testbed System
  Funding: Honda Initiation Grant Europe, 30 k€
  Duration: 01.05.2018 – 30.04.2019
  My role: Co-author, Master thesis co-supervisor, Participant

Description: This project focused on building and validating an AVB/TSN testbed using open-source software (OpenAvnu) and commodity hardware.

- **Project name:** FCD4ITS–Floating Car Data Collection for Intelligent Transportation Systems
  Funding: EU H2020 RAWFIE 3^{rd} Open Call, 100 k€
  Duration: 01.03.2018 – 31.12.2018
  My role: Author, WP leader, Participant
  Description: This project deployed and executed a set of V2X experiments using the RAWFIE vehicular testbeds to evaluate the performance of several Floating Car Data collection algorithms, in order to understand their properties in real-world settings.

Other Activities

- **Standardization:**
  - Rapporteur of ETSI GR IP6 030 "IPv6-based Vehicular Networking (V2X)" (link)
- **Teaching:**
  - Lecturer of the "Networking and Communications" class for Bachelor in Computer Science, University of Luxembourg (2019-present);
  - Delivered teaching lectures on "Selected Topics in Network and System Security" to Master students in Computer Science and PhD students at University of Luxembourg (2017-2018);
  - Delivered teaching lectures on "Laboratory of Network Traffic Engineering" (A.Y. 2016/2017) to students enrolled in Master-level programs at University of Rome Sapienza.
- **Reviewer Activities:**
  - **Chairing:** MedComNet 2024 (TPC Co-Chair), IEEE VNC 2024 (Poster/Demo Co-Chair), IEEE VNC 2023 (Publicity Co-Chair)
  - **Technical Program Committee:** IEEE WCNC (2023, 2022), IEEE Melecon 2022, IEEE VTC-Spring 2022 Workshop ExpCCAM, IEEE VNC (2023, 2021), IEEE/IFIP WONS 2021, IEEE ISC2 2021, MedComNet 2020, ANT (2020,2019), IEEE CCNC (2023, 2020), VEHICULAR (2019, 2018, 2017), 5G-Auto (2019, 2018);
  - **Reviewer (Journals):** IEEE Transactions on Mobile Computing, IEEE Transactions on Vehicular Technology, IEEE Transactions on Intelligent Transportation Systems, IEEE Transactions on Green Communications and Networking, IEEE Communications Magazine, IEEE Communications Letters, IEEE Vehicular Technology Magazine, Elsevier Ad Hoc Networks, Elsevier Computer Communications, Elsevier Computer Networks, Elsevier Vehicular Communications, Transactions on Emerging Telecommunications Technologies, MDPI Sensors, IET Networks, Springer Wireless Networks.
- **Participation (presenter) in international networking events:**
  - Invited speaker at BMW Summer School 2024, Fraueninsel, Chiemsee, Bavaria, Germany
  - 22nd Mediterranean Communication and Computer Networking Conference (MedComNet 2024), Nice, France
  - 2024 EuCNC & 6G Summit, Antwerp, Belgium
  - IEEE Vehicular Networking Conference (VNC) 2024, Kobe, Japan
  - IEEE Consumer Communications & Networking Conference (CCNC 2024), Las Vegas, USA
  - 21st Mediterranean Communication and Computer Networking Conference (MedComNet 2023), Ponza Island, Italy
  - IEEE Vehicular Networking Conference (VNC) 2023, Istanbul, Turkey
  - IEEE Vehicular Technology Conference (VTC2022-Spring), Helsinki, Finland
  - Smart City Expo World Congress 2021, Barcelona, Spain
  - IEEE Vehicular Networking Conference (VNC) 2021, Online Event

- 19th Mediterranean Communication and Computer Networking Conference (MedComNet 2021), Online Event
- IEEE Vehicular Networking Conference (VNC) 2020, Online Event
- IEEE Vehicular Networking Conference (VNC) 2019, Los Angeles, CA, USA
- IEEE Vehicular Technology Conference (VTC-Fall) 2019, Honolulu, Hawaii, USA
- IEEE Vehicular Networking Conference (VNC) 2018, Taipei, Taiwan
- IEEE Vehicular Networking Conference (VNC) 2016, Columbus, OH, USA
- ACM International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing (MobiHoc) 2016, Paderborn, Germany
- ACM International Symposium on Performance Evaluation of Wireless Ad Hoc, Sensor, and Ubiquitous Networks (PE-WASUN) 2015, Cancun, Mexico

Further Education & International Experience

- **King's College London** London, UK
  Summer School on 5G V2X Communications *11.06.2018 - 12.06.2018*
  - Attending a two-day summer school on various aspects of 5G V2X Communications, as pertained to connect autonomous driving.
- **BMW Summer School 2017** Bad Wörishofen, Bavaria, Germany
  BMW Summer School 2017: Intelligent Cars on Digital Roads *09.07.2017-14.07.2017*
  - Attending a six-day summer school jointly organized by BMW Group Research and Technology, EURECOM and the Technische Universität München (TUM), with the support of Bayerisch-Französisches Hochschulzentrum (BFHZ).
- **University of Paderborn** Paderborn, Germany
  Visiting Scholar *03.2016 - 09.2016*
  - Working on Floating Car Data collection algorithms using Heterogeneous LTE/DSRC Vehicular Networks with application on Traffic Monitoring Systems at Heinz Nixdorf Institute and Department of Computer Science under the supervision of Prof. Falko Dressler.
- **Graz University of Technology** Graz, Austria
  International Summer School on Smart Cars (IS3C) *06.09.2015-12.09.2015*
  - Attending a one-week summer school organized by Graz University of Technology. The goal of this summer school was to survey fundamental and applied aspects of embedded automotive computing and networking for Smart Cars, as well as to identify novel opportunities and research directions in related areas through a series of lectures held by international experts.
- **University of Trento** Trento, Italy
  First IEEE ComSoc Summer School *06.07.2015-09.07.2015*
  - Attending a four-day summer school on wireless communications, organized by IEEE Communications Society.

Awards, Grants & Honors

- The "Mario Gerla" Best Paper Award, 21st Mediterranean Communication and Computer Networking Conference (MedComNet 2023).

Publications

Academic Journals and Magazines

1. Alexey Rolich, Ion Turcanu, Alexey Vinel, and Andrea Baiocchi, "Understanding the impact of persistence and propagation on the Age of Information of broadcast traffic in 5G NR-V2X sidelink communications", in *Elsevier Computer Networks*, 2024, DOI: 10.1016/j.comnet.2024.110503.

2. Alessio Buscemi, Ion Turcanu, German Castignani, Andriy Panchenko, Thomas Engel, and Kang G. Shin, "A Survey on Controller Area Network Reverse Engineering", in *IEEE Communications Surveys & Tutorials*, 2023, DOI: 10.1109/COMST.2023.3264928.

3. Andrea Baiocchi and Ion Turcanu, "On Flow Control and Optimized Back-Off in Non-Saturated CSMA", in *IEEE/ACM Transactions on Networking*, 2023, DOI: 10.1109/TNET.2023.3239410.

4. Andrea Baiocchi, Ion Turcanu, and Alexey Vinel, "Age of Information in CSMA-Based Networks With Bursty Update Traffic", in *IEEE Access*, vol. 10, pp. 44088-44105, 2022, DOI: 10.1109/ACCESS.2022.3168321.

5. Alessio Buscemi, Ion Turcanu, German Castignani, Romain Crunelle, and Thomas Engel, "CANMatch: A Fully Automated Tool for CAN Bus Reverse Engineering based on Frame Matching", *IEEE Transactions on Vehicular Technology*, November 2021. DOI: 10.1109/TVT.2021.3124550

6. Ion Turcanu, Thomas Engel, and Christoph Sommer, "Adaptive Content Seeding for Information-Centric Networking under High Topology Dynamics", *IEEE Vehicular Technology Magazine*, vol 16, no 2, February 2021. DOI: 10.1109/MVT.2021.3050728

7. Andrea Baiocchi, Ion Turcanu, "Age of Information of One-Hop Broadcast Communications in a CSMA Network", *IEEE Communications Letters*, September 2020, vol. 25, no. 1, pp. 294-298. DOI: 10.1109/LCOMM.2020.3022090

8. Ion Turcanu, Pierpaolo Salvo, Andrea Baiocchi, Francesca Cuomo, Thomas Engel, "A multi-hop broadcast wave approach for floating car data collection in vehicular networks", *Elsevier Vehicular Communications*, August 2020, vol. 24, pp. 100232. DOI: 10.1016/j.vehcom.2020.100232

9. Izhak Rubin, Andrea Baiocchi, Yulia Sunyoto, and Ion Turcanu, "Traffic Management and Networking for Autonomous Vehicular Highway Systems", *Elsevier Ad Hoc Networks*, February 2019, vol. 83, pp. 125-148. DOI: 10.1016/j.adhoc.2018.08.018

10. Ion Turcanu, Florian Klingler, Christoph Sommer, Andrea Baiocchi, and Falko Dressler, "Duplicate Suppression for Efficient Floating Car Data Collection in Heterogeneous LTE-DSRC Vehicular Networks", *Elsevier Computer Communications*, June 2018, vol. 123, pp. 54-64. DOI: 10.1016/j.comcom.2018.03.015

11. Pierpaolo Salvo, Ion Turcanu, Francesca Cuomo, Andrea Baiocchi and Izhak Rubin, "Heterogeneous cellular and DSRC networking for Floating Car Data collection in urban areas", *Elsevier Vehicular Communications*, April 2017, vol. 8, pp. 21-34. DOI: 10.1016/j.vehcom.2016.11.004

12. Ion Turcanu, Pierpaolo Salvo, Andrea Baiocchi, and Francesca Cuomo, "An integrated VANET-based data dissemination and collection protocol for complex urban scenarios", *Elsevier Ad Hoc Networks*, December 2016, vol. 52C, pp. 28-38. DOI: 10.1016/j.adhoc.2016.07.008

Conferences and Workshops (10 most recent)

1. Saleh Nikooroo, Juan Estrada-Jimenez, Aurel Machalek, Jerome Harri, Thomas Engel, and Ion Turcanu, "Mitigating Collisions in Sidelink NR V2X: A Study on Cooperative Resource Allocation", in *22nd Mediterranean Communication and Computer Networking Conference (MedComNet)*, June 2024, DOI: 10.1109/MedComNet62012.2024.10578242.

2. Alexey Rolich, Ion Turcanu, and Andrea Baiocchi, "AoI-Aware and Persistence-Driven Congestion Control in 5G NR-V2X Sidelink Communications", in *22nd Mediterranean Communication and Computer Networking Conference (MedComNet)*, June 2024, DOI: 10.1109/MedComNet62012.2024.10578132.

3. S. Faye, M.C. Botero, J.S. Sottet, C. Sommer, M. Franke, J. Baudouin, G. Castellanos, R. Decorme, M.P. Fanti, R. Fuladi, G. Kesik, B. Mendes, C. Murphy, S. Parker, S. Pryor, S.M. Senouci, and I. Turcanu, "Integrating Network Digital Twinning into Future AI-Based 6G Systems: The 6G-TWIN Vision", in *EuCNC 2024 & 6G Summit*, June 2024, pp. 883-888, DOI: 10.1109/EuCNC/6GSummit60053.2024.10597058.

4. Saleh Nikooroo, Juan Estrada-Jimenez, Aurel Machalek, Jerome Harri, Thomas Engel, and Ion Turcanu, "Poster: Evaluating the Potential of Mode 2(b) Resource Allocation in NR V2X Sidelink", in *15th IEEE Vehicular Networking Conference (VNC 2024)*, May 2024, pp. 241-242, DOI: 10.1109/VNC61989.2024.10575999.

5. Darinela Andronovici, Damien Nicolas, Ion Turcanu, and Christoph Sommer, "Demo: Interactive Off-the-Shelf In-Car TSN Testbed", in *15th IEEE Vehicular Networking Conference (VNC 2024)*, May 2024, pp. 267-268, DOI: 10.1109/VNC61989.2024.10575946.

6. Darinela Andronovici, Ion Turcanu, Jannusch Bigge, and Christoph Sommer, "Cross-Validating Open Source In-Vehicle TSN Simulation Models With a COTS Hardware Testbed", in *15th IEEE Vehicular Networking Conference (VNC 2024)*, May 2024, pp. 172-179, DOI: 10.1109/VNC61989.2024.10575954.

7. Ion Turcanu, German Castignani, and Sébastien Faye, "On the Integration of Digital Twin Networks into City Digital Twins: Benefits and Challenges", in *IEEE 21st Consumer Communications & Networking Conference (CCNC)*, January 2024, pp. 752-758, DOI: 10.1109/CCNC51664.2024.10454704.

8. Alexey Rolich, Ion Turcanu, Alexey Vinel, and Andrea Baiocchi, "Impact of Persistence on the Age of Information in 5G NR-V2X Sidelink Communications", in *21st Mediterranean Communication and Computer Networking Conference (MedComNet)*, June 2023, DOI: 10.1109/MedComNet58619.2023.10168874.

9. Tobias Hardes, Ion Turcanu, and Christoph Sommer, "Poster: A Case for Heterogenous Co-Simulation of Cooperative and Autonomous Driving", in *14th IEEE Vehicular Networking Conference (VNC 2023), Poster Session*, 2023, pp. 151-152, DOI: 10.1109/VNC57357.2023.10136319.

10. Alessio Buscemi, Ion Turcanu, German Castignani, and Thomas Engel, "Preventing Frame Fingerprinting in Controller Area Network Through Traffic Mutation", in *IEEE International Conference on Communications Workshops (ICC Workshops)*, 2022, pp. 385-390, DOI: 10.1109/ICCWorkshops53468.2022.9814703.