Luca Baldesi

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Profile

My work and research interests encompass all aspects of **Internet-of-Things** or Cyber-Physical Systems, including **communication** performance, **privacy** protection, and **machine-learning** aided applications.

Experience

08/2023–now **Project Scientist**, *University of California, Irvine*, USA.
- Smart home voice assistant privacy and security
- Large language model (LLM) agents and privacy
- IoT network fingerprinting and inspection

other affiliation –, *Proper Data, NSF SaTC Frontier center*, USA.

01/2023–07/2023 **Team Lead for IoT/IoMT**, *Hamilton Medical*, Switzerland.
Design and development of IoT technologies, including:
- Internet-of-Medical-Things to cloud systems
- Real-time content distribution and processing

04/2022–01/2023 **Software Engineer for IoT/IoMT**, *Hamilton Medical*, Switzerland.
Design and development of IoT technologies, including:
- developing and maintaining a custom Unix-based operating system for ARM architectures
- real-time content distribution and OS development

10/2020–03/2022 **Postdoctoral research associate**, *Northeastern University*, USA.
Design and development of machine learning solutions for 5G wireless systems, including:
- prototyping with linux kernels, FPGA and Software Defined Radio systems
- contributing source code to the srsRAN project for 5G-and-beyond networks
- developing of residual stack Deep Neural Networks targeting raw wireless I/Q samples.

other affiliation –, *Institute for the Wireless Internet-of-Things*, USA.

10/2019–02/2020 **Research and development engineer**, *MindMaze*, Paris, France.
Design and development of embedded software for signal processing applications.

05/2018–09/2019 **Research fellowship**, *University of Trento*, Trento, Italy.
Design and development of distributed platforms for live video streaming on community networks; theoretical analysis of stochastic delay bounds for flooding on mesh networks.

03/2016–12/2016 **Visiting PhD. Student**, *University of California, Ivine*, USA.
Research on privacy and anonymization on social networks.

05/2013–09/2014 **Research fellowship**, *University of Trento*, Trento, Italy.
Research in the fields of peer-to-peer live video streaming and Wireless Community Networks.

Education

2014-2018 **PhD. on Real-Time Content Delivery in Distributed Networks**, *University of Trento*, Italy.

2011–2013 **M.S. in Computer Science Engineering**, *The University of Florence*, Italy, cum laude and career mention.

2007–2011 **B.S. in Computer Science Engineering**, *The University of Florence*, Italy.

Awards

2022 **Best paper award** at IEEE Conference on Computer Communications, INFOCOM

2018 **Best in-session presentation** at IEEE Conference on Computer Communications, INFOCOM

2013 **Summa cum laude** and **career mention** for my M.S. degree, at the University of Florence, Italy

Patents

2022 Provisional Patent, Channel-Aware Reactive Mechanism (ChARM), US 63/244,192

Teaching and Mentoring

2024-2025 **Instructor**, *University of California, UCI*, USA, Course: *Advanced C programming*.

2023-2024 **Guest Lecturer**, *University of California, UCI*, USA, Class title: *Audio Security & Privacy for IoT devices*.

2023-2024 **Curriculum lead and instructor**, *University of California, UCI*, USA, **Summer school**: *Privacy, IoT & AI Research Exploration*.

2021-2022 **Instructor**, *Northeastern University*, USA, **Summer school**: *Colosseum Young Gladiators 2021: experimenting with a large scale spectrum emulator*.

2015-2016 **Lecturer**, *University of Trento*, Italy, Course: *Privacy, Trust and Security*.

2014-2016 **Teaching Assistant**, *University of Trento*, Italy, Course: *Simulation and Performance Evaluation*.

2014-2019 **Thesis advisor**, Lorenzo Ghiro (UniTN), Riccardo Francescato (UniTN), Riccardo Martinelli (UniTN), Enrico Egidi (UniTN), Giulia Nardó (UniTN), Massimo Girondi (UniTN).

Service

2024-now **Program Committee Member**, *USENIX Security*.

2023-now **Program Committee Member**, *USENIX Security Artifact Evaluation*.

2020-2022 **Associate Editor**, *Elsevier Software Impact*.

Selected Publications (Google Scholar link)

Luca Colombo, Luca Baldesi, Tommaso Melodia, and Matteo Rinaldi. Neural Network-Aided Spurious Modes Optimization Targeting Lithium Niobate MEMS Resonators. In *IEEE IMS 2022 - IEEE International Microwave Symposium*, June 2022

Luca Baldesi, Francesco Restuccia, and Tommaso Melodia. ChARM: NextG Spectrum Sharing Through Data-Driven Real-Time O-RAN Dynamic Control. In *IEEE INFOCOM 2022 - IEEE Conference on Computer Communications*, May 2022. **Best Paper Award**

- Mattia Milani, Marco Nesler, Michele Segata, Luca Baldesi, Leonardo Maccari, and Renato Lo Cigno. Improving BGP Convergence with Fed4FIRE+ Experiments. In *39th IEEE Conference on Computer Communications (INFOCOM 2020), 5th International Workshop on Computer and Networking Experimental Research using Testbeds (CNERT 2020)*, Toronto, Canada, 7 2020
- Luca Baldesi, Leonardo Maccari, and Renato Lo Cigno. Infective Flooding in Low-Duty-Cycle Networks, Properties and Bounds. *Computer Communications*, 151:216 – 226, 2020
- Luca Baldesi, Athina Markopoulou, and Carter Butts. Spectral graph forge: A framework for generating synthetic graphs with a target modularity. *IEEE/ACM Transactions on Networking*, 27(5):2125–2136, Oct 2019
- Luca Baldesi, Leonardo Maccari, and Renato Lo Cigno. Keep it fresh: Reducing the age of information in v2x networks. In *1st ACM Workshop on Technologies, mOdels, and Protocols for Cooperative Connected Cars (TOP-Cars)*, 2019
- Luca Baldesi, Leonardo Maccari, and Renato Lo Cigno. On the properties of infective flooding in low-duty-cycle networks. In *15 th Wireless On-demand Network systems and Services Conference*, 2019
- Luca Baldesi. *Distributed live streaming on mesh networks*. University of Trento, 2018
- Luca Baldesi, Carter T. Butts, and Athina Markopoulou. Spectral graph forge: Graph generation targeting modularity. In *IEEE INFOCOM 2018 - IEEE Conference on Computer Communications*, April 2018
- Leonardo Maccari, Nicoló Facchi, Luca Baldesi, and Renato Lo Cigno. Optimized P2P streaming for wireless distributed networks. *Pervasive and Mobile Computing*, 2017
- Luca Baldesi, Leonardo Maccari, and Renato Lo Cigno. On the Use of Eigenvector Centrality for Cooperative Streaming. *IEEE Communications Letters*, 21(9):1953–1956, Sept 2017
- Luca Baldesi, Leonardo Maccari, and Renato Lo Cigno. Optimized cooperative streaming in wireless mesh networks. In *IFIP Networking Conference (IFIP Networking) and Workshops*, pages 350–358, May 2016
- Luca Baldesi and Leonardo Maccari. NePA TesT: network protocol and application testing toolchain for community networks. In *12th Annual Conference on Wireless On-demand Network Systems and Services (WONS)*, pages 1–8, Jan 2016
- Luca Baldesi, Leonardo Maccari, and Renato Lo Cigno. Improving P2P streaming in Wireless Community Networks. *Computer Networks*, 93(Part 2):389 – 403, 2015