Lorenzo Rosa

Email: lorenzo.rosa@unibo.it
Website: www.lorenzorosa.info
Linkedin: linkedin.com/lorenzo-rosa
GitHub: github.com/ellerre

I am currently a **postdoctoral researcher** at the University of Bologna, Italy, as part of the Mobile Middleware Group. I am also co-founder of Hazeware Industrial Networking. My research interests cover a broad spectrum of topics in both **networks** and **systems**. In particular, end-host network stacks, kernel-bypass networking, and hardware accelerators. My current research focuses on leveraging these tools to support latency-critical applications in cloud and serverless platforms, either in large-scale datacenters or in the industrial edge.

Work Experience

Postdoc Researcher — Bologna, Italy
University of Bologna — 2024–in progress
Supervisor: Prof. G. Di Modica

Education

Ph.D. in Computer Science and Engineering — Bologna, Italy
University of Bologna — 2020–2024
Supervisor: Prof. A. Corradi

M.Sc. in Computer Engineering — Bologna, Italy
University of Bologna — 2017–2020
110/110 cum laude

Licenza del Collegio Superiore — Bologna, Italy
Collegio Superiore dell'Università di Bologna — 2014–2020

B.Sc. in Computer Engineering — Bologna, Italy
University of Bologna — 2014–2017
110/110 cum laude

Maturità Classica — Bologna, Italy
Liceo Classico M. Minghetti — 2009–2014
100/100 cum laude

Research collaborations

Cornell University — Ithaca, NY, USA
Visiting PhD student — Sept. 2019–Feb. 2020 and Feb. 2023–May 2023
Advisor: Prof. Ken Birman

ETH Zürich — Zürich, Switzerland
Visiting PhD student — Jan. 2024–March 2024
Advisor: Prof. Ana Klimović

Publications

L. Rosa, "This Is INSANE! Kernel-Bypass Networking Finally Made Easy", in *Proceedings of the 26th International Middleware Conference Tutorial Track*, December 2025

I.M. Al Jawarneh, **L. Rosa**, R. Venanzi, L. Foschini, P. Bellavista, "Efficient Parallel Processing of Big Data on Supercomputers for Industrial IoT Environments", in *Electronics 14 (13), 2626*, June 2025

L. Rosa, A. Calvio, A. Garbugli, L. Foschini, "A QoS-Aware Data Distribution Platform for Edge-Based Vehicular Digital Twins in Smart Cities", *2025 IEEE Wireless Communications and Networking Conference (WCNC)*, March 2025

L. Rosa, L. Foschini, and A. Corradi "Empowering Cloud Computing With Network Acceleration: A Survey", in *IEEE Communications Surveys & Tutorials 26 (4), 2729-2768*, March, 2024

L. Rosa, A. Garbugli, A. Corradi, and P. Bellavista "INSANE: A Unified Middleware for QoS-aware Network Acceleration in Edge Cloud Computing", in *Proceedings of the 24th ACM/IFIP International Middleware Conference (Middleware '23)*, Dec. 2023

L. Rosa, A. Garbugli, L. Patera, and L. Foschini, "Supporting vPLC Networking over TSN with Kubernetes in Industry 4.0", *Proceedings of the 1st Workshop on Enhanced Network Techniques and Technologies for the Industrial IoT to Cloud Continuum (IIoT-NETs '23)*, Sept. 2023

A. Garbugli, **L. Rosa**, A. Bujari, and L. Foschini, "KuberneTSN: a Deterministic Overlay Network for Time-Sensitive Containerized Environments", *2023-IEEE International Conference on Communications (ICC)*, May 2023

K. Birman, S. Jha, M. Milano, **L. Rosa**, W. Song, and E. Tremel, "Monotonicity and Opportunistically-Batched Actions in Derecho", *International Symposium on Stabilizing, Safety, and Security of Distributed Systems*, Sept. 2023

A. Sabbioni, **L. Rosa**, A. Bujari, L. Foschini, and A. Corradi, "DIFFUSE: A DIstributed and decentralized platForm enabling Function composition in Serverless Environments", *Computer Networks*, Volume 210, 2022

L. Rosa and A. Garbugli, "Poster: INSANE–A Uniform Middleware API for Differentiated Quality using Heterogeneous Acceleration Techniques at the Network Edge", *2022 IEEE 41st International Conference on Distributed Computing Systems (ICDCS)*, July 2022

S. Jha, **L. Rosa**, and K. Birman, "Spindle: Techniques for Optimizing Atomic Multicast on RDMA", *2022 IEEE 41st International Conference on Distributed Computing Systems (ICDCS)*, July 2022

W. Song, Y. Yang, T. Liu, A. Merlina, T. Garret, R. Vitenberg, **L. Rosa**, A. Awatramani, Z. Wang, and K. Birman, "Cascade: An Edge Computing Platform for Real-time Machine Intelligence", *2022 Workshop on Advanced tools, programming languages, and PLatforms for Implementing and Evaluating algorithms for Distributed systems (ApPLIED '22)*, July 2022

A. Garbugli, **L. Rosa**, L. Foschini, A. Corradi, and P. Bellavista, "A Framework for TSN-enabled Virtual Environments for Ultra-Low Latency 5G Scenarios", *2022-IEEE International Conference on Communications (ICC)*, May 2022

L. Rosa, W. Song, L. Foschini, A. Corradi, and K. Birman, "DerechoDDS: Strongly Consistent Data Distribution for Mission-Critical Applications", *2021 IEEE Military Communications Conference (MILCOM)*, Dec. 2021

L. Rosa, S. Jha, and K. Birman, "DerechoDDS: Efficiently leveraging RDMA for fast and consistent data distribution", *CARS 2021 6th International Workshop on Critical Automotive Applications: Robustness & Safety*, Sept. 2021

A. Sabbioni, **L. Rosa**, A. Bujari, L. Foschini, and A. Corradi, "A Shared Memory Approach for Function Chaining in Serverless Platforms", *2021 IEEE Symposium on Computers and Communications (ISCC)*, Sept. 2021

Teaching

- **Teaching Assistant** at University of Bologna — Fall 2021, 2022, 2023
  Computer Networks
- **Teaching Assistant** at University of Bologna — Spring 2018
  Software Engineering
- **Teaching Assistant** at University of Bologna — Spring 2018, 2019, 2022
  Foundations of Computer Science (Java)

Talks and conferences

- I have presented my papers, in person or remotely, at CARS'21, MILCOM'21, ICC'22 and '23, ICDCS'22, IIoT-Nets'23 (co-located with ACM SIGCOMM), Middleware'23.
- I have presented in person the poster *INSANE–A Uniform Middleware API for Differentiated Quality using Heterogeneous Acceleration Techniques at the Network Edge* at ICDCS'22.
- I have served as a tutor for the demo *Derecho: Blindingly Fast RDMA Replication for Cloud and Edge Services* at the *AI Sys* workshop (SOSP'19).
- *Reducing Delays In RDMA-based Communication.* Invited talk. Real-Time Innovations HQ, Sunnyvale, CA, USA (February, 20 2020).
- *Empowering Cloud Computing with Network Acceleration as a Service.* Systems Group Meeting, TUM Munich. Invited by Prof. Pramod Bhatotia. (January, 11 2024)
- *Bringing Network Acceleration in the Cloud Continuum.* Systems Group Lunch Seminar. ETH Zürich. Invited by Prof. Ana Klimović. (February, 23 2024)
- I have presented the tutorial *"This is INSANE! Kernel-Bypass Networking Finally Made Easy"* at ACM/IFIP Middleware 2025. (December, 15 2025)

Community Service

I have served in the Technical Program Committee (TPC) of:

- IEEE International Conference on Human-Machine Systems (ICHMS) 2025 (Late Track)
- IEEE Symposium on Computers and Communications (ISCC) 2025 and 2026

I have been the registration co-chair for IEEE ISCC 2025.

Technical strengths

Programming Languages. I have mostly worked with the C, C++, and Java languages since the start of my BSc. Occasionally, I have also used Rust, Python, and C#.

Operating systems and software frameworks. I have mostly worked and interacted with Linux-based systems. As a researcher in kernel-bypassing technologies, I am familiar with user-level networking stacks, communication libraries and SDKs (DPDK, RDMA *Verbs*), and network device drivers. My expertise also includes the knowledge of the Time-Sensitive Networking (TSN) protocol set for deterministic Ethernet communication.

Spoken languages. I am proficient in English (CEFR level C1 - IELTS 7.5). I am a native Italian speaker.