

Francesco Binucci, Ph.D.



Employment History

May 2023 – December 2025

■ **Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)**, Research Collaborator within the project NRRP "RESTART".

Education

2021 – 2025 ■ **Ph.D., University of Perugia** in Industrial and Information Engineering.
Thesis title: *Resource Optimization and Feature Extraction for Reliable Edge-Assisted Goal-Oriented Communications*

2019 – 2021 ■ **M.Sc. Computer Engineering, University of Perugia**.
Thesis title: *Energy, latency and accuracy trade-offs for Mobile Edge Learning, by auto-encoders and Lyapunov Optimization.*
Final mark: 110/110 with honors

2016 – 2019 ■ **B.Sc. Computer Engineering, University of Perugia**.
Thesis title: *Development of a Configuration Tool for the Orchestration of Virtual Networks in 5G Systems.*
Final mark: 110/110 with honors

International Experiences

January – July 2024

■ **Visiting PhD Student**, KCLIP Lab., King's College London, London, UK.
Research Collaborator with the King's Communications, Learning and Information Processing (KCLIP) lab., coordinated by prof. Osvaldo Simeone, on *Reliable AI for wireless engineering*.

Teaching Experiences

February – May 2021

■ **Teaching Tutor, Calculus II** B.Sc. in Mechanical Engineering, University of Perugia

Research Publications

Journal Articles

- 1 F. Binucci, P. Banelli, P. Di Lorenzo, and S. Barbarossa, "Opportunistic information-bottleneck for goal-oriented feature extraction and communication," *IEEE Open Journal of the Communications Society*, vol. 5, pp. 2418–2432, 2024.
- 2 F. Binucci, P. Banelli, P. D. Lorenzo, and S. Barbarossa, "Multi-user goal-oriented communications with energy-efficient edge resource management," *IEEE Transactions on Green Communications and Networking*, vol. 7, no. 4, pp. 1709–1724, 2023.
- 3 P. Di Lorenzo, M. Merluzzi, F. Binucci, *et al.*, "Goal-oriented communications for the iot: System design and adaptive resource optimization," *IEEE Internet of Things Magazine*, vol. 6, no. 4, pp. 26–32, 2023.

4 F. Binucci, P. Banelli, P. Di Lorenzo, and S. Barbarossa, "Adaptive resource optimization for edge inference with goal-oriented communications," *EURASIP Journal on Advances in Signal Processing*, vol. 2022, no. 1, p. 123, 2022.

Conference Proceedings

- 1 F. Binucci and P. Banelli, "Optimal resource management for wireless cooperative edge learning with energy harvesting," in *2025 33rd European Signal Processing Conference (EUSIPCO)*, 2025.
- 2 F. Binucci, O. Simeone, and P. Banelli, "Resource management for edge-assisted learning with deterministic reliability constraints," in *2025 23rd International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, 2025, pp. 1–6.
- 3 F. Binucci, O. Simeone, and P. Banelli, "Resource management for multiuser opportunistic edge-inference by conformal lyapunov optimization," in *2025 10th International Conference on Fog and Mobile Edge Computing (FMEC)*, 2025, pp. 194–201.
- 4 F. Binucci and P. Banelli, "Opportunistic information bottleneck for edge-assisted goal-oriented communications," in *2024 58th Asilomar Conference on Signals, Systems, and Computers*, 2024, pp. 748–753.
- 5 F. Binucci, M. Merluzzi, P. Banelli, E. C. Strinati, and P. Di Lorenzo, "Enabling edge artificial intelligence via goal-oriented deep neural network splitting," in *2024 19th International Symposium on Wireless Communication Systems (ISWCS)*, 2024, pp. 1–6.  DOI: 10.1109/ISWCS61526.2024.10639178.
- 6 F. Binucci and P. Banelli, "Ber-aware dynamic resource management for edge-assisted goal-oriented communications," in *ICASSP 2023 - 2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023, pp. 1–5.  DOI: 10.1109/ICASSP49357.2023.10096653.
- 7 F. Binucci and P. Banelli, "Goal-oriented water-filling for dynamic management of edge-assisted ofdm communications," in *ICC 2023 - IEEE International Conference on Communications*, 2023, pp. 5761–5766.  DOI: 10.1109/ICC45041.2023.10278684.
- 8 F. Binucci, P. Banelli, P. Di Lorenzo, and S. Barbarossa, "Analog versus digital pulse amplitude modulation for goal-oriented wireless communications," in *2023 31st European Signal Processing Conference (EUSIPCO)*, 2023, pp. 1415–1419.
- 9 F. Binucci, P. Banelli, P. Di Lorenzo, and S. Barbarossa, "Dynamic resource allocation for multi-user goal-oriented communications at the wireless edge," in *2022 30th European Signal Processing Conference (EUSIPCO)*, 2022, pp. 697–701.  DOI: 10.23919/EUSIPCO55093.2022.9909863.

Skills

Languages	 Italian Native  English Advanced
Coding	 Matlab, Python, R, Java
Databases	 MySQL, PostgreSQL
Web Dev	 HTML, CSS, JavaScript, Apache Web Server, Tomcat Web Server, PHP.
Misc.	 Academic research, teaching, training, consultation, L ^A T _E X typesetting and publishing.

Miscellaneous Experience

Awards and Achievements

2022  **Pegaso 2000 Graduation Award**, Best Thesis in Computer Engineering & Digital Tech.

Miscellaneous Experience (continued)

2020  **“Riccardo Domenici” Graduation Award**, Best Graduate Computer & Electronic Engineering, University of Perugia (AY 2018/19).

Certification

2016  **First Certificate in English (FCE)**. Awarded by Cambridge Assessment English.

2012  **European Computer Driving License (ECDL)**, Awarded by Associazione Italiana per il Calcolo Automatico (AICA).