




# 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 33th 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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.23919/EUSIPCO55093.2022.9909863).

## Skills

Languages	 Italian <b>Native</b>  English <b>Advanced</b>
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, $\text{\LaTeX}$ typesetting and publishing.


## Miscellaneous Experience

### Awards and Achievements



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

## Miscellaneous Experience (continued)

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- 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).