

RAOUL RAFTOPOULOS

Assistant Professor (RTDa – Fixed-Term Researcher, Type A)

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Born 23 Apr 1996

PROFESSIONAL SUMMARY

I was born in Catania, Italy, in 1996. Since January 2024 I have been an Assistant Professor (RTDa, Fixed-Term Researcher Type A) at the Department of Electrical, Electronic and Computer Engineering (DIEEI) of the University of Catania, within the PNRR project RESTART. I received my Ph.D. in Systems, Energy, Computer and Telecommunications Engineering from the University of Catania in 2023. My research focuses on applying machine learning (Deep Reinforcement Learning, Multi-Armed Bandits, Digital Twins) to improve the performance of 5G/6G networks, O-RAN, drone networks and underwater networks. In 2023 I was a Research Assistant and Visiting Student at Northeastern University, Boston, MA, where I designed reinforcement learning algorithms for Network Slicing in O-RAN. In 2022 I received the "Francesco Carassa" award for best presentation and publication. I was also involved in the H2020 European projects Triangle, 5GINFIRE and Flame as a Research Consultant and Software Engineer.

SKILLS

Reinforcement Learning
Multi-Armed Bandit
Machine Learning
O-RAN (xApp / rApp)
Network Digital Twins
TensorFlow and PyTorch
Python
Code and Quality Standards
Performance Evaluation and Optimization
Data Analysis
Strong Communication
Critical Thinking
Source and Version Control: Git

EXPERIENCE

Assistant Professor (RTDa) Jan 2024 – Present
DIEEI, University of Catania – Catania, Italy

Researcher on the PNRR project RESTART (RESearch and innovation on future Telecommunications systems and networks, to make Italy more smART), within WP5 of the structural project SUPER. Research and teaching in telecommunications: machine learning algorithms (Deep Reinforcement Learning, Multi-Armed Bandits) for the orchestration of 5G/6G and O-RAN networks, network Digital Twins, drone networks (FANETs) and edge computing and underwater networks.

Research Assistant Apr 2023 – Oct 2023
Institute for the Wireless Internet of Things – Northeastern University, Boston, MA

Designed Deep Reinforcement Learning solutions to meet the Service Level Agreement (SLA) requirements of different Network Slices in O-RAN. Collected data from the Colosseum testbed to pre-train the agents offline, designed the agents' state and reward, and then fine-tuned them on the testbed.

Teaching Assistant May 2022 – Jun 2022
University of Catania – Catania, Italy

Teaching support for the course "Design of Telecommunication Networks and Systems" (M.Sc. in Telecommunications Engineering). In three lectures I covered the principles of Markov Decision Processes, Reinforcement Learning and Deep Reinforcement Learning, which were then implemented in realistic network scenarios using the ns3-gym emulator.

Computer Engineer Jul 2019 – Oct 2019
University of Catania – Catania, Italy

Managed the installation, upgrade and deployment of the "Tourist Eyes" project on the 5GinFire testbed. Used metrics to monitor application and infrastructure performance. Designed VNFs (Virtualized Network Functions) and triggers for the testbed.

Computer Engineer May 2018 – Sep 2018
CNIT Consortium – Catania, Italy

Monitored and tested the DiMoVis (Distributed Mobile Video Surveillance) system to identify bottlenecks, and deployed the containerized system on the 5G Triangle testbed. Identified, analyzed and fixed OpenStack infrastructure vulnerabilities and application deployment issues.

EDUCATION

Ph.D. in Systems, Energy, Computer and Telecommunications Engineering Oct 2020 – Nov 2023
University of Catania – Catania, Italy

M.Sc. in Computer Engineering Sep 2018 – Oct 2020
University of Catania – Catania, Italy

LANGUAGES	B.Sc. in Computer Engineering University of Catania — Catania, Italy	Oct 2014 — Sep 2018
Italian Native		
English Advanced C1 TOEFL	HONORS AND AWARDS	
Spanish Intermediate	"Francesco Carassa" Award	2022
Greek Basic		

PUBLICATIONS

JOURNAL ARTICLES

1. A. Caruso, C. Grasso, **R. Raftopoulos**, G. Schembra, "Autonomic reconfigurable 5G network slicing enabling immersive VR applications in 5G&B softwarized networks," *Computer Networks*, vol. 283, 112275, 2026.
2. A. Caruso, C. Grasso, **R. Raftopoulos**, G. Schembra, "FALCON: Fanet-Aware Learning and digital twin CONTROL framework," *Computer Communications*, vol. 251, 108481, 2026.
3. F. Busacca, S. Palazzo, **R. Raftopoulos**, G. Schembra, "MANTRA: A Distributed MAB-Based Multi-Agent Framework for Latency- and Energy-Aware Offloading in Vehicular Networks," *IEEE Transactions on Network and Service Management*, vol. 22, no. 5, pp. 3849–3865, 2025.
4. F. Busacca, L. Galluccio, S. Palazzo, A. Panebianco, **R. Raftopoulos**, "AMUSE: A Multi-Armed Bandit Framework for Energy-Efficient Modulation Adaptation in Underwater Acoustic Networks," *IEEE Open Journal of the Communications Society*, vol. 6, pp. 2766–2779, 2025.
5. R. Avanzato, F. Beritelli, **R. Raftopoulos**, G. Schembra, "A deep reinforcement learning-based UAV-smallcell system for mobile terminals geolocalization in disaster scenarios," *Computer Communications*, vol. 234, 108088, 2025.
6. C. Grasso, **R. Raftopoulos**, G. Schembra, "Smart Zero-Touch Management of UAV-Based Edge Network," *IEEE Transactions on Network and Service Management*, vol. 19, no. 4, pp. 4350–4368, 2022.
7. C. Grasso, **R. Raftopoulos**, G. Schembra, S. Serrano, "H-HOME: A learning framework of federated FANETs to provide edge computing to future delay-constrained IoT systems," *Computer Networks*, vol. 219, 109449, 2022.
8. C. Grasso, **R. Raftopoulos**, G. Schembra, "Slicing a FANET for heterogeneous delay-constrained applications," *Computer Communications*, vol. 195, pp. 362–375, 2022.

CONFERENCE PAPERS

1. S. Ahmad, A. Caruso, **R. Raftopoulos**, D. Riccobene, "Coordinated Energy-Efficient Orchestration of UAV-Mounted gNBs via Negotiating xApps in O-RAN," *2026 IEEE 12th International Conference on Network Softwarization (NetSoft)*, pp. 378–380, 2026.
2. F. Busacca, A. Panebianco, **R. Raftopoulos**, D. Scuderi, "VISTA: Velocity-Informed Smart Transmission Adaptation in High Mobility IoT," *2026 24th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, pp. 9–15, 2026.
3. A. Scarvaglieri, F. Busacca, **R. Raftopoulos**, "Multi-Armed Bandit Autoscaling with Monotonic Arm Banning for Distributed NextG Services," *IEEE INFOCOM 2026 – IEEE Conference on Computer Communications*, 2026.
4. F. Busacca, S. Palazzo, **R. Raftopoulos**, D. Riccobene, A. Scarvaglieri, G. Schembra, "A Low-Complexity O-RAN xApp Based on Multi-Armed Bandit to Optimize Traffic Steering Decisions," *IEEE INFOCOM 2026 – IEEE Conference on Computer Communications*, 2026.
5. S. Ahmad, **R. Raftopoulos**, G. Schembra, "Energy-Efficient O-RAN Control with Multi-Agent Multi-Armed Bandits," *2026 IEEE Network Operations and Management Symposium (NOMS)*, 2026.
6. F. Busacca, L. Galluccio, A. Panebianco, S. Palazzo, **R. Raftopoulos**, D. Scuderi, "MERMAID: a Multi-armEd bandit approach foR optiMal cArrier selection In OFDM-based unDerwater acoustic networks," *2025 IEEE 36th International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, 2025.
7. F. Busacca, L. Galluccio, S. Palazzo, A. Panebianco, **R. Raftopoulos**, "A Distributed Multi-Armed Bandit Approach for Modulation Adaptation in Underwater Networks," *2025 IEEE Wireless Communications and Networking Conference (WCNC)*, 2025.

8. A. Caruso, C. Grasso, **R. Raftopoulos**, G. Schembra, "IDLE: A Digital Twin Framework for 6G Network Intelligence," *2024 IEEE 29th International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD)*, 2024.
9. A. Caruso, C. Grasso, **R. Raftopoulos**, G. Schembra, "An Adaptive Closed-Loop Encoding VNF for Virtual Reality Applications," *2024 IEEE 10th International Conference on Network Softwarization (NetSoft)*, pp. 222–230, 2024.
10. F. Busacca, S. Palazzo, **R. Raftopoulos**, G. Schembra, "MARBLE: Multi-Player Multi-Armed Bandit for Lightweight and Efficient Job Offloading in UAV-Based Mobile Networks," *IEEE International Conference on Communications (ICC 2024)*, pp. 4936–4941, 2024.
11. F. Busacca, S. Palazzo, **R. Raftopoulos**, G. Schembra, "MAD-FELLOWS: A Multi-Armed Bandit Framework for Energy-Efficient, Low-Latency Job Offloading in Robotic Networks," *IEEE INFOCOM 2024 Workshops (INFOCOM WKSHPS)*, 2024.
12. **R. Raftopoulos**, S. D'Oro, T. Melodia, G. Schembra, "DRL-Based Latency-Aware Network Slicing in O-RAN with Time-Varying SLAs," *2024 International Conference on Computing, Networking and Communications (ICNC)*, pp. 737–743, 2024.
13. F. Busacca, S. Palazzo, **R. Raftopoulos**, G. Schembra, "MANTRA: an Edge-Computing Framework based on Multi-Armed Bandit for Latency- and Energy-aware Job Offloading in Vehicular Networks," *2023 IEEE 9th International Conference on Network Softwarization (NetSoft)*, pp. 143–151, Madrid, 2023.
14. C. Grasso, **R. Raftopoulos**, G. Schembra, "OSCAR: A Contention Window Optimization Approach Using Deep Reinforcement Learning," *IEEE International Conference on Communications (ICC 2023)*, pp. 459–465, Rome, 2023.
15. C. Grasso, **R. Raftopoulos**, G. Schembra, "A FANET to Provide Blockchain On Demand at the Extreme Edge of a 6G Network," *2022 61st FITCE International Congress*, Rome, 2022.
16. C. Grasso, **R. Raftopoulos**, G. Schembra, "Comparison of Deep Reinforcement Learning Approaches for FANET Optimization," *2022 61st FITCE International Congress*, Rome, 2022.
17. C. Grasso, **R. Raftopoulos**, G. Schembra, "Multi-Agent Deep Reinforcement Learning in Flying Ad-Hoc Networks for Delay-Constrained Applications," *17th International Conference on Future Networks and Communications (FNC)*, Niagara Falls, Canada; *Procedia Computer Science*, vol. 203, pp. 69–78, 2022.
18. C. Grasso, **R. Raftopoulos**, G. Schembra, "Tailoring FANET-Based 6G Network Slices in Remote Areas for Low-Latency Applications," *2022 IFIP Networking Conference (IFIP Networking)*, Catania, 2022.
19. L. Galluccio, C. Grasso, G. Maier, **R. Raftopoulos**, M. Savi, G. Schembra, S. Troia, "Reinforcement Learning for Resource Planning in Drone-Based Softwarized Networks," *2022 20th Mediterranean Communication and Computer Networking Conference (MedComNet)*, pp. 200–207, Paphos, 2022.
20. C. Grasso, **R. Raftopoulos**, G. Schembra, "Deep Q-Learning for Job Offloading Orchestration in a Fleet of MEC UAVs in 5G Environments," *2021 IEEE 7th International Conference on Network Softwarization (NetSoft)*, pp. 186–190, Tokyo, 2021.
21. L. Galluccio, C. Grasso, M. Grasso, **R. Raftopoulos**, G. Schembra, "Measuring QoS and QoE for a Softwarized Video Surveillance System in a 5G Network," *2019 IEEE International Symposium on Measurements & Networking (M&N)*, 2019.