Esteban Municio

Telecommunications Engineer and PhD in Computer Science

More on: https://emunicio.github.io/

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SUMMARY

- Telecommunications Engineer and PhD in Computer Science specialized in programmable networks and Industrial IoT.
- In-depth knowledge on wired and wireless networks, with focus on the PHY, MAC and IP layers.
- Hands-on experience in multi-domain testbeds and on-field network deployments.
- Wide background and research experience in ultra-reliable IoT networks, Open RAN and end-to-end traffic engineering through, SDN, network orchestration, TSN and network slicing techniques.
- Experience in ICT4D and international development cooperation projects. Interested in connectivity provision in rural and isolated environments.

Education

2015 – 2020 **Ph.D. in Computer Science**
at Faculty of Science – Universiteit Antwerpen (UAntwerpen)
Thesis: *Towards Scalable End-to-End Programmable Industrial Internet of Things*

2013 – 2014 **M.Sc. in Networks and Computer Systems**
at School of Telecommunications Engineering (ETSIT), Universidad Rey Juan Carlos (URJC) - 60 ECTS
Thesis: *Heterogeneous wireless backhaul networks for rural 3G femtocells in developing countries.*

2009 – 2013 **University-specific degree in Development Cooperation**
at School of Agricultural Engineering (ETSIA), Universidad Politécnica de Madrid (UPM) - 41 ECTS

2010 – 2013 **M.Sc. in Telecommunications Engineering**
at School of Telecommunications Engineering (ETSIT), Universidad Politécnica de Madrid (UPM) - 120 ECTS
Thesis: *Study and implementation of routing protocols for wireless mesh networks in rural environments*.
Grade: A with Honours - Percentile: 99.9 %

2006 – 2010 **B.Sc. in Telecommunications Engineering**
at Technical University School (EUITT), Universidad Politécnica de Madrid (UPM) - Telematics - 240 ECTS

Experience

Jan 2022 – ongoing **Senior Researcher** at i2CAT Foundation – AI-Driven Systems (Spain)
AI-driven network automation, Open Radio Access Networks and 5G security and TSN

Nov 2019 – Dec 2021 **Postdoc Researcher** at IDLab Antwerp, *University of Antwerp – imec* (Belgium)
End-to-end programmable networks and Industrial IoT

May 2015 - Nov 2019 **PhD Researcher** at IDLab Antwerp, *University of Antwerp – imec* (Belgium)
Scalable End-to-End Programmable Industrial Internet of Things

Mar 2013 - May 2015 **Research Assistant** at TSC, *King Juan Carlos University* (Spain)
In EU-FP7 TUCAN3G project: "*Wireless technologies for isolated rural communities in developing countries based on cellular 3G/4G femtocell deployments*"

Jun 2012 - Mar 2013 **Research Internship** at INICTEL-UNI, *National University of Engineering* (Peru)
Deployment of wireless mesh networks in a high-Andean rural ecosystem and teaching workshops at INICTEL-UNI

RESEARCH PROJECTS

European Projects:
EU-FP7 TUCAN3G (2013-2015), Celtic+ FlexNet (2018-2021), H2020 ProTego (2019-2022), H2020 DAEMON (2021-2023), H2020 Vital-5G (2021-2023), H2020 InterConnect (2019-2023), SNS Stream A 01-01 BeGREEN (2023), and SNS ORIGAMI (2024)
National Projects (Belgium):
ICON iFest (2015-2017), ICON CONAMO (2016-2018), ICON Smart Waterway (2019-2021)
National Projects (Spain):
UNICO Open6G (2022)

TEACHING

2024-2025: Adjunct Professor “Redes Inalámbricas y Móviles”, Bachelor in Telematic Engineering, *Universidad Carlos III Madrid* (3 ECTS)
2023-2025: Adjunct Professor “5G and Wireless Networking”, *Master in Connected Industry 4.0, Universidad Carlos III Madrid* (3 ECTS)
2016-2018: Lab Teaching Assistant “Computer and Network Security”, *Master of Computer Science, University of Antwerp* - (6 ECTS)

TOP PUBLICATIONS

Baguer, P., Yilma, G. M., **Municio, E.**, Garcia-Aviles, G., Garcia-Saavedra, A., Liebsch, M., & Costa-Pérez, X. Attacking O-RAN interfaces: threat modeling, analysis and practical experimentation. *IEEE Open Journal of the Communications Society*. (2024).

Baguer, P., **Municio, E.**, Garcia-Aviles, G., & Costa-Pérez, X. Enabling Beyond-Visual-Line-of-Sight Drones Operation over Open RAN 5G Networks with Slicing. *IEEE Network. (2024).*

Municio, E., G. Garcia-Aviles, A. Garcia-Saavedra and X. Costa-Pérez, "O-RAN: Analysis of Latency-Critical Interfaces and Overview of Time Sensitive Networking Solutions," in *IEEE Communications Standards Magazine*, vol. 7, no. 3, pp. 82-89, September 2023

Municio, E., Cevik, M., Ruth, P., & Marquez-Barja, J. M. (2021, May). Achieving End-to-End Connectivity in Global Multi-Domain Networks. In *IEEE INFOCOM 2021-IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS)* (pp. 1-6)

Municio, E., Latre, S., & Marquez-Barja, J. M. (2020). “Extending Network Programmability to the Things Overlay using Distributed Industrial IoT Protocols”. *IEEE Transactions on Industrial Informatics*, *17*(1), 251-259.

Municio, E., Balemans, N., Latré, S., & Marquez-Barjal, J. (2020, January). “Leveraging distributed protocols for full End-to-End softwarization in IoT networks”. In *2020 Annual Consumer Communications & Networking Conference (CCNC)* (pp. 1-6). IEEE. [IF: N/A]

Municio, E., Daneels, G., De Brouwer, M., Ongenae, F., De Turck, F., Braem, B., Famaey, J. & Latré, S. (2019). “Continuous Athlete Monitoring in Challenging Cycling Environments Using IoT Technologies”. *IEEE Internet of Things Journal*, *6*(6), 10875

Municio, E., Daneels, G., Vučinić, M., Latré, S., Famaey, J., Tanaka, Y., Brun, K., Muraoka, K., Vilajosana, X. & Watteyne, T. (2019). Simulating 6TiSCH networks. *Transactions on Emerging Telecommunications Technologies*, *30*(3), e3494.

Municio, E., Marquez-Barja, J., Latré, S., & Vissicchio, S. (2018). “Whisper: Programmable and flexible control on Industrial IoT networks” *Sensors*, *18*(11), 4048.

Municio, E., Spaey, K., & Latré, S. (2018). “A distributed density optimized scheduling function for IEEE 802.15. 4e TSCH networks”. *Transactions on Emerging Telecommunications Technologies*, *29*(7), e3420.

Daneels, G., **Municio, E.**, Van de Velde, B., Ergeerts, G., Weyn, M., Latré, S., & Famaey, J. (2018). “Accurate energy consumption modelling of IEEE 802.15. 4e TSCH using dual-band OpenMote hardware”. *Sensors*, *18*(2), 437.

Simo-Reigadas, J., **Municio, E.**, Morgado, E., Castro, E. M., Martinez, A., Solorzano, L. F., & Prieto-Egido, I. (2015). “Sharing low-cost wireless infrastructures with telecommunications operators to bring 3G services to rural communities”. *Computer Networks*, *93*

For a full list of the publications please visit https://emunicio.github.io/publications/

SKILLS

Languages: Spanish: Native English: Fluent Dutch: B1 French: A2

“More” languages:

Strong skills: C, C++, Python, Unix Shell Scripting, Java, Matlab, and LaTeX
Rusted skills: Ruby, PHP, Objetive-C, Assembly, Ada, Perl, TCL and VHDL

Tools and Platforms: J-Link, GNU Radio, 6TiSCH Simulator, OpenWSN, Contiki, ns-3, Jupyter, TensorFlow, PyTorch, Ansible, Juju charms, Grafana, MQTT, MySQL, PostgreSQL, OSM, OpenStack, jFed, Chamaleon Cloud, 5G-Empower, Click, OAI, SD-RAN, FlexRIC, srsRAN, O-RAN-SC, ONOS, Kubernetes and Docker