

Dr. Ramón Agüero

CONTACT INFORMATION	University of Cantabria Department of Communications Engineering Edificio Ingeniería de Telecomunicación Plaza de la Ciencia s/n Santander, 39005 - Spain	Work: +34 942 203 916 Fax: +34 942 201 488 eMail: ramon@tlmat.unican.es ramon.agueroc@unican.es www: www.tlmat.unican.es
EDUCATION	<p>Ph.D, Communications Engineering at University of Cantabria (Spain), March 2008</p> <ul style="list-style-type: none">• Thesis Topic: <i>Contribution to the performance enhancement over non-conventional wireless access networks</i>• Extraordinary Award (University of Cantabria)• Social Council Award (University of Cantabria)• Best PhD by the Spanish Association of Communication Engineers• The PhD (in Spanish) can be accessed here <p>M.Sc, Telecommunications Engineering at University of Cantabria (Spain), April 2001</p> <ul style="list-style-type: none">• With honors (1st of 80)• Awarded as the 2nd best graduate in Telecommunications Engineering by the Spanish Ministry of Education• The thesis was awarded as the best M.Sc thesis by the Spanish Association of Communication Engineers	
CURRENT ACADEMIC APPOINTMENTS	<p>Full Professor, University of Cantabria (Spain) April 2023 to present Network Planning and Mobile Communications Laboratory Department of Communications Engineering</p> <p>Head of Digital Transformation, University of Cantabria (Spain) Jan 2021 to present</p> <ul style="list-style-type: none">• Responsible of the IT services and Digital Transformation Area of University of Cantabria	
PREVIOUS ACADEMIC APPOINTMENTS	<p>Head of the Campus Area May 2016 to Jan 2021 University of Cantabria</p> <p>Head/Director of Communications Engineering Department Oct 2015 to May 2016 University of Cantabria Department of Communications Engineering</p> <p>Deputy Director of Communications Engineering Department Jan 2015 to Sep 2015 University of Cantabria Department of Communications Engineering</p> <p>Associate Professor, University of Cantabria (Spain) 2010 to 2023 Network Planning and Mobile Communications Laboratory Department of Communications Engineering</p> <p>Assistant Lecturer, University of Cantabria (Spain) 2006 to 2010 Network Planning and Mobile Communications Laboratory Department of Communications Engineering</p> <p>Senior Researcher, University of Cantabria (Spain) 2002 to 2006 Network Planning and Mobile Communications Laboratory Department of Communications Engineering</p>	

CURRENT TEACHING RESPONSIBILITIES	<p>Associate Professor at University of Cantabria, (Spain)</p> <p><i>Main Instructor in B.Sc courses</i></p> <ul style="list-style-type: none"> • Communication Networks <ul style="list-style-type: none"> • Undergraduate course (2nd year) in B.Sc on Telecommunications Engineering • Basic Teletraffic and Network Dimensioning • Syllabus available here • Slides and course materials (Spanish) available here • Network Dimensioning and Planning <ul style="list-style-type: none"> • Undergraduate course (3rd year) in B.Sc on Telecommunications Engineering • Advanced Teletraffic and Network Dimensioning, Graph Theory • Syllabus available here • Slides and course materials (Spanish) available here <p><i>Instructor in M.Sc courses</i></p> <ul style="list-style-type: none"> • Network Desing and Operation <ul style="list-style-type: none"> • 1st year course in M.Sc on Telecommunications Engineering • Performance analysis, access to shared channels, multiple access, routing, TCP • Syllabus available here • Slides and course materials (Spanish) available here
STUDENT ADVISING	<p>Johnny Choque PhD on Communications Engineering, University of Cantabria. <i>On the contribution to access selection in heterogeneous wireless networks</i> July 2014. Summa Cum Laude. The PhD (in Spanish) can be accessed here</p> <p>David Gómez Fernández PhD on Communications Engineering, University of Cantabria. <i>Reliable Communications over Wireless Mesh Networks by means of Network Coding and Multi-Path Techniques</i>. May 2015. Summa Cum Laude. The PhD (in Spanish) can be accessed here</p> <p>José Ángel Irastorza PhD on Communications Engineering, University of Cantabria. <i>A distributed management architecture for wireless mesh networks and its application over personal network environments</i>. February 2016. Summa Cum Laude. The PhD (in Spanish) can be accessed here</p> <p>Luis Francisco Diez Fernández PhD on Information Technologies and Mobile Communications, University of Cantabria. <i>Reducing the exposure to electro-magnetic fields in heterogeneous networks: design and analysis</i> May 2018. Summa Cum Laude. The PhD (in English) can be accessed here The PhD was awarded by the Spanish Telecommunication Engineering Association in 2019.</p> <p>Pablo Garrido Ortiz PhD on Information Technologies and Mobile Communications, University of Cantabria. <i>Opportunistic Network Coding over wireless networks</i> September 2018. Summa Cum Laude. The PhD (in English) can be accessed here</p> <p>Mihail Zverev PhD on Information Technologies and Mobile Communications, University of Cantabria in collaboration with Ikerlan. <i>Reducing transport protocol latency: QUIC protocol enhancements</i> June 2023. Outstanding, A.</p>

Fátima Fernández Pérez

PhD on Information Technologies and Mobile Communications, University of Cantabria in collaboration with Ikerlan. Expected 2024.

BSc and MSc thesis supervision

More than 80 thesis supervised since 2002

PROJECT EXPERIENCE

Ramón Agüero holds a strong experience in different collaborative research projects, highlighting those belonging to the various IST Frameworks. He has coordinated the participation of University of Cantabria in, at least, 6 of them. In addition he has also taken different responsibility roles: task leader, work-package leader, technical manager. Some of the most relevant ones, from the last 10 years, are enumerated below.

Digital Twin Enabling Technologies, and their application within the communications and chemical verticals

- *Cantabria Regional Project*
- Project duration: 2023-2026
- Project coordinator: Prof. Ramón Agüero
- Role: Project Coordinator

QoS and queue management techniques for transport networks

- *Spanish Research Project, within the Virtualized, adaptative, and blurred network architectures (6GBLUR)*
- Project duration: 2023-2024
- Project coordinator: Dr. Josep Mangues
- Role: Project Coordinator at University of Cantabria

Modeling and performance assessment of novel 5G/6G network access architectures

- *Spanish Research Project, within the Operational Planning and dimensioning Tool for operator network Infrastructures Moving to Advanced 5G/6G leveraging on AI techniques (OPTIMAIX)*
- Project duration: 2023-2024
- Project coordinator: Prof. Oriol Sallent
- Role: Project Coordinator at University of Cantabria

Deployment of Fog/Cloud Continuum Solutions. Performance Evaluation

- *Spanish Research Project*
- Project duration: 2023
- Project coordinator: Dr. Ramón Agüero
- Role: Project Coordinator

Digital twin of a hybrid system solar photovoltaic-hydrogen for the energy self-sufficiency within the residential sector

- *Spanish Research Project*
- Project duration: 2022-2024
- Project coordinator: Dr. Ramón Agüero
- Role: Principal Researcher

Semantically-enabled Interoperable Trustworthy Enriched Data-spaces

- *Spanish Research Project*
- Project duration: 2022-2025
- Project coordinator: Dr. Luis Sánchez
- Role: Senior researcher

Design, implementation and evaluation of an IoT-Fog-Cloud platform: connectivity protocols and orchestration techniques assessment

- *Research contract with Ikerlan S. Coop.*
- Project duration: 2021-2022
- Project coordinator: Dr. Ramón Agüero
- Role: Project coordinator

Development of a demonstrator for a three-tier IoT-Fog-Cloud architecture

- *Research contract with Ikerlan S. Coop.*
- Project duration: 2020-2021
- Project coordinator: Dr. Ramón Agüero
- Role: Project coordinator

Advanced methodologies for performance evaluation and QoX in telematics networks and services, EVEREST

- *Spanish Research Network of Excellence*
- Project duration: 2020-2021
- Project coordinator: Dr. Dolores Cano
- Role: Principal researcher at University of Cantabria

Future Internet Enabled Resilient Cities, FIERCE

- *Spanish Research Project*
- Project duration: 2019-2021
- Project coordinator: Dr. Luis Sánchez
- Role: Senior researcher

Flexible IoT Networks for Value Creators, FLEXNET

- *CELTIC Project*
- Project duration: 2017-2021
- Project coordinator: Dr. Zbigniew Kopertowski (Orange)
- Role: Senior researcher

Dynamic provisioning of connectivity in high density 5G wireless scenarios, ADVICE

- *Spanish Research Project*
- Project duration: 2016-2018
- Project coordinator: Dr. Ramón Agüero
- Role: Principal researcher, coordinator

Connectivity as a Service: Access for the Internet of the Future, COSAIF

- *Spanish Research Project*
- Project duration: 2013-2016
- Project coordinator: Dr. Ramón Agüero
- Role: Principal researcher, coordinator

Low EMF Exposure Future Networks, LEXNET

- *7th Framework Programme*
- Project duration: 2012-2015
- Project coordinator: Dr. Joe Wiart (Orange)
- Role: work-package leader, coordinated University of Cantabria activities

RELEVANT
PUBLICATIONS
(LAST 6 YEARS)

In what follows, some of the most relevant publications from the last 6 years (since 2018) is given, in reverse chronological order.

- Fátima Khan, Fátima Fernández, Luis Diez, and Ramón Agüero. “Exploiting QUIC multi-streaming over NTN: Delay-based scheduling policies,” *Accepted in IEEE Global Communications Conference, Globecom 2023*
- Sidna Jeddou, Luis Diez, Najid Abdellah, Amine Baina, Ramón Agüero, “On the Performance of Transport Protocols Over mmWave Links: Empirical Comparison of TCP and QUIC,” *IEEE Open Journal of the Communications Society*, 10.1109/OJCOMS.2023.3325764
- Fátima Fernández, Mihail Zverev, Luis Diez, José R. Juárez, Anna Brunstrom, and Ramón Agüero. “Flexible Priority-based Stream Schedulers in QUIC”. *Proceedings of the 20th ACM International Symposium on Performance Evaluation of Wireless Ad Hoc, Sensor, & Ubiquitous Networks (PE-WASUN '23)* doi:10.1145/3616394.3618267
- Cristian C. Erazo-Agredo, Luis Diez, Ramón Agüero, Mario Garza-Fabre, Javier Rubio-Loyola, “Enabling realistic experimentation of disaggregated RAN: Design, implementation, and validation of a modular multi-split eNodeB,” *Computer Networks Volume 235*, November 2023, doi:10.1016/j.comnet.2023.109993
- Fátima Khan, Cristina Hervella, Luis Diez, Fátima Fernández, Néstor J. Hernández-Marcano, Rune Hylsberg Jacobsen, and Ramón Agüero. “Realistic Assessment of Transport Protocols Performance over LEO-based Communications”, *Computer Networks Volume 236*, November 2023, doi:10.1016/j.comnet.2023.110008
- Neco Villegas, Luis Diez, Idoia De La Iglesia, Marco González-Hierro, and Ramón Agüero, “Energy-Aware Optimum Offloading Strategies in Fog-Cloud Architectures: A Lyapunov Based Scheme,” *IEEE Access*, vol. 11, pp. 73116-73126, 2023, doi:10.1109/ACCESS.2023.3295496
- Cristina Hervella, Luis Diez, Fátima Fernández, Néstor J. Hernández-Marcano, Rune Hylsberg Jacobsen, and Ramón Agüero. “Realistic Assessment of Transport Protocols Performance over LEO-based Communications”. *Proceedings of the 19th ACM International Symposium on Performance Evaluation of Wireless Ad Hoc, Sensor, & Ubiquitous Networks (PE-WASUN '22)* doi:10.1145/3551663.3558680
- Néstor Hernández-Marcano, Luis Diez, Ramón Agüero, Rune Hylsberg-Jacobsen, “Finite Buffer Queuing Delay Performance in the Low Earth Orbit Land Mobile Satellite Channel” *Proceedings of IEEE WCNC 2022* doi:10.1109/WCNC51071.2022.9771859
- Sidna Jeddou, Fátima Fernández, Luis Diez, Amine Baina, Najid Abdallah, Ramón Agüero, “Delay and Energy Consumption of MQTT over QUIC: An Empirical Characterization Using Commercial-Off-The-Shelf Devices,” *Sensors* 2022, 22(10), 3694 doi:10.3390/s22103694
- Voichita Iancu, Luis Diez, Emil Slusanschi, Ramón Agüero, “Balancing the Electromagnetic Field Exposure in Wireless Multi-Hop Networks: An EMF-Aware Routing Scheme” *Mathematics* 2022, 10, 668 doi:10.3390/math10040668
- Luis Diez, Alberto Martínez-Alba, Wolfgang Kellerer, Ramón Agüero, “Flexible Functional Split and Fronthaul Delay: A Queuing-Based Model” *IEEE Access* 2021, Vol. 9. doi: 10.1109/ACCESS.2021.3124374
- Fátima Fernández, Mihail Zverev, Pablo Garrido, José R. Juárez, Josu Bilbao, Ramón Agüero, “Even Lower Latency in IIoT: Evaluation of QUIC in Industrial IoT Scenarios,” *Sensors* 2021, 21(17), 5737. doi:10.3390/s21175737
- Mihail Zverev, Pablo Garrido, Fátima Fernández, Josu Bilbao, Özgü Alay, Simone Ferlin, Anna Brunstrom, Ramón Agüero, “Robust QUIC: Integrating Practical Coding in a Low Latency Transport Protocol,” *IEEE Access* 2021, Vol. 9. doi:10.1109/ACCESS.2021.3118112

- Cristian C. Erazo-Agreto, Mario Garza-Fabre, Ramón Agüero, Luis Diez, Joan Serrat, Javier Rubio-Loyola, “Joint Route Selection and Split Level Management for 5G C-RAN,” *IEEE Transactions on Network and Service Management* doi:10.1109/TNSM.2021.3091543
- Néstor Hernández-Marcano, Luis Diez, Ramón Agüero, Rune Hylsberg-Jacobsen, “On the Queuing Delay of Time-Varying Channels in Low Earth Orbit Satellite Constellations,” *IEEE Access* doi:10.1109/ACCESS.2021.3089005
- Luis Diez, Cristina Hervella, Ramón Agüero, “A Quasi-Birth-Death model for Functional Split in 5G Controllers,” *Proceedings of IEEE ICC 2021* doi:10.1109/ICC42927.2021.9500266
- Luis Diez, Cristina Hervella, Ramón Agüero, “Understanding the performance of flexible functional split in 5G vRAN Controllers: A Markov Chain-based model,” *IEEE Transactions on Network and Service Management*, 18(1) (March 2021) doi:10.1109/TNSM.2020.3045968
- Luis Diez, Alfonso Fernández, Muhammad Khan, Yasir Zaki, Ramón Agüero, “Can We Exploit Machine Learning to Predict Congestion over mmWave 5G Channels?” *Appl. Sci.* 2020, 10(18), 6164, doi:10.3390/app10186164
- Luis Diez, Ramón Agüero, Alfonso Fernández, Yasir Zaki, Muhammad Khan, “Learning congestion over millimeter-wave channels,” *Proceedings of IEEE Wimob, 2020* doi:10.1109/WiMob50308.2020.9253443
- Fátima Fernández, Mihail Zverev, Pablo Garrido, José R. Juárez, Josu Bilbao, Ramón Agüero, “And QUIC meets IoT: performance assessment of MQTT over QUIC,” *Proceedings of IEEE Wimob, 2020* doi:10.1109/WiMob50308.2020.9253384
- M. Richart, J. Baliosian, J. Serrat, J. Gorricho and R. Agüero, “Slicing with Guaranteed Quality of Service in WiFi Networks,” *IEEE Transactions on Network and Service Management*, 17(3), (September 2020) doi:10.1109/TNSM.2020.3005594
- Goiuri Peralta, Pablo Garrido, Josu Bilbao, Ramón Agüero, Pedro M. Crespo. “Fog to cloud and network coded based architecture: Minimizing data download time for smart mobility”. *Simulation Modelling Practice and Theory*, 101. (May 2020) doi:10.1016/j.simpat.2019.102034
- Pablo Garrido, Isabel Sánchez, Simone Ferlin, Ramón Agüero, Özgü Alay. “rQUIC: Integrating FEC with QUIC for Robust Wireless Communications”. *Proceedings of IEEE Globecom 2019* doi:10.1109/GLOBECOM38437.2019.9013401
- Marcos Postigo-Boix, Ramón Agüero, José Luis Melús. “An alternative procedure to obtain the mortality rate with non-linear functions: Application to the case of the Spanish population”. *Plos ONE*, 14(10), 2019. doi:10.1371/journal.pone.0223789
- Talal Ahmad, Shiva R. Iyer, Luis Diez, Yasir Zaki, Ramón Agüero, Lakshminarayanan Subramanian. “Learning Congestion State For mmWave Channels”. *Proceedings of 3rd ACM Workshop on Millimeter-wave Networks and Sensing Systems, 2019*. doi:10.1145/3349624.3356769
- Pablo Garrido, Douglas Leith, Ramón Agüero. “Joint Scheduling and Coding for Low In-Order Delivery Delay Over Lossy Paths With Delayed Feedback”. *IEEE/ACM Transactions on Networking*, 27(5), pp 1987-2000. doi:10.1109/TNET.2019.2934522
- Javier Rubio-Loyola, Christian Aguilar-Fuster, Luis Diez, Ramón Agüero, Juan-Luis Gorricho, Joan Serrat. “Fast and Efficient Energy-Oriented Cell Assignment in Heterogeneous Networks”. *Wireless Networks, Springer, 2020*. doi:10.1007/s11276-019-02047-x

- Luis Diez, Andres Garcia-Saavedra, Victor Valls, Xi Li, Xavier Costa-Perez, Ramon Agüero. “LaSR: A Supple Multi-Connectivity Scheduler for Multi-RAT OFDMA Systems”. *IEEE Transactions on Mobile Computing*, 19(3) March 2020. doi:10.1109/TMC.2018.2876847
- Luis Diez, Víctor González, Ramón Agüero. “Minimizing delay in NFV 5G Networks by means of flexible split selection and scheduling”. *Proceedings of VTC-Fall 2019* doi: 10.1109/VTCFall.2019.8891238
- Luis Diez, Ramón Agüero. “Uplink Power Control Modeling for Dense OFDMA-based Heterogeneous Networks”. *Proceedings of PIMRC 2019* doi:10.1109/PIMRC.2019.8904453
- Pablo Garrido, Isabel Sánchez, Simone Ferlin, Ramón Agüero, Özgü Alay. “(Poster) rQUIC: Integrating FEC with QUIC for Robust Wireless Communications”. *Proceedings of IFIP Networking 2019*
- Matías Richart, Javier Baliosian, Joan Serrat, Juan Luis Gorricho, Ramón Agüero. “Guaranteed Bit Rate Slicing in WiFi Networks”. *Proceedings of IEEE Wireless Communications and Networking Conference (WCNC’19)*. doi:10.1109/WCNC.2019.8885636
- Goiuri Peralta, Pablo Garrido, Josu Bilbao, Ramón Agüero, Pedro M. Crespo. “On the Combination of Multi-Cloud and Network Coding for Cost-Efficient Storage in Industrial Applications”. *Sensors 2019*, 19(7), 1673. doi:10.3390/s19071673
- Matías Richart, Javier Baliosian, Joan Serrat, Juan-Luis Gorricho, Ramón Agüero. “Slicing in WiFi Networks Through Airtime-Based Resource Allocation”. *Journal of Network and Systems Management 2019*, 27(3). doi:10.1007/s10922-018-9484-x
- Pablo Garrido, Alfonso Gutiérrez, Ramón Agüero. “To Recode or Not to Recode: Optimizing RLNC Recoding and Performance Evaluation over a COTS Platform”. *Proceedings of European Wireless 2018*
- Pablo Garrido, Ramón Agüero. “Improving wireless multicast communications with NC: performance assessment over a COTS platform”. *Proceedings of Wireless Networks and Communications Conference, WCNC’18* 10.1109/WCNC.2018.8377395.

EDITORIAL SERVICES

- *Mobile Networks & Applications*, Springer, Guest Editor of 8 Special Issues since 2011
- *Wireless Networks*, Springer. Member of the editorial board since January, 2015
- *IEEE Communication Letters*. Member of the editorial board since January, 2017. Senior Editor from September 2019 until June 2023. Area Editor from July 2023. Exemplary editor recognition in 2019, 2021 and 2022.
- *Mobile Information Systems*, Hindawi. Member of the editorial board, from June, 2018 to July, 2023.
- *IEEE Open Journal of the Communication Society*. Member of the editorial board since September, 2019.
- *IEEE Systems Journal*. Member of the editorial board since January, 2023.

COMMITTEE AND REFEREE SERVICES

- General Chair of the *Mobile Networks and Management*, MONAMI conference in 2010, 2015 and 2016
- TPC Chair of the *Mobile Networks and Management*, MONAMI conference in 2009, 2011, 2012, 2013 and 2014
- Mobile and Wireless Networks Track Chair in the *International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC)* in 2015 and 2016

	<ul style="list-style-type: none"> - Emerging Technologies, Architectures and Services Track Chair in the <i>IEEE Wireless Communications and Networking Conference (WCNC)</i> in 2018. - Applications and Business Track Chair in the <i>International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC)</i> in 2020. - TPC Chair in European Wireless 2019. - Workshop Chair in European Conference on Networks and Communications, EUCNC 2019. - Communication QoS, Reliability, & Modeling Symposium Co-chair in <i>IEEE GLOBECOM</i> 2021. - Workshop chair in the <i>IEEE Wireless Communications and Networking Conference (WCNC)</i> in 2024. - Tutorial chair in the <i>IEEE International Mediterranean Conference on Communications and Networking (MeditCom)</i> in 2024. - Regular TPC member of various conferences, including: PIMRC, WCNC, WiMob, ISWCS, ICC, Globecom, Wireless Days, European Wireless - Regular reviewer of several journals and magazines, including: IEEE Communications Magazine, IEEE Transactions on Networking, IEEE Communication Letters, Wireless Networks, Computer Networks
INVITED TALKS, TUTORIALS	<ul style="list-style-type: none"> - Tutorial speaker in European Wireless 2018. “Intra-flow sparse network coding: Modeling and open issues”
OTHER RESPONSIBILITIES	<p>Ramón Agüero was the main organizer and chaired the following two Summer Schools.</p> <ul style="list-style-type: none"> - SAIL Summer School. Santander, June 25th-28th, 2012. More than 50 attendees the event, which featured 11 Lectures and 2 keynotes. A PhD Work-In-Progress session was also organized within the event. - LEXNET Summer School on Low-EMF Communications and Networking. Santander, July 6th-9th, 2015. More than 40 attendees the event, which featured 11 different talks.
ADDITIONAL INFORMATION	<ul style="list-style-type: none"> - IEEE Senior Member since 2015