institute imdea networks

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annual report

2024

developing the science of networks

foreword

annual report 2024

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Arturo Azcorra
Director of the IMDEA Networks Institute

IMDEA Networks Institute stands as a premier research institute dedicated to the Science of Networks and Communication Technology. At the forefront of our mission is the pursuit of fundamental, systems-oriented networking research with a strong emphasis on technology transfer to industry and standard bodies. Our diverse team of researchers boasts expertise across a spectrum of topics including mobile networks, protocols, security, optimization, and machine learning, among others.

One of the most exciting developments in the area of mobile networks in recent years is the rise of Integrated Sensing and Communication (ISAC), a concept that combines wireless communication with the ability to sense the physical environment. Instead of treating sensing and communication as separate systems, ISAC allows both to happen through the same wireless infrastructure, which opens up a wide range of possibilities. This approach has clear applications from enabling safer autonomous vehicles and more responsive smart factories to improving energy efficiency and even supporting healthcare services. Networks are no longer just carrying data, they are becoming more aware of the world around them.

At the same time, designing well performing, efficient ISAC systems is not straightforward. It involves assigning network resources to balance the competing goals of fast data transmission while gathering accurate sensing information. At IMDEA Networks, we have been working on algorithm to extract high-accuracy sensing information from limited data as well as architecture designs to seamlessly integrate ISAC algorithms and the machine intelligence that then processes the sensing data into mobile networks.

Interest in ISAC is growing fast, not just in academia but across industry and standardization bodies. 3GPP and IEEE are already discussing how to include ISAC in future wireless standards, and companies are starting to explore early use cases. We are contributing to this momentum through several EU-funded research projects, where we collaborate with both academic and industrial partners to develop practical solutions and field-test our prototype designs.

One of the things that makes ISAC so compelling is that it brings together several different disciplines, from signal processing and machine learning to hardware design and real-world applications. We work across all of these areas to build systems that are not just technically sound, but also useful and deployable.

ISAC is a powerful tool for the future of wireless networks and will likely play a key role in 6G. At IMDEA Networks, we explore where it works best, what its limitations are, and how to make it part of tomorrow's network infrastructure in a way that works well in practice.

As every year, my gratitude goes to the Regional Government of Madrid for its continued support of this economy transforming initiative, as well as to all those who are contributing to make this exciting project an international success.

annual report 2024

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table of contents

executive summary

annual report

2024

www.networks.imdea.org

A research team of technical leaders

The IMDEA Networks research team consists of distinguished technical leaders. All researchers at IMDEA Networks have exceptional research records, with publications in their field's most influential venues, and have graduated from or worked at top-tier international universities. Additionally, our scientists have extensive industry experience, having worked at leading industry research laboratories and obtained numerous patents throughout their careers. This blend of academic and industry expertise is crucial for conducting research that can be transferred to companies and transformed into profitable products, fostering economic growth and job creation.

Alongside our world-renowned experienced researchers, the Institute's research team also includes highly motivated pre-doctoral researchers who are eager to explore new ideas while pursuing their PhD theses at IMDEA Networks. In 2024, the Institute graduated 7 new PhD students and hired 8 new pre-doctoral researchers. This continuous output of highly qualified doctors significantly contributes to the national and European economy.

Our researchers' international reputation is underscored by the prestigious awards and prizes they receive. In 2024, Research Professor Marco Ajmone Marsan was awarded the prestigious ACM SIGMETRICS Achievement Award. The award recognizes his outstanding contributions to stochastic modeling and analysis techniques and for application of the techniques to obtain a wealth of pioneering results in the analysis of communication protocols and energy efficiency in computer systems and networks. Furthermore, Javier Talavante, a PhD student at IMDEA Networks, has won second place in the II Edition of the Young Entrepreneurship Awards of the Community of Madrid in the innovative modality with the spin-off Sensory-FI, developing the greenhouse monitoring system LiFi4Food. This achievement highlights IMDEA Networks' strong contributions to regional technology transfer.

For the years of 2020 to 2024, IMDEA Networks ranked No. 2 in the csrankings.org index for mobile computing research, No. 2 in measurements and performance analysis, and No. 18 in Europe for computer networks.

The excellence of our scientific results

IMDEA Networks had a significant impact this year on leading conferences and journals in our field. We published numerous papers in top journals such as IEEE Transactions on Network and Service Management, IEEE Journal on Selected Areas in Communications, IEEE Transactions on Mobile Computing, and IEEE Transactions on Wireless Communications, as well as at top conferences like IEEE INFOCOM, ACM IMC, ACM MOBICOM, and Usenix Security Symposium.

In 2024, our scientific contributions have once again shone at IEEE INFOCOM, where IMDEA Networks ranks first among European institutions with 8 papers published at this conference. We are proud to have had 2 papers presented at ACM MOBICOM 2024, and 1 paper at the Internet Measurement Conference (IMC 2024). This milestone reaffirms our status as a leading international research center.

Our team's dedication to producing outstanding scientific work resulted in numerous publications and awards in 2024. For instance, IMDEA Networks researchers received the IEEE INFOCOM 2024 Best Paper Award for their paper "AIChronoLens: Advancing Explainability for Time Series AI Forecasting in Mobile Networks", and the MedComNet 2024 Best Paper Award for the paper "The Rumble in the Millimeter Wave Jungle: Obstructions Vs RIS". Additionally, IMDEA Networks researchers received the EWSN 2024 Best Demo Runner-Up Award.

We also had the honor of organizing the 24th edition of ACM IMC 2024, an internationally selective forum for cutting-edge research on empirical network measurements and analysis. Our researchers also regularly serve on the Technical Program Committees of these conferences. Moreover, Marco Fiore received the Distinguished TPC Member Award at IEEE Infocom 2024, Sergey Gorinsky received the Outstanding Reviewer Award at ACM Multimedia 2024, and Guillermo Suárez-Tangil received the Distinguished Reviewer Award at USENIX Security'24.

These honors underscore IMDEA Networks' commitment to excellence and its continued influence in advancing networking and communications research.

Contributing to a knowledge-based economy

IMDEA Networks strives to produce high-quality research that contributes to a knowledge-based economy. Our strategy for transferring scientific and technological developments to industry has led to numerous new collaborations and strengthened existing partnerships with key industrial collaborators.

In 2024, our researchers participated in 32 ongoing research projects funded from diverse sources: 15 European projects, 18 national projects, 3 funded by the Regional Government of Madrid, and 5 contracts with industrial partners.

Among our industry collaborations, notable strategic partnerships include those with Telefonica, which co-founded 5TONIC with IMDEA Networks and has a Joint Research Unit (JRU), along with participating in multiple research projects. Ericsson is a key partner of 5TONIC and collaborates with IMDEA Networks on several fronts, including research pro-

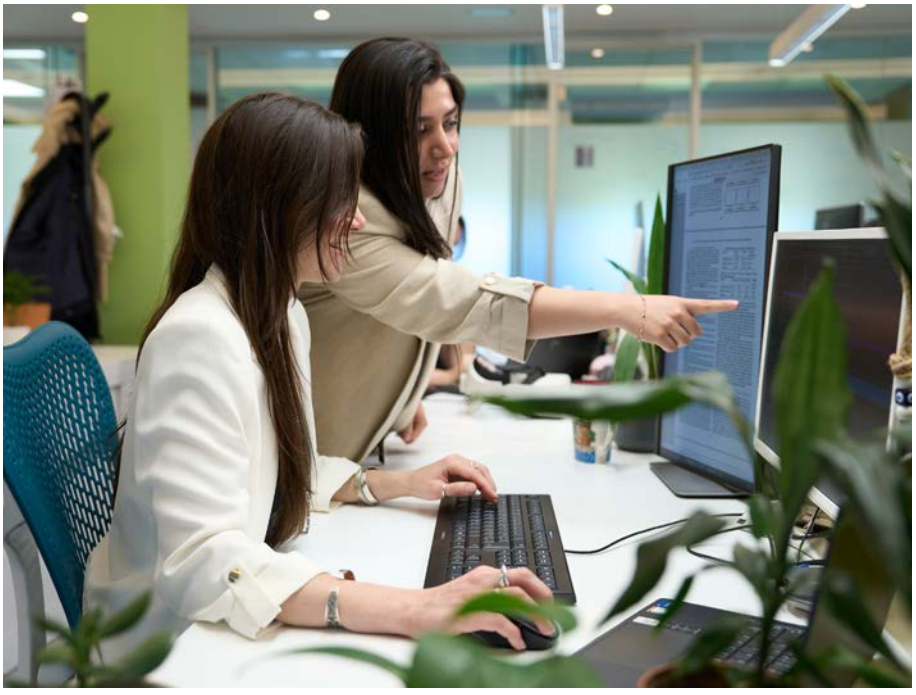
jects and leading Masters programs on SDN and NFV. NEC also collaborates extensively with IMDEA Networks and has established a JRU with us.

Communicating our results

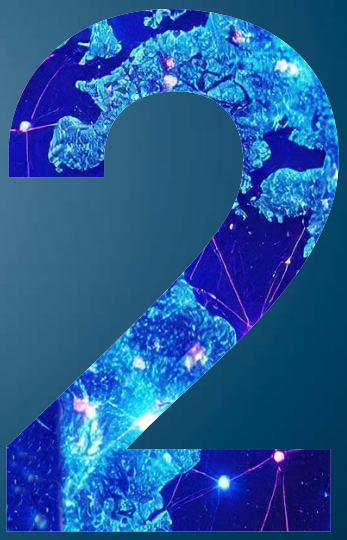
Beyond producing high-quality technical results, it is vital for the Institute to communicate these contributions to society. Our outreach targets the general public, prospective PhD students, scientists, academics, specialists from other areas, decision-makers, stakeholders, and collaborators, to highlight the benefits of having such a research institute in Madrid.

Over the past years, IMDEA Networks has consistently appeared in both national and international, specialized and general media with extensive outreach. This year was no exception, with our news being featured in approximately 130 unique media outlets, including ABC, El País, Telemadrid, La Vanguardia, Invertia (El Español), La Razón, COPE, RTVE, Agencia SINC, Redes Telecom, Cadena Ser Madrid Sur, Innovaspain, Telecompaper, Total Telecom, and Science X Network.

Building on our 2024 results, we look forward to making further impactful scientific discoveries, establishing fruitful collaborations, launching exciting new research initiatives, and increasing our outreach in the coming year, all for the benefit of society.



about us



annual report 2024

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2.1. Profile

IMDEA Networks Institute is a research organization on computer and communication networks whose multinational team is engaged in cutting-edge fundamental science and technology. As an English-speaking institute located in Madrid, Spain, IMDEA Networks offers a unique opportunity for pioneering scientists to develop their ideas. IMDEA Networks has established itself internationally at the forefront in the **development of future network principles and technologies.** Our **team** of highly reputed researchers is designing and creating today the networks of tomorrow.

Some keywords that define us: *5G, 6G, Big Data, blockchains and distributed ledgers, cloud computing, content-delivery networks, data analytics, energy-efficient networks, fog and edge computing, indoor positioning, Internet of Things (IoT), machine learning, millimeter-wave communication, mobile computing, network economics, network measurements, network security, networked systems, network protocols and algorithms, network virtualization (software defined networks – SDN and network function virtualization – NFV), privacy, quantum communication, social networks, vehicular networks, wireless networks and more…*

2.2. Our Strategic Goals

- Conduct first class research on an international level in the area of computer networking.
- Transfer technology to the industrial sector, in order to improve its capacity for innovation and competitiveness.
- Transfer technology to spin-off-companies in order to promote the release of new products and services to the global market.
- Attract and retain human capital of excellence with the aim to internationalize research in the Madrid region.
- Collaborate with Madrid's industrial sector, research centers and educational institutions.

2.3. Our Vision

IMDEA Networks focuses on an area that has a profound impact on people's lives. Over the last decades, the Internet, smartphones, Wi-Fi and social networks transformed society and the economy. Indeed, the **widespread access to networks** has dramatically changed the way manufacturers produce and supply their goods, how public administrations operate, how professionals work and in general how individuals and society are shaped. **The Internet socio-economic phenomenon** continues to transform our lives at an amazing pace, and will continue to do so in the future with the deployment of new communication technologies and paradigms.

2.4. Our Mission

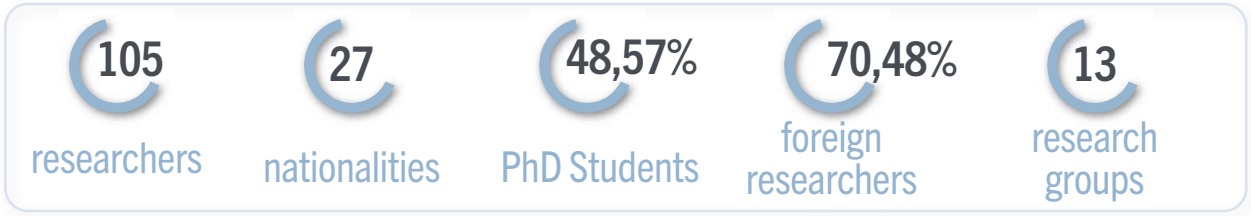
Our mission is to create value by **leading research in protocol, algorithm and systems developments** that enable the **Digital Knowledge Society.** We do this by conducting research and developing innovative and useful scientific and technical advances in the above areas, while actively **promoting their successful transfer to market.** The Institute strives to provide optimal working conditions and the most attractive and best-equipped environment in which researchers can focus on this process of innovation and scientific advance.

RESEARCH GROUPS

- Global Computing Group [Antonio Fernández Anta]
- Internet Analytics Group [Narseo Vallina-Rodríguez]
- NETCOM Lab [Arturo Azcorra, Albert Banchs]
- NetEcon Group [Sergey Gorinsky]
- Opportunistic Architectures Lab [Marco Ajmone Marsan and Vincenzo Mancuso]
- Pervasive Wireless Systems Group [Domenico Giustiniano]
- Wireless Networking Group [Joerg Widmer]
- Data Transparency Group [Nikolaos Laoutaris]
- Networks Data Science Group [Marco Fiore]
- Cybersecurity Group [Guillermo Suárez-Tangil]
- Quantum Information Group [Marius Paraschiv]
- Resilient AI Networking Lab [Claudio Fiandrino]
- Distributed Systems and Networks Group [Lucianna Kiffer]

2.5. The Institute in figures

The core strength of the Institute is its international **research team, consisting of talented researchers from 27 different nationalities,** which carries out new scientific discoveries in Computer Networks, and foster the development of emerging technologies.



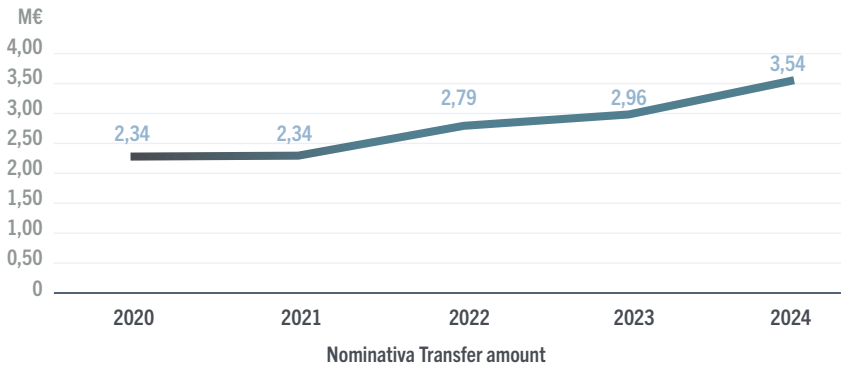
The facilities of IMDEA Networks Institute

The building and laboratories of IMDEA Networks Institute are located at Leganés, Madrid.

535,49 m² of research labs

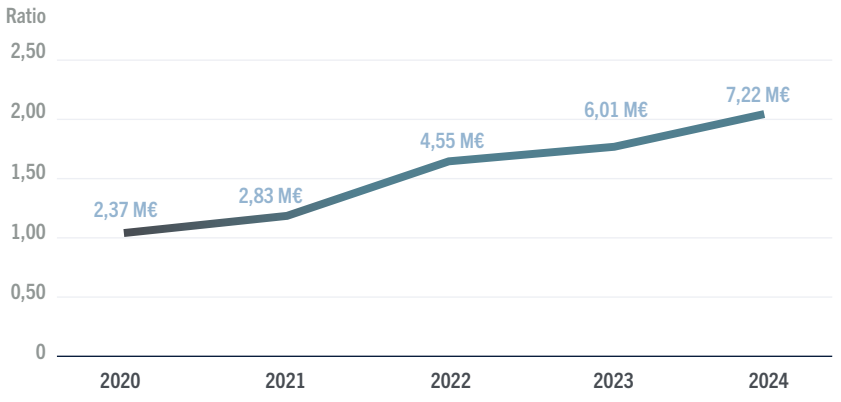
In order to support cutting-edge research, IMDEA Networks invests in the latest, **state-of-the-art laboratories and laboratory test equipment**, endowing the Institute with the capacity of transforming research into high added value products and services.

Direct Funding by the Madrid Regional Government



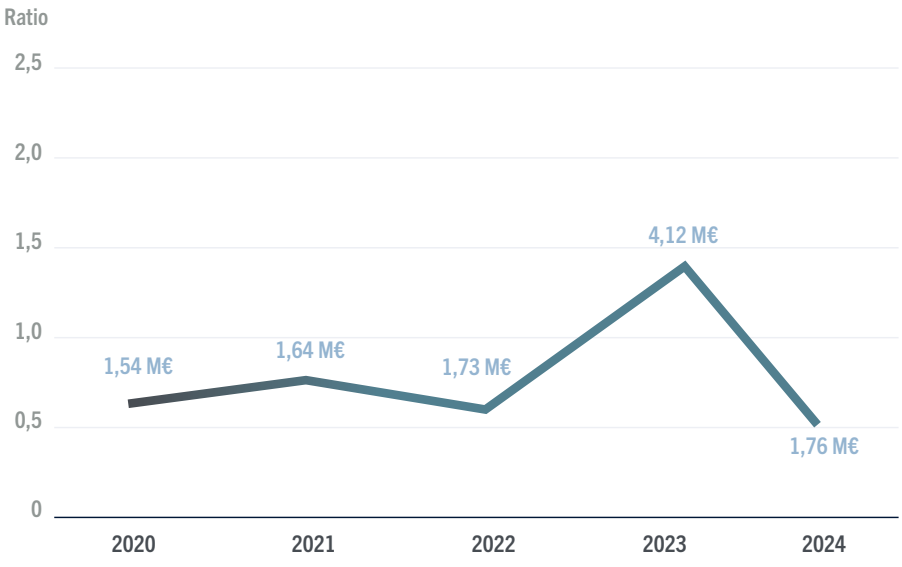
Nominativa Transfer amount

We bring Money to Madrid: Self Funding



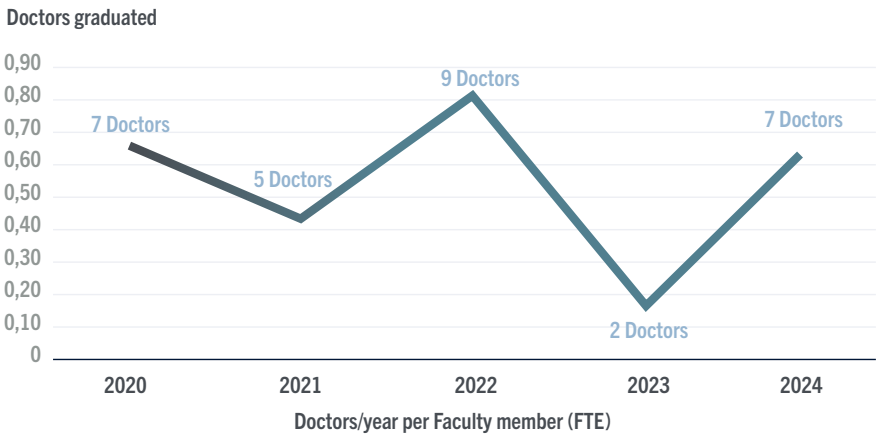
External Fund / Nominativa

We improve the Competitiveness of Madrid: Projects & Contracts with Industry

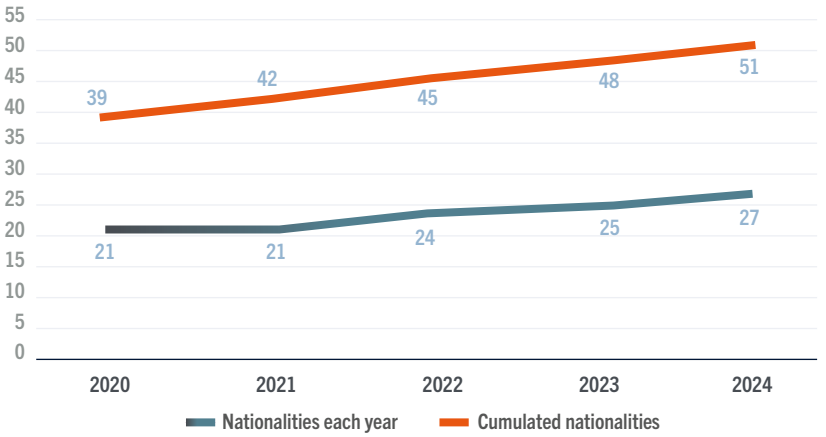


Funds from projects & contracts with industry / Nominativa

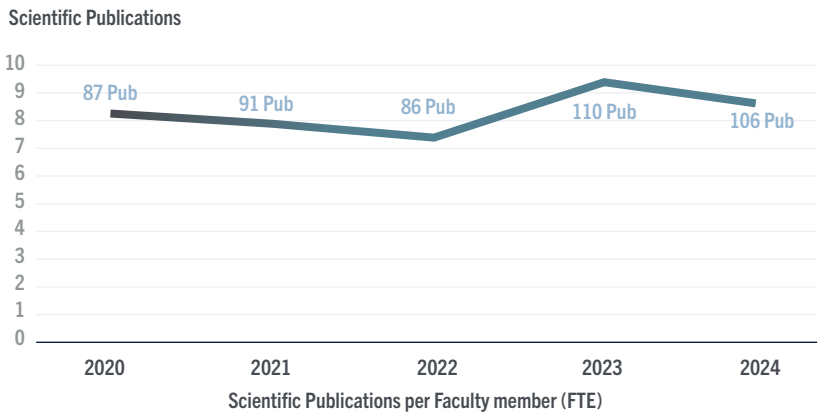
We produce Talent for Madrid: Doctors/year per faculty member (FTE)



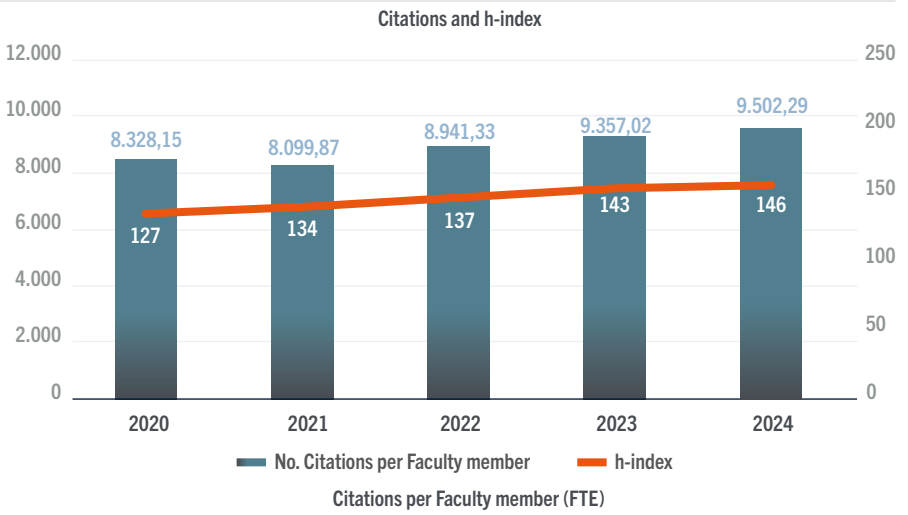
We produce Internationalization of Madrid: Nationalities (Cumulative & Current)



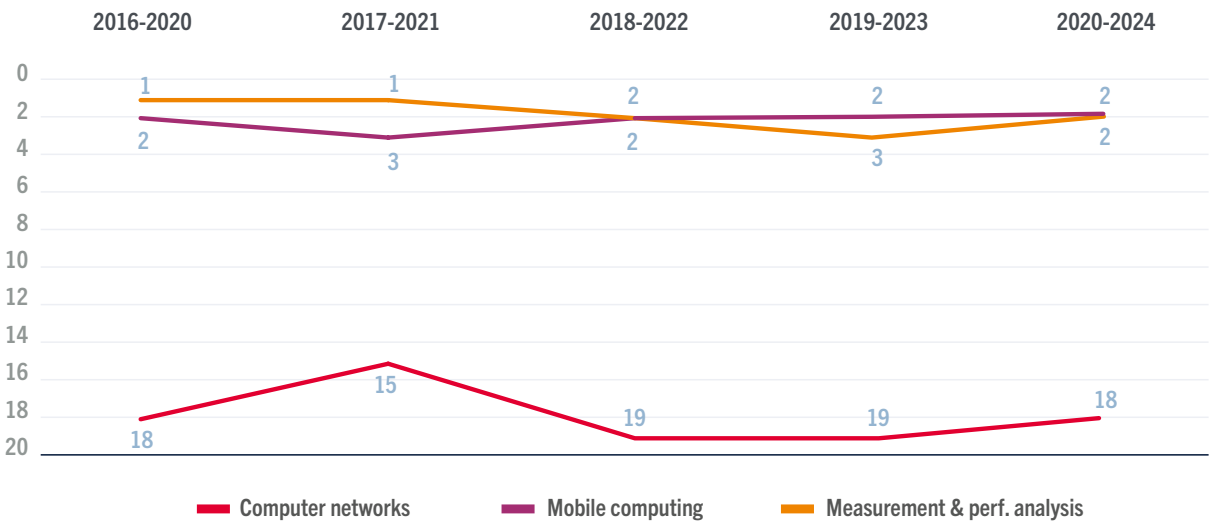
We produce Science in Madrid:Journal and Conference Publications



We produce Leadership for Madrid: Citations

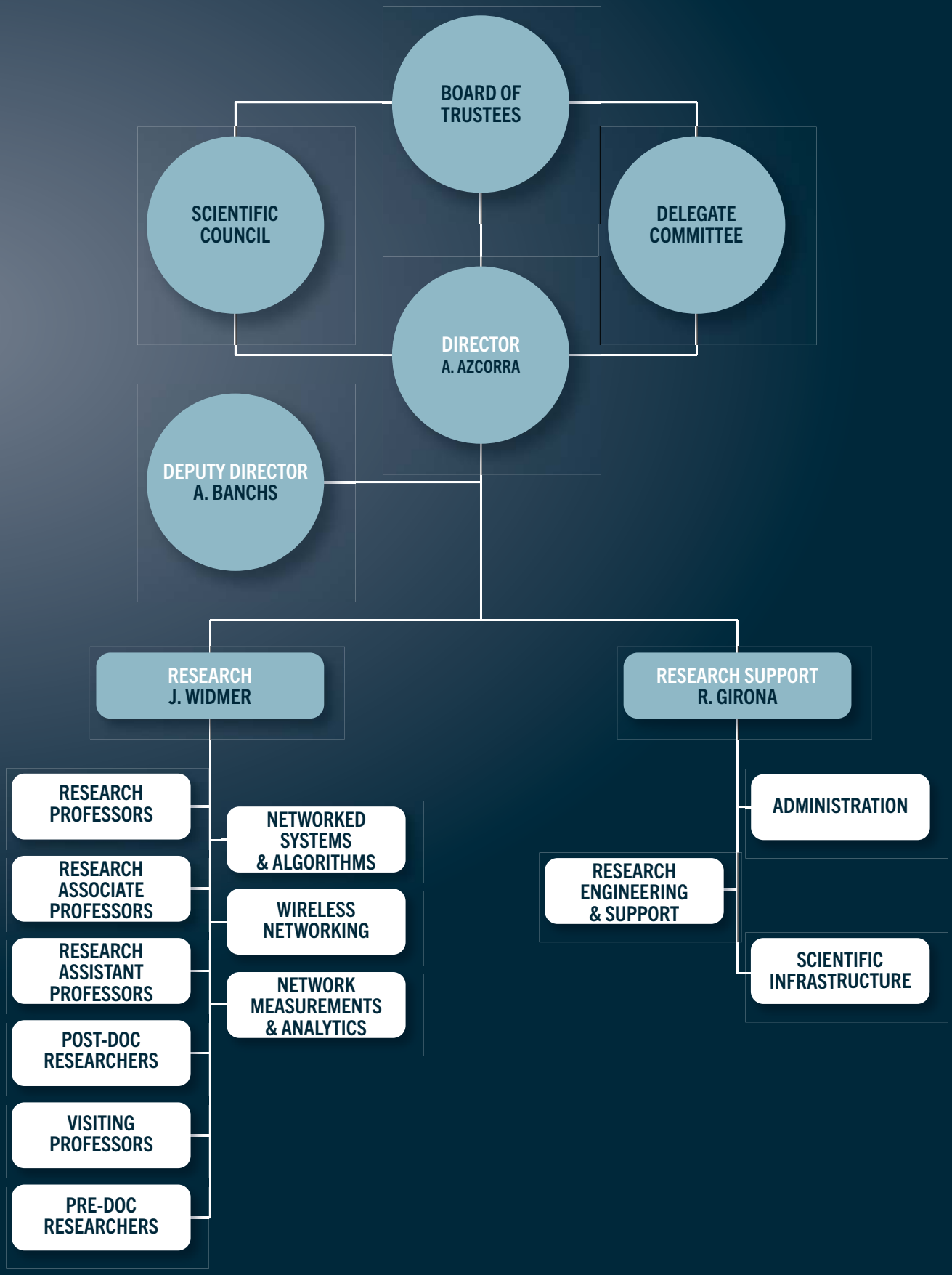


We produce Leadership for Madrid: CS-Rankings European Position



Mobile Computing CS-Rank 2020-2024

1 ▶ TU Delft
2 ▶ IMDEA Networks Institute
3 ▶ University of Edinburgh
3 ▶ University of Oxford
5 ▶ University of Cambridge
6 ▶ Politecnico di Milano
7 ▶ ETH Zurich
8 ▶ KU Leuven
8 ▶ University of Southampton
10 ▶ EPFL
11 ▶ Imperial College London
11 ▶ University College London
11 ▶ Uppsala University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RESEARCH ENGINEERING & SUPPORT
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2.6.1. Board of Trustees

The Board of Trustees of IMDEA Networks Institute is its highest organ of governance, representation and administration. In accordance with the Institute's statutes, the Board of Trustees is composed of Ex Officio Members representing the Regional Government of Madrid and Elective Members who are recognized leaders in the scientific matters of the Institute. The Director and General Manager of the Institute also participate in the Board of Trustees.

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Prof. Dr. Ralf Steinmetz

Vice-President
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Vice-Ministry of Universities, Science and Innovation
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Vice-Presidency, Department of Education and Universities
Regional Government of Madrid
(Madrid, Spain)

Sr. D. José de la Sota Ríus
Scientific-Technical Coordinator
Madrimasd Foundation for Knowledge
(Madrid, Spain)

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Technische Universität Darmstadt
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The University of Texas at Austin
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Independent consultant

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Designated representative
Prof. Dr. Luis Javier García Villalba
Associate Professor of the Department of Software Engineering and Artificial Intelligence
Faculty of Computer Science & Engineering

2.6.2. Scientific Council

The Scientific Council is a very important organ of IMDEA Networks, advising us on all aspects of the Institute's scientific activities. Among many other things, the Council proposes the incorporation and renewal of Scientific Expert members of the Board of Trustees; reviews and approves scientific appointments, and generally provides support to the Director – Dr. Arturo Azcorra- and the Deputy Director – Dr. Albert Banchs – in determining scientific research strategy and policies.

The Institute's Scientific Council is composed of internationally prestigious researchers in the field of Telematics and Internet technologies. IMDEA Networks is greatly strengthened by the participation of these eminent scientists. The current members are:

Dr. Gonzalo CAMARILLO

Position: Head of Implementation Components, Ericsson. Finland

PhD: Aalto University. Helsinki. Finland

Research: Signaling; Multimedia applications; Transport protocols; Network security; Networking architectures

Prof. Dr. Carla Fabiana CHIASSERINI

Position: Full Professor, Department of Electronics and Telecommunications, Politecnico di Torino. Torino. Italy

PhD: Electronic Engineering and Telecommunications. Politecnico di Torino. Italy

Research: Wireless and mobile networks

Prof. Dr. Jon CROWCROFT

Position: Marconi Professor of Communication Systems at University of Cambridge. Cambridge. UK

PhD: Computer Science, University College London (UCL) (England, UK)

Research: Computer Science

Prof. Dr. Gustavo DE VECIANA

Position: Cockrell Family Regents Chair in Engineering Professor and Associate Chair of Electrical and Computer Engineering at the University of Texas at Austin. USA.

PhD: Electrical Engineering, University of California at Berkeley. USA

Research: Analysis and Design of Wireless and Wireline Telecommunication Networks; Architectures and Protocols to Support Sensing and Pervasive Computing; Applied Probability, Queuing and Information Theory

Prof. Dr. Jim KUROSE

Position: Distinguished University Professor of Information and Computer Sciences at the University of Massachusetts at Amherst. MA. USA.

PhD: Columbia University. United States

Research: Network Protocols and Architecture; Network Measurement; Sensor Networks; Multimedia Communication; Modeling and Performance Evaluation

Prof. Dr. Edward KNIGHTLY

Position: Sheafor-Lindsay Professor and Department Chair of Electrical and Computer Engineering at Rice University. Houston. Texas. USA

PhD: University of California at Berkeley. Berkeley. USA

Research: Wireless Networks and Protocols; Wireless Access for Developing Regions; Dynamic Spectrum Access Networks

Dr. Pablo RODRÍGUEZ RODRÍGUEZ

Position: Director, CTO Office at Google. CA. USA.

PhD: École Polytechnique Fédérale de Lausanne (EPFL). Lausanne. Switzerland

Research: Networking; Distributed Systems; Information Theory; Wireless and Mobile; Network Economics; Social Networks

Prof. Dr. Ralf STEINMETZ

Position: President of Board of Trustees of IMDEA Networks Institute; Full Professor & Managing Director of Multimedia Communications Lab (KOM) at Technische Universität Darmstadt. Darmstadt. Germany

PhD: Electrical Engineering. Technische Universität Darmstadt. Darmstadt. Germany

Research: Scalable Quality of Service; Content Distribution Networks; Context Aware Communications; Adaptive Mobile Networking; Knowledge Media; Serious Games

Prof. Dr. Ioannis STAVRAKAKIS

Position: Full Professor & Head Department of Informatics and Telecommunications. National and Kapodistrian University of Athens. Athens. Greece

PhD: Electrical Engineering. University of Virginia. Charlottesville. USA

Research: Resource Allocation Protocols and Traffic Management for Communication Networks, with recent emphasis on Peer-to-Peer, Mobile, Ad hoc, Autonomic and Social Networking

Dr. Heinrich J. STÜTTGEN

Position: Independent consultant

PhD: Computer Science, Associative Memory Architecture, University of Dortmund. Germany

Research: Network Architecture and Protocols; Software Defined Networking; Internet of Things (IoT)

research areas

annual report

2024

www.networks.imdea.org

As illustrated by **our motto** – **Developing the Science of Networks** – IMDEA Networks identifies and addresses major scientific and engineering challenges in communications and computer networks, and also aims to develop these results by bringing them into practical deployments. The nature of these challenges varies with ever-greater rapidity. To ensure the relevance of our research activities, we continuously adjust our research agenda to stay at the forefront of technological innovation. We organize our scientific activities into research areas that reflect our current working priorities, ensuring sufficient flexibility to allow us to respond to emerging technological challenges. The research mission of our Institute also adapts to the strengths of our growing research team and our external collaborators.

The research work at IMDEA Networks is led by **Joerg Widmer,** who is the **Research Director** of the Institute and therefore responsible for its research direction.

Currently, our scientific work focuses on the following three general areas:

network design&intelligence

3.1. Network Design and Intelligence

Any network has a structure and needs protocols to achieve its objectives. The researchers of IMDEA Networks Institute have an extensive expertise in architectures and protocols for communication networks, e.g., for network topology design, routing, forwarding, packet classification, in-network storage, congestion control, and media access control. Besides, we have research interests in other networking domains such as social networks, energy networks, and transportation networks.

Our research takes a multi-disciplinary approach to the design and understanding of network protocols and architectures. We go beyond technological constraints and account also for social and economic factors. For example, our research on Internet routing and forwarding accounts for the multitude of Internet service providers and their individual economic interests. In working on either centralized or decentralized solutions to problems, we assume that perfect information is never available. To deal with such uncertainty as well as selfishness of individual entities, our analysis adopts game-theoretic techniques and online algorithms. Our protocol design assumes that behavior of counterparts is always unpredictable to some extent. Hence, the designed protocols rely on continuous learning and adaptation as the main modes of operation.

Practicality is another distinguishing aspect of our research. Real data serves as a departing point for our analytical efforts as well as a basis for validating our analytical conclusions. For instance, our large-scale simulation studies of Internet routing rely on real Internet topologies. Furthermore, we implement our theoretical ideas and make the prototypes available to the public, either directly or through our commercial partners.

An important focus of our work is on the systems side of networks. For example, we explore tradeoffs between simplicity and expressiveness of packet processing engines, new abstractions for heterogeneous control planes, and network virtualization techniques. We also work on networking aspects that pertain to cloud computing.

3.2 Wireless Communication and Sensing

wireless communication&sensing

Given the scarcity of wireless spectrum resources and the rising demand for mobile applications, optimizing wireless communication and improving wireless network architectures is currently one of the most important and challenging research topics in networking. The proliferation of inexpensive, high-rate mobile devices and ubiquitous connectivity opens up a vast spectrum of possible new services but also poses unique challenges concerning scalability, interference and the unpredictability of the wireless medium.

IMDEA Networks is involved in a number of different wireless research areas. We are investigating emerging wireless technologies such as extremely high frequency communication for 5G and wireless LAN and Visible Light Communication, which promise to increase wireless data rates by an order of magnitude or more. Our work on capacity improvements also focuses on topics such as ultra-dense networks, intelligent interference management, cooperative coding and network coding, improved medium access control mechanisms that make use of advanced physical layer technologies such as MIMO, successive interference cancellation, etc.

At the same time, mobile network architectures need to support these new technologies as well as new use cases, and thus become more flexible. We perform research on network architectures for 5G and beyond, specifically focusing on software-defined networks

(SDN)-based architectures and network function virtualization (NFV). In addition, wireless networks are becoming more heterogeneous as they are gaining traction in more diverse use cases such as the Internet of Things (IoT) and intermittently connected or delay-tolerant networks, unmanned aerial vehicular networks. The research activities span medium access control (MAC), routing, error control and transport protocols, both as standalone entities and as part of cross-layer design frameworks. To improve the flexibility and programmability of future wireless technologies, we also explore novel programmable interfaces that expose low-level operations to foster network evolution and enable performance optimization and service customization. For a number of the above use case scenarios, efficient and accurate device localization is highly useful.

We recognize the importance of bridging the gap between theoretic results and applied wireless research and have deployed a range of wireless testbeds (for mm-wave, visible light communication, 5G, IEEE 802.11, and others) on which we implement and evaluate our ideas.

network measurements, cybersecurity&privacy

3.3 Network Measurements, Cybersecurity and Privacy

The rapid evolution of the Internet, comprising the fixed network, mobile portable systems and the Internet of Things (IoT) has given birth to a rich ecosystem of applications, personalization and services that is changing the way billions of users communicate and interact with their environment. This digitalization of the world has allowed new innovative applications with new levels of personalization and the ability to interact the environment. However, this trend is also producing large volumes of data, which may raise privacy and security threats unseen in previous networked technologies while also generating unknown traffic patterns and performance bottlenecks which can have a negative impact on the network and user experience.

At IMDEA Networks, we are involved in novel research efforts to empirically illuminate how users, networks, devices and applications interact, behave and perform in the wild.

Our research is particularly focused on conducting analytical measurements of real-world networked systems, with a strong interest in understanding their use (and abuse) as well as the performance, privacy and security challenges present in emerging networking technologies. Our research team also develops Big Data solutions to analyze and process large-scale traffic-, network- and application-generated data fast and correctly.

At IMDEA Networks, we engage and collaborate with users, cyber-activists, industry and regulators to identify and address important problems of societal, industrial and academic interest from a practical angle. Often times, our researchers are responsible for developing practical tools to assist the different stakeholders to understand how users, devices, networks, services, and applications interconnect, perform and behave behind the scenes.

3.4 Headquarters and research laboratories infrastructure

3.4.1 Headquarters

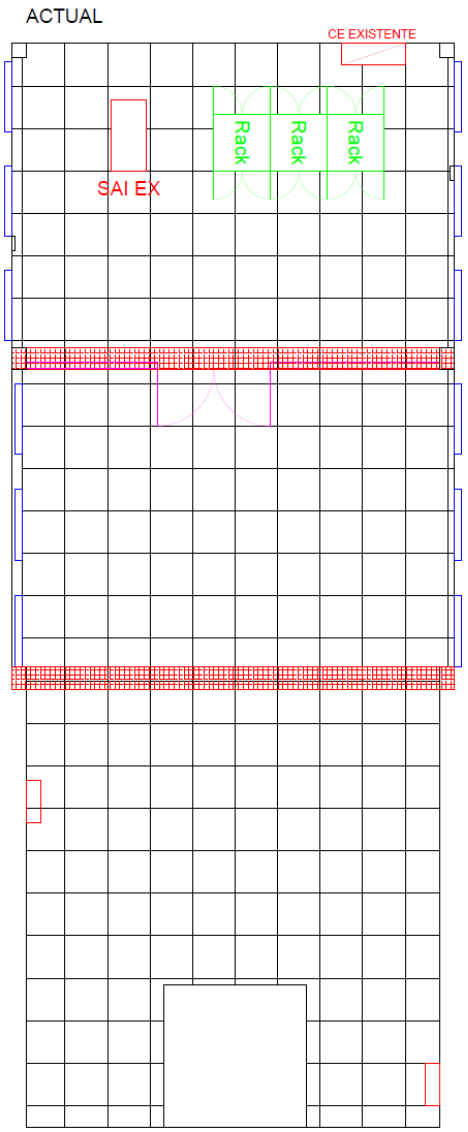
IMDEA Networks includes in its goals the provision of the highest international level of research and technology development capabilities geared to the advancement of future Internet technologies. Our headquarters aim to fulfill the functional requirements of a leading- edge research center and to attract researchers from around the World. The main objective of our office and lab space is to provide a high quality-working environment for researchers.

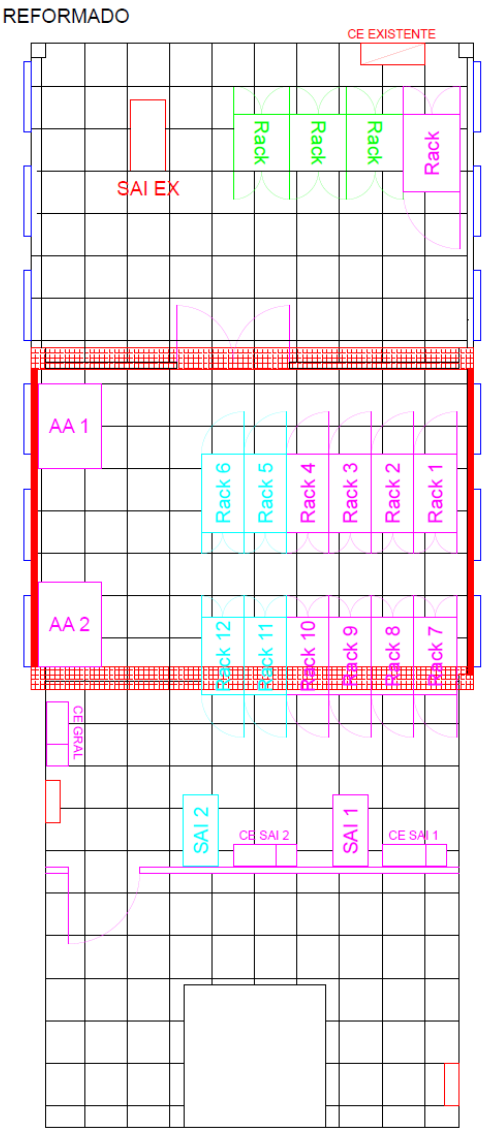
We are continuously refurbishing our site at Avenida del Mar Mediterráneo in Leganes (Madrid) in order to furnish it with renovated and extended facilities. The new spaces are conceived primarily with researchers' needs and preferences in mind, including spacious premises with state-of-the-art facilities and equipment, labs adapted to the needs of our lines of research, with excellent communications and ICT infrastructure, and specific research equipment.

The area of the building already remodeled in 2024 amounted to 3,025 m^2.

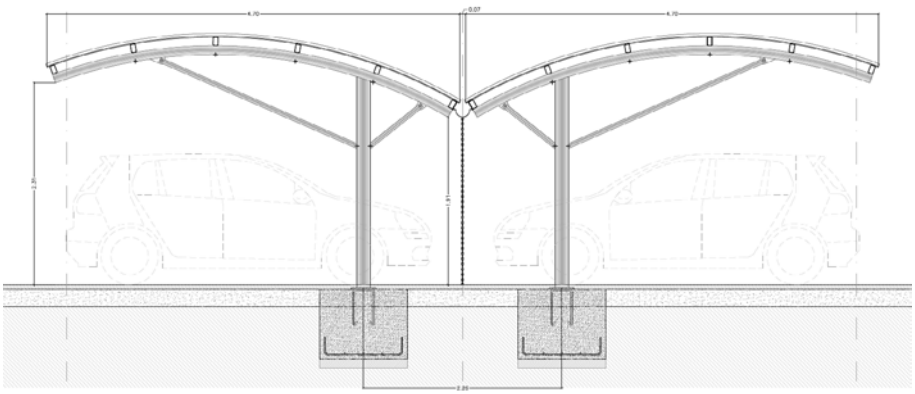
During 2024 we have performed the following works to improve our facilities:

• **New data center:** in the scope of the UNICO I+D infrastructure projects ADVANCE-6G, INES and TEST-6G, funded by the Plan de Recuperación, transformación y Resiliencia – Next GenerationEU, we have started the works for the construction of a new data center to host all the infrastructure and equipment (servers, switches, firewalls…) contemplated in these projects.





- **New canopy for the main parking:** a new canopy of polycarbonate has been installed in the main parking of the institute, to provide shadow to a larger number of spaces of the parking.



- **Renovation and installation of new A/C machines:** some of the oldest A/C units on the 2nd floor of the main building (areas 2E and 2C) and the X3 lab of 5TONIC have been replaced by new, more efficient and powerful units to improve the climatization conditions of these areas. Besides, we have installed new A/C at the reception of the institute in order to improve the comfort in this area.

3.4.2 Research laboratories

At our scientific laboratories we aim to transform our research results into high value added products and services. They allow us to perform:

- The measurements and prototypes of the devices, protocols and algorithms developed by our researchers.

- Simulations of highly complex baseband and medium access control systems, as well as sophisticated radio subsystems.

- Radio parameter measurements involved in mobile and fixed communications and evaluation of effects on the radio spectrum of the new protocols and algorithms designed in the Institute.

- The development and deployment of reliable, high-performance networked systems, of software defined networking, and of novel architectures and protocols for behavioral networking and for network economics.

In order to support cutting-edge research, IMDEA Networks invests in the latest, state-of-the-art laboratory test equipment, endowing the Institute with the capacity of transforming research into high added value products and services.

The laboratories are used for:

- Constructing prototypes and measuring the devices, protocols and algorithms developed by the researchers.

- Simulating complex base-band and medium access systems, as well as sophisticated radio subsystems.

- Measuring radio parameters involved in mobile, fixed and satellite communications, designing and characterizing radiating elements, and measuring the effects on the radio electric spectrum of new protocols and algorithms designed by the Institute.

IMDEA Networks is aware of the importance of having the best equipment to perform experimental work. We invest in the latest technologies.

In the scope of project ESFRI-SLICES-CM, we have acquired the following equipment:

- A F8800B PROPSIM F64 Channel Emulator. This equipment allows the replication of radio channels in conditions similar to real world conditions, test new signal processing designs and algorithms and will speed up significantly the development of 6G technology.

- An Asus ESC4000A-E12 server to provide the AI/ML processing capabilities, including areas like AI-based 6G radio interface or AI operation and optimization of 6G mobile networks.

- 2 USRP N310, software defined radio systems that allow the flexible implementation of different radio interfaces over a wide range of operating frequencies and test the different waveforms proposals for the future 6G standard.

- 2 EK-U1-ZCU208-V1-G evaluation kits, electronic hardware intended to be used to design an experimentation platform for Multiple-Input Multiple Output Millimeter Wave Communication Systems. They constitute the best of their class for the development of the experimentation platform and will allow to extend the millimeter wave testbed from single user systems to multiple user cases to be able to perform experiments for next generation wireless communication standards.

- A R&S TS7124 RF shielded box, a high-performance solution designed to ensure reliable and reproducible measurements in shielded test environments with a shielding effectiveness greater than 80 dB and a customizable antenna configuration, accommodating a frequency range from 0.3 GHz to 18 GHz. It is intended for research using frequency bands that are assigned to other users or operators, as well as protecting the devices under test from external interference.

All this equipment is intended to implement a node for the ESFRI-SLICES-CM infrastructure, which is part of the ESFRI inititiave, that is a strategic instrument to develop the scientific integration of Europe and to strengthen its international outreach. SLICES is intended to extend ESFRI reach to the area of wireless networking.

In the scope of project ADVANCE_6G, the following equipment has been purchased:

- 2 pairs of Cerberis XGR-P2P-1551-12 and Eavesdropping Simulator for the development of research activities in the quantum communications area.

- 4 Dell PowerEdge R760XA, 2 of them equipped with 4 GPUs NVIDIA L40S and 1 with 4 GPUs NVIDA L4, and 1 Dell PowerEdge R7615 equipped with 2 GPUSs NVIDIA A40, all of them to perform tests with: AI/ML algorithms for the management of mobile networks, fraud detection, remote sensing using mobile networks metadata and the design and evaluation of solutions based on ML for B5G/6G applications.

- A Firewall Fortinet FortiGate FG-601E, 2 Extreme Networks 7520-48Y-8C switches and a SAI APC Easy UPS 3S 40kVA, to provide the project infrastructure and equipment with additional Internet and electric security and guarantee the interconnection of the different elements.

- A smartpole for the deployment of radio units and antennas in order to provide 5G outdoor coverage in both lower and millimeter frequency bands (plus Wi-Fi 7).

In the scope of project INES, we have invested in the following equipment:

- A Dell PowerEdge R760 server for research in consensus algorithms.
- 4 Ettus USRP N310 to deploy a base cellular infrastructure using software defined radios and run the Open Air Interface (OAI)36 software on top of it.
- A White Rabbit Z16 switch and a SecureSync Model 2406-033 time and frequency synchronization platform to improve monitoring capability, including accuracy and precision within the infrastructure and democratize high resolution time-based services.

Apart from this, we have renewed most of the informatic equipment (laptops, monitors, docking stations…) of the Institute's staff so they can work with up to date and more efficient equipment.

The 5TONIC Laboratory

The 5TONIC Laboratory offers a complete 5G network infrastructure designed to support the development, analysis, testing, and demonstration of cutting-edge 5G, 5G Advanced and 6G technologies.

5TONIC's mission is to foster a collaborative global environment where industry and academia can drive innovation in 5G and 6G, promoting both technological advancements and new business ventures.

In 2024, 5TONIC solidified its position as a hub for 5G/6G innovation through strategic EU projects, industry partnerships, and high-impact demonstrations.

1. Participation in Major Mational and EU Projects

- 5TONIC supported the 6G XR project's II Open Call in 2024, collaborating with members like Telefónica, Ericsson, and InterDigital to develop next-generation XR services and strengthen European leadership in 6G technologies.
- The lab contributed to other EU SNS program projects' demos and testbeds, including Desire 6G, Predict 6G, and TrialsNet, focusing on deterministic networking, AI-driven control planes, and large-scale 5G application testing in sectors like security and entertainment.

- In National projects, 5TONIC also supported the activities in UNICO I+D projects such as 6G-DATADRIVEN and MadQuantum CM, aiming to consolidate Spain's role in quantum communications and edge computing.

2. Energy Efficiency and Industry Collaboration

- Partnered with Telcaria, an SME, to enhance energy efficiency for 5G Advanced technologies, laying groundwork for sustainable 6G networks.

- Collaborated with Ericsson and Capgemini Engineering on predictive maintenance solutions for industries like energy, showcased at Ericsson Imagine Live 2024, where real-time monitoring of wind turbines via 5G was demonstrated.

3. Events and Industry Impact

- In February 2024, the lab welcomed members of Spain's Ministry of Digital Transformation, including the Secretary General of Telecommunications and Audiovisual Communication Services. During this visit, 5TONIC showcased a demonstration of a digital twin with integrated sensing and robotic control capabilities via 5G, emphasizing the collaborative environment between industry and academia in advancing 5G and 6G technologies.

- At Ericsson Imagine Live 2024, several use cases developed at 5TONIC were showcased, covering areas like AI-optimized RANs, immersive VR streaming (with YBVR), and deterministic networks for industrial automation, emphasizing 5G's role in enabling seamless XR experiences

4. Project TEST 6G

- TEST-6G is a project awarded to IMDEA Networks Institute under the Spanish UNICO I+D program, financed by the Ministry for Digital Transformation and Public Service using European Union NextGenerationEU funds as part of the national Recovery, Transformation and Resilience Plan. Its formal title describes its focus on "Scientific infrastructure for technical testing on B5G and 6G networks. The primary goal of TEST-6G is to further extend and enhance the advanced scientific and technological equipment available at the ESFRI SLICES node and the 5TONIC laboratory.

In other areas, Cayetano Carbajo, Director of Core at Telefónica Global CTIO office, was appointed as 5TONIC's new President, signaling a strategic focus on advancing Spain's leadership in 6G standardization and global tech innovation.

research projects, grants and fellowships

4.1. Funding awards

We dedicate extensive resources to obtaining external funding to support our research team and in particular those members who excel in their capacities, with the objective to promote the scientific and technical potential of our human capital and, as a direct result, the outreach of the Institute's activities.

The funding of our individual researchers takes the form of awarded grants, scholarships and fellowships. These awards are similar to externally funded research in their openness and the strict selection processes used, and they confer prestige on the awardee as well as on the organization he/she is affiliated to.

4.1.1. National

Ramón y Cajal Grants

Programa de Ayudas para contratos Ramón y Cajal

Awardees

- Dr. Narseo VALLINA, Research Associate Professor
- Dr. Guillermo SUÁREZ-TANGIL, Research Assistant Professor
- Dr. Claudio FIANDRINO, Research Assistant Professor

Funded by

Spanish Ministry of Science and Innovation *(Ministerio de Ciencia e Innovación - MICINN)*

Juan de la Cierva Incorporation Grants

Awardees

- Dr. Livia CHATZIELEFTHERIOU, Post-Doc Researcher (Call 2022)
- Dr. Syed WAQAS, Post-Doc Researcher (Call 2023)

Funded by

Spanish Ministry of Science and Innovation (MICINN)

INVESTIGO-SEPE Grants for young job seekers to undertake research and innovation initiatives

(Ayudas para la contratación de jóvenes demandantes de empleo en iniciativas de investigación)

Awardees

- Alfonso RODRÍGUEZ, PhD student
- Pablo FERNÁNDEZ, Research Engineer
- Celia CABELLO, Research Engineer
- Michal TERESZKOWSKI-KAMINSKI, Research Engineer
- Anthony SÁNCHEZ, Research Engineer
- Iñaki BRAVO, Research Engineer
- José GALLEGO, Research Engineer
- José Pedro MARTÍN YUBERO, Research Engineer
- Gonzalo DÍAZ ELIAS, Research Engineer

Funded by

Ministry of Employment and Social Economy - SEPE

Predoctoral Grants – National

Awardees

- Stavros ELEFTHERAKIS
- Arivarasan KARMEGAM

Funded by

Spanish Ministry of Science and Innovation *(Ministerio de Ciencia e Innovación - MICINN)*

Mobility Grants

For Senior Researchers mobility stays abroad.

Awardee

- Domenico GIUSTINIANO

Funded by

Spanish Ministry of Science and Innovation and Universities
(Ministerio de Ciencia e Innovación y Universidades)

4.1.2. Regional

Predoctoral Grants - CAM

Awardees

- Sergio DÍAZ ARANDA (Call 2022)
- Beyza BÜTÜN (Call 2022)
- Bei OUYANG (Call 2022)
- Louis MIERMONT (Call 2023)
- Vinuri BANDARA (Call 2023)

Funded by

Department of Science, Universities and Innovation of the Regional Government of Madrid

Talent Attraction Grant – Modality 1: Researchers with Experience. Extension for 1 year.

Awardee

- Marco FIORE, Research Associate Professor

Funded by

Department of Science, Universities and Innovation of the Regional Government of Madrid

Talent Attraction Grant – Modality 2: Young Postdoctoral Researchers

Awardee

- Dr. Antonio BAZCO-NOGUERAS, Post-Doc Researcher

Funded by

Department of Science, Universities and Innovation of the Regional Government of Madrid

4.2. Ongoing projects

Externally funded research projects enable us to collaborate with researchers from other organizations and backgrounds. Research funding is awarded following an open competitive selection process in which project proposals, and the private or public sector organizations presenting them, are subject to rigorous scrutiny. Such thoroughness helps to ensure that research undertaken with those funds is relevant, well managed and with high probabilities of success in achieving its stated goals.

ANT

(Embedded AI Systems and Applications)

Funded by: European Commision HORIZON EUROPE

Duration: February 2025 to January 2029

ANT is a MSCA Doctoral Networks project funded by the European Union in the call HORIZON-MSCA-2023-DN-01-01. The MSCA Doctoral Networks program aims to train entrepreneurial, innovative and resilient doctoral candidates, able to face current and future challenges and to convert knowledge and ideas into products and services for economic and social benefit.

Embedded Artificial Intelligence (AI) has emerged as a transformative technology with immense potential to revolutionise various domains, spanning from robotics and healthcare to environmental monitoring and the Internet of Things. This project aims to train a network of 15 excellent Doctoral Candidates (DCs) by addressing the fundamental challenges of Embedded AI and accelerating the development of Embedded AI systems and applications through an innovative and interdisciplinary research and training program.

ANT consists of four interconnected Work Packages (WPs) that encompass different aspects of Embedded AI.

- WP1 tackles the challenges in designing low-footprint standalone Embedded AI models under resource constraints and with diverse contexts and evolving environments.
- WP2 goes beyond standalone Embedded AI and designs innovative distributed and scalable learning solutions for heterogeneous Embedded AI networks under energy and bandwidth constraints.
- WP3 enhances the trustworthiness of Embedded AI with explainability, robustness, security, and privacy.

ANT concludes in WP4 with a concerted effort to transfer fundamental research contributions to industry-relevant applications in autonomous robotics, underwater IoT, mobile healthcare, and smart farming, boosting Europe's position in the global AI market both from a talent and a technological perspective.

These interdisciplinary and inter-domain research training, along with the comprehensive soft-skills training (spanning from presentation skills to intellectual property, marketing, and economics, etc.) will make ANT's 15 DCs highly employable in various industries, academia, or public government bodies, and will position the EU at the forefront of the emerging revolution of Embedded AI on Things.

More info

6THSENSE

(Joint Communication and Sensing in 6g Networks)

Funded by: European Commision

Duration: February 2024 to January 2028

Having lost a significant share of the market to big players from the US and Asia, Europe is no longer at the forefront of the telecommunication industry. However, new services focusing on remote health monitoring, industry 4.0 and autonomous vehicles have created a unique opportunity for Europe to regain a leading position in 6G. Unlike traditional mobile broadband that mainly connect people, these emerging services not only exchange data but also critically rely on accurate information from their surroundings (i.e. sensing). Consequently, joint communication and sensing (JCAS) is a key feature of 6G networks, where devices will embed wireless sensing capabilities (e.g. localization, activity recognition). JCAS faces major challenges since it demands fundamental changes to current communication systems.

6thSense consortium is an intersectoral and interdisciplinary cluster of excellence formed by electrical engineers and computer scientists that has pooled leading members of large EU initiatives (5G PPP), industry leaders (e.g. Nokia, Ford, Bosch) and academic institutions (e.g. KUL, TUDelft, Princeton, UCLA). Benefitting from this consortium, 6thSense follows a holistic approach to address these challenges by:

- WP1: Going beyond traditional sub-6GHz systems and enabling sensing in new B5G/6G communication bands, i.e. millimeter-wave and visible light;
- WP2: Addressing distributed sensing and networking challenges through architecture and protocol design;
- WP3: Handling the analytical complexity of JCAS by combining the strengths of classical signal processing and optimization models with advanced machine learning techniques
- WP4: Transferring these research contributions to industry-relevant applications in healthcare, manufacturing, and automotive sectors.
- WP5: A comprehensive soft-skill training
- WP6: tailored dissemination and exploitation strategy

The 10 PhD fellows will become highly employable in various industries, academia, or public government bodies.

UNITE

(Unmanned aerial vehicles for non-terrestrial communications and sensing)

Funded by: European Commision HORIZON-MSCA-2022-SE-01

Duration: December 2023 to November 2027

Satellites and unmanned aerial vehicles (UAVs) represent a perfect match for non-terrestrial sensing and communications in 6G. Hence, it is of great interest to combine UAVs with satellites to maximize their respective advantages for emerging applications. This project tackles the challenges of using UAV for non-terrestrial communications and non-terrestrial sensing, in combination with satellites, for 6G. The objectives of this research include:

1) Data-driven UAV deployment: to perform intelligent analysis of the spatial and temporal needs for UAV deployment using data mining techniques in important 6G scenarios;
2) Communications and sensing channel modelling: to establish realistic channel models to describe the 3D environment in non-terrestrial applications;
3) Separate non-terrestrial communications and sensing designs: to develop efficient data transmission strategies to ensure the reliable delivery of information and the accurate acquisition of network perception using new channel models, reconfigurable intelligent surfaces and computer vision;
4) Integrated non-terrestrial communications and sensing designs: to devise robust signal processing and networking algorithms to integrate non-terrestrial communications with non-terrestrial sensing using dual-functional waveforms and UAV wireless charging based on the previous separate designs;
5) Sensing-based communications designs: to design effective non-terrestrial communications methods using the network information acquired from non-terrestrial sensing;
6) Disseminate, exploit and communicate the outcomes of this research to the wider community.

Achieving the above measurable objectives will provide crucial inputs to the exploitation of UAVs in non-terrestrial communications and non-terrestrial sensing for 6G by solving its major challenges, which will allow us to address the digital inequality issue and to enhance the terrestrial network functionality.

More info

GenAI4ED

(A platform for Assessing and Bridging Generative AI and Human Skills in Secondary Education)

Funded by: European Commision HORIZON EUROPE
Duration: October 2024 to September 2027

Despite the recent emergence of GenAI and large language models (LLMs), numerous educational tools utilizing these technologies have already been developed, with their numbers expected to increase rapidly. Users of such tools are also growing exponentially. AIbased educational tools, leveraging the capabilities of large language models, usher in a new era of education with personalized tutoring, easy content creation, and automatic grading. As the array of available tools expands, educators must acquire digital competencies to select and evaluate the most suitable options. However, the swift growth in GenAI capabilities raises concerns about their impact on students (e.g., misinformation, increased cheating, ethical and privacy issues) and teachers (reduced social interaction, job displacement, and loss).

The GenAI4ED project aims to address these challenges by developing a digital platform to consider popular AI-based educational software, evaluate various aspects of each tool, and offer the most suitable option for individual teachers and/or students. Notably, the platform will be employed in pilot experiments in selected schools, whereby students and educators will be asked to evaluate the available tools. Assessment will be based on a predefined set of carefully designed criteria, exploring how such tools affect the student's experience and how they complement the teachers' skills and improve their working conditions. Importantly, through an interdisciplinary approach involving experts in AI, psychology, and ethical concerns as well as teachers and parents, GenAI4ED will utilize the results of the pilot experiments to develop policy recommendations on how to harness the benefits of GenAI tools best to enhance the teaching experience for both students and educators, while protecting the teachers' jobs, improving their working conditions and creating opportunities for new teaching roles.

More info

CYBERACTIONING

(Training Cybersecurity Skills through Advanced Higher Education Joint Programmes)

Funded by: European Commision DIGITAL-2022-SKILLS-03
Duration: October 2023 to September 2027

This project has been funded by the European Union Digital Europe Programme grant CYBERACTIONING (Grant Agreement 101123445).

CYBERACTIONING project is originated by a consortium originally formed within the European University Alliance ARQUS, with the addition of five SMEs and a Research Centre, all of them covering four different European countries and with a high level of expertise in the field of cybersecurity. It aims to train professionals in this field through the following

initiatives: (a) a joint European Master in cybersecurity with a mobility path along the four universities; (b) a MOOC in cybersecurity aiming at training a minimum of 800 students from non-ICT sectors in each edition; (c) a scholarship programme to attract highly qualified students; (d) a programme of agreements and incentives to attract faculty, companies and research centres and generate synergies; and (e) the acquisition of key technological infrastructure for support of the programmes.

The two training activities (Master and MOOC) have been developed taking into account the main frameworks and recommendations for the development of professional training plans in the field of cybersecurity, such as NICE (National Initiative for Cybersecurity Education) from NIST in the USA or the Joint Task Force (JTF) on cybersecurity, involving ACM, IEEE and other reference organizations. This adaptation of the training initiatives to the actual demands will guarantee an accurate impact in the European and global labour market.

Finally, the project foresees a dissemination plan that ensures the impact of the proposed activities, mainly based on the celebration of a research conference, a programme of agreements with companies and organizations in the cybersecurity sector, a programme of grants for internships and research stays, and a set of initiatives for the dissemination of the training activities promoted by the members of the consortium.

More info

PARASITE

(Methods and techniques to characterize supply chain threats in software)

Funded by: Ministry of Science and Innovation

Duration: September 2023 to August 2027

PARASITE is an ambitious and holistic research effort to create an evidence-based observatory to characterize, model, and analyze the modern software supply chain, its actors, behaviors, and the rampant and diverse range of security and privacy threats targeting them. PARASITE builds on over 20 years of experience and highly impactful research in program testing, cybersecurity, and cybercrime. It aims to push the boundaries of our understanding of the supply chain and its socio-technical ramifications and implications. Our approach will address the current set of challenges and limitations of existing static and dynamic analysis methods for understanding the supply chain and its inherent risks. Specifically, existing static analysis methods to identify dependencies in compiled and packaged software need to address challenges arising from differing versions of compilation toolchains, target architecture, optimization, and other compile-time configuration which substantially alter the final artifact of software production from its source code. Additionally, we have no methods to attribute and identify vulnerabilities in modern programs, as most analysis methods consider them as monolithic objects rather than multiparty ones.

More info

ORIGAMI

(Optimized resource integration and global architecture for mobile infrastructure for 6G)

Funded by: European Commision HORIZON-JU-SNS-2023

Duration: January 2024 to December 2026

ORIGAMI aims at spearheading the next-generation of mobile network architecture, overcoming eight factual barriers to ensure a successful 6G future. With three critical architectural innovations – Global Service-based Architecture (GSBA), Zero-Trust Exposure Layer (ZTL), and Compute Continuum Layer (CCL) – ORIGAMI strives to create global single standards, promote green transition, boost affordability and accessibility, and inspire ground-breaking applications and fresh business models.

To assess ORIGAMI's effectiveness, the project will carry out eight real-world demonstrations across six experimental sites and two large-scale international datasets from two major operators and validate our findings against twelve ambitious KPI targets.

The GSBA proposed by ORIGAMI will streamline communication and interoperability across network planes, paving the way for truly global standards. The AI-aided CCL will democratize access to extremely heterogeneous computing resources and will boost resource sharing with reliability guarantees, encouraging green transition, sustainability and greater accessibility. In turn, the ZTL will enable third-party players to securely program their virtual networks in zero-trust arenas, driving innovative high-value applications and creative business models.

ORIGAMI's emphasis on dependable, explainable, and unbiased AI/ML will ensure a reliable system that avoids corner case errors, setting the stage for a more connected, efficient, and sustainable telecommunications future.

More info

DRONAC

(Distributed Reliable Objects for Networked Applications Coordination)

Funded by: Ministry of Science and Innovation

Duration: September 2023 to August 2026

Over the past decade, blockchains have come to the fore as tools for coordinating entities with very different and possibly competing interests that benefit from working together. Current blockchain systems maintain a reliable storage of data, organised as a fully ordered sequence of transactions, and only provide eventual consistency to access it. However, we believe there are many alternatives to explore beyond this usual service. In one dimension, the total order between transactions imposed by the ledger is useful, but at the cost of having to solve distributed consensus, which limits scalability. Some applications may

not need the transactions to be fully ordered, and could coordinate with weaker order guarantees such as no order, DAG orders, or barriers (setchains). In another dimension, applications may want a stronger level of consistency than eventual consistency, such as linearizability, sequential consistency, or causal consistency.

In this project, we intend to enrich the distributed ledger ecosystem with several alternative types of reliable distributed storage objects that allow data records to be stored and read. Reliable distributed storage objects will be Byzantine fault tolerant and provide persistent and immutable storage. The quality of service (or type) of a reliable distributed object will be defined by the two dimensions presented above: order and consistency guarantees. This will allow applications that need to coordinate to share records with the appropriate level of order guarantees and the desired type of consistency.

The practical interest of these objects will be illustrated by three practical application scenarios that require the implementation of computing and networked services: (a) coordination of electricity producers and consumers, (b) coordination of platoons of autonomous vehicles using edge computing, and (c) construction of machine learning models for assisted driving using federated learning.

More info

6TH SENSE_ELSA

(6G location and sensing-based analytics)

Funded by: Ministry of Science an Innovation

Duration: September 2023 to August 2026

Localization has achieved great attention in 5G networks, and was strongly pushed by the 3rd Generation Partnership Project (3GPP) for standardization. This area of innovation thrives: according to market research studies, the market size of Location-Based Services (LBS) is expected to grow at a Compound Annual Growth Rate of 17.6% during the period 2022-2027.

Location is now one of the most active areas of standardization in 3GPP, and new releases of the standards promise to further enable new techniques for accurate and fast positioning toward 6G networks. In parallel, higher spectral bandwidths will provide better range resolutionfor processing received signals reflected off objects, thus enabling precise environmental sensing and localization. Finally, MachineLearning (ML) and artificial intelligence are playing an increasing role in 5G, and are expected to play an even greater role in 6G networks. Localizing and sensing 6G terminals, people and things accurately and reliably will allow network operators to design innovative servicesfor new stakeholders. At national level, the strategic line “Internet de la próxima generación” will greatly benefit from advancing theknowledge in location, sensing, and analytics for developing future cellular networks.

Despite the large standardization effort and expectations for future cellular generations, the lack of experimental studies in cellular locationand sensing limits the scientific impact and innovation in this area. 6G-ELSA aims to fill this gap, studying the key scientific and technological enablers of future cellular network for location and sensing-based analytics. 6G-ELSA will provide an end-to-end integratedplatform for enhanced localization and sensing. To this end, departing from currently available 5G software, 6G-ELSA will make holistic contributions at all layers of the protocol stack, from the core network all the way down to the physical layer in the radio access, providing analytics for external stakeholders.

In order to advance the knowledge and foster adoption of the developed results, the research and development of the project will be driven by an important example use case that we expect in future cellular networks on localization and environment sensing for fine-grained human activity recognition and new user interactions.

The project consists of two Scientific and Technical (S&T) work packages, one on architecture, use cases and demonstrations, and one on management. The research methodology of the project is set up as follows: i) the research will be performed on key S&T enablers identified at the time of the proposal and that we will address in WP1 and WP2; ii) all the research in the project will be related to common reference architecture and use case on human activity recognition, identified and used by all research domains; iii) selected technology components developed during the project will be integrated in proof-of-concept demonstrations (in WP3): we will integrate the different components under a single 5G-NR open platform and demonstrate the potential of 6G for sensing and positioning services. We will test individual components first in isolation and then we will validate the integrated platform as a whole as indicated in the implementation plan.

More info

GERMINAL

(Connectivity: Enabling Next Generation NAV/COM Hybrid Terminal)

Funded by: EUSPA, EU Agency for the Space Programme

Duration: June 2024 to May 2026

The main objective of the E-GNSS programmes is to maximize socio-economic benefits for European citizens of European satellite navigation systems. As a consequence, more cost-efficient solutions are targeted together with encouraging the penetration of E-GNSS into the connectivity domain and the other way around use Communication technology to support positioning. One of the key issues to ensure a favourable reception from the user communities of E-GNSS technology and its evolutions is to provide a clear added value from other alternatives (technology competitors) and to achieve this, the availability of products implementing such valuable capabilities in a proper way is a clear need.

GERMINAL action has received funding from the **European Union** (EUSPA/GRANT/06/2022)

One of the current EU financial mechanisms/instruments to encourage the development of market-ready GNSS-products is the Fundamental Elements, to which this GSA/GRANT/06/2022 call belongs. Under Fundamental Elements programme, the goal is to support the development of E-GNSS-enabled chipsets, receivers and antennas, to facilitate the adoption of E-GNSS systems, improve the competitiveness of EU industry, address user needs and maximize benefits to EU citizens.

GNSS include constellations of satellites orbiting around the Earth that broadcast their locations in space and time, and receivers computing ground positions by trilateration. GNSS are used in different transportation domains: aviation, maritime, rail, road or UAVs and a great number of applications rely on PNT services provided by GNSS. Galileo, probably, the brightest element of the European Union Space Programme, is a civilian Global Navigation Satellite System intended to provide robust navigation services. GNSS users utilizing Galileo experience a significant improvement in terms of performances and capabilities.

On the other hand, the number of connected devices is growing dramatically and the importance of locating devices has very much increased. It is not only relevant the location of the asset itself but also, the solution owner be able to locate all assets at the same time with minimum power consumption. Thus, integrating TN and NTN has the potential of connecting the unconnected.

Thus, this project focuses on the combination of these two worlds, PNT Systems and Connectivity Systems. In particular, this Project is devoted to the integration of GNSS (Galileo), other PNT sources and Connectivity Systems.

More info

6G-IRONWARE

(Time-resilient mobile network traffic forecasting in 6G)

Funded by: Funded by MICIU/AEI /10.13039/501100011033 and by the European Union NextGenerationEU/PRTR
Duration: April 2024 to June 2026

The vision for sixth-generation (6G) mobile networks sets extraordinarily high bars for future communication systems, which shall meet outstanding performance requirements, including near-zero latency, apparent infinite capacity, and 100% reliability and availability that will make the communication infrastructure fully transparent to the applications. In order to meet these ambitious goals, 6G networks are expected to complete the transition to full virtualization, with the vast majority of network functions running in dedicated telco Clouds on top of an open and programmable user plane.

To fulfil the potential of 6G systems to instantly orchestrate resources and Virtual Network Functions (VNFs) across a tangled multi-domain network infrastructure. 6G networks shall integrate Zero-touch Network and Service Management (ZSM) solutions capable of completely automating the resource and VNF orchestration process, pushing network management operations to very fast timescales (e.g., of milliseconds to minutes) not achievable by traditional human-in-the-loop approaches. Artificial Intelligence (AI) is widely regarded as the primary enabler for the decision-making algorithm that will underpin ZSM, and the success of 6G as a technology may ultimately depend on the quality of the AI that will de-facto manage the infrastructure by autonomously taking and enacting operational decisions at schedulers, controllers, and orchestrators across network domains. In particular, AI models are expected to provide prompt and efficient support for anticipatory MANO, i.e., adopt decisions that proactively address future shifts in the user demands, which is an ostensibly more effective approach than reactive policing, and is instrumental to unlocking the full benefits of automation. This clearly calls for the design of AI models tailored for the forecast of key performance indicators (KPIs) of network traffic, and indeed a large number of AI predictors have been proposed that outperform traditional methods based on statistical modeling in varied traffic forecasting tasks.

However, for AI predictors to be deployed in production-grade operational systems serving millions of users, robustness is critical, and, in fact, one of the major barriers presently withholding MNOs from trusting ZSM technologies. In the case of mobile network KPI prediction, it is paramount not only that forecasts are accurate upon deployment, but also that they stay so over time. The task is not obvious, since both user demands and network configurations are time-varying, due to the adoption of new services, shifts in the popularity of mobile applications, availability of faster communication technologies, network configurations changes, deployment of additional carriers, or decommissioning of old antennas. These phenomena occur over timescales of weeks, and are characterized by a combination of steady trends and abrupt events. Practical AI predictors shall be able to cope with these complex temporal dynamics, and retain their forecasting quality despite the underlying system changes.

6G-IRONWARE targets precisely the development of AI models for time-resilient mobile network traffic forecasting in 6G, via the design of custom predictors that are robust to (i) temporal drifts in user demands and (ii) updates to the network configuration over time.

More info

ADVANCE_6G

(Scientific infrastructure of computing and communications for advanced experimentation in 6G networks)

Funded by: Ministry of Economic Affairs and Digital Transformation

Duration: September 2022 to December 2025

The next technological revolution in the field of communications networks will be the sixth-generation mobile networks, or 6G networks. IMDEA Networks is playing a determining role in the development of this new technological paradigm, leading several pioneering projects of 6G technology, developing cutting-edge lines of research and playing a determining role in the SNS JU (Small Network and Services Joint Undertaking), a Large-scale European public-private initiative to research and develop advanced 5G and 6G technologies. However, in order to continue playing this role and ensure that Spain has a relevant role in research in this revolutionary field, it is essential to have a leading experimental platform at a global level that allows the evaluation and validation of new disruptive ideas and new technologies in the field of 6G networks, thus ensuring their practical viability. In order to create this unique experimental platform, IMDEA Networks participates in the SLICES-RI research infrastructure (www.slices-ri.eu) included in the ESFRI Roadmap 2021. IMDEA Networks has contributed since its inception to SLICES-RI and has a relevant role, managing the node of the 5TONIC laboratory (www.5tonic.org) integrated in SLICES-RI.

ADVANCE_6G aims to provide the scientific and technological infrastructure and equipment that will allow 5TONIC to address, in an integrated manner with SLICES-RI, an infrastructure for experimentation in advanced 5G and 6G, offering a catalog of resources and services available to the research community, not only nationally but also internationally.

More info

MADQUANTUM-CM

(MADQuantum-CM. Quantum Communication in the Autonomous Region of Madrid)

Funded by: The Regional Government of Madrid through the Spanish Plan for Recovery, Transformation and Resilience and the NextGeneration EU Funds from European Union.

Duration: January 2022 to December 2025

The overall objective of the project is to structure and coordinate Quantum Communications R+D+i capacities of the Community of Madrid (CM), among themselves and with other Autonomous Communities with common interests, within the framework of the Complementary Plan for Quantum Communication whose main objective is the alignment of Spain with the key European initiatives in the field of Quantum Communication, both the Quantum Flagship and the EuroQCI. MADQuantum-CM project develops the participation of the Community of Madrid in the Complementary Plan for Quantum Communication,

contributing to its scientific-technological objectives as well as the creation of talent and the industrial ecosystem, through 7 scientific-technical lines:

Line 1: EuroQCI – Towards a European Quantum Communications Infrastructure
Line 2: Hardware for quantum communications
Line 3: Software for quantum communications
Line 4: Hardware for quantum processing
Line 5: Software for quantum processing
Line 6: Human Resources and training for innovation and entrepreneurship
Line 7: Innovation and industrial ecosystem, dissemination and exploitation of results

The main line of the project is line 1, in which technological developments and deployments will be carried out to contribute to the first objectives defined in the European programs: the creation of a high-security communications network, resistant to any computer attack, orchestrated either through classical or quantum means.

Line 2 will contribute to the development of line 1 through hardware developments for quantum communication, first for fiber systems, considering both technologies easier to integrate in the network and to industrialize (Continuous Variables), as well as those more optimal for long distances/rates (Discrete Variables) and secondly for free space, which includes satellites, foreseeing the space segment that will be necessary in the EuroQCI for very long-distance communications in the short/medium term, and communications with an unmanned aerial vehicle (UAV). Likewise, within this line, technology based on entanglement will be developed, including quantum repeaters for Quantum Communications for long distances (>300 km) over optical fibers.

Line 3 will focus on systems and new protocols with advantages in terms of security, distance and functionality, as well as security studies of experimental systems and their integration into the networks.

Quantum Communications, however, not only produce secure systems, their ultimate goal is the ability to create quantum correlations between any two points in the network. These quantum processing technologies will be developed in lines 4 and 5. The main applications of these developments may be: ultra-precise distribution of time signals, quantum sensors, distributed quantum computing, etc.

Finally, lines 6 and 7 aim to educate and train researchers, by hiring research personnel in their different stages of training, and generate human capacities for the development of a national industry that covers the entire value chain around quantum communications.

More info

DATABRI-X

(Data Process & Technological Bricks for expanding digital value creation in European Data Spaces)

Funded by: European Union HORIZON-CL4-2021-DATA-01 (Work Leading Data and Computing Technologies).

Duration: October 2022 to September 2025

The emergent European Data Economy relies on the availability of data as a basis for further innovation and exponential development of technologies, especially the development of trustworthy 'made in Europe' AI that reflects European values. Data Spaces, platforms and marketplaces are enablers, key to unleash the potential of such data. However, data sharing and data interoperability are still at their infancy. Through DataBri-X, European Data Spaces, platforms and marketplaces and their wide range of business, governmental and public, research and civil society stakeholders will be equipped with a holistic and flexible data governance process and a seamless integrated standards based toolbox for data- and metadata management which can be assembled along relevant requirements, provides open source as well as commercial tools (the bricks / bri-X), and mechanisms to load 3rd party resources like language resources or AI models, and can be easily deployed into Data Spaces and thereby will contribute to make Europe the most successful area in the world in terms of data sharing and data re-use, to gain the full benefit from the value of data, while respecting the legal framework relating to security and privacy. The project's objective is to provide a holistic, energy-efficient and user-friendly toolbox of practical, robust and scalable bricks/Bri-X (processes, technologies and tools) that improve the interoperability, usability, discoverability, quality, and integrity of data and metadata, with the aim of making data sets ready for expanded digital value creation in the context of European Data Spaces. The DataBri-X toolbox will be offered in compliance with accountability, fairness, privacy, and confidentiality regulations as well as FAIR principles and will build on existing and emerging initiatives. The DataBri-X consortium comprises 14 partners from 6 EU members and 1 associated country (UK), that together form a complete value chain of actors.

More info

BRAIN

(Explainable and robust AI for integration in next generation networked systems)

Funded by: Ministry of Science and Innovation

Duration: September 2022 to August 2025

Fifth-generation (5G) networks are now entering a stable phase in terms of system architecture and commercial release, and the identification of the advanced features that will shape the evolution of 5G into the sixth generation (6G) of mobile network systems has already started. Despite being at early stages of conceptualization, some key aspects of

the future infrastructure have been identified by the community: 6G will bring a paradigm shift from connected things to connected intelligence, supporting even more stringent KPI requirements than 5G, and global coverage (air, ground, and underwater). Therefore, there are strong expectations that Artificial Intelligence (AI) will permeate the 6G network infrastructure, allowing for much swifter and more effective decision-making in scheduling, control and orchestration operations of the end-to-end communication systems. Ultimately, this will allow 6G to support ambitious performance targets such as near-zero latency, apparent infinite capacity, or 100% reliability and availability, so as to support new and diverse classes of innovative mobile services.

The BRAIN project will contribute to making this vision of 6G as a network augmented via pervasive artificial intelligence a reality, by addressing the two main roadblocks. On the one hand, existing AI models employed for network management are black boxes, and their complete lack of transparency is a clear barrier for adoption: here, BRAIN aims at proposing new AI tools for network management that are explainable and trustworthy by design and specifications on robustness that allow to benchmark existing AI models. On the other hand, the disruptive softwarization of the network architecture has opened new opportunities for a deep integration of AI into the future 6G infrastructure that have yet to be explored: here, BRAIN will investigate novel approaches for the design, implementation and evaluation of in-band network intelligence, i.e., AI models that run directly into the user-plane programmable switches, operating at line rate over the transiting data traffic, and laying the foundations to a truly AI-native 6G network..

More info

INES

(Intelligent Networks for Enhanced 6g Services)

Funded by: Ministry of Economic Affairs and Digital Transformation (UNICO INFRAESTRUCTURAS 2023)

Duration: April 2023 to June 2025

The next generation of networks will need to be extremely agile and highly reconfigurable to meet the demanding requirements imposed by emerging complex use cases. The 6G network will have to be self-controllable at much finer levels than the 5G network to realize different services such as the metaverse and the Internet of Things (IoT). To this end, significant improvements will need to be made to multiple wireless radio access technologies, including LoRa, millimeter-wave transmission, and THz, the core network, and auxiliary infrastructure to ensure higher performance and greater reliability. Furthermore, complex strategies employing the latest ML/AI technologies will be needed to manage and orchestrate resources so they can be optimally shared among different services. Due to

this inevitable resource sharing among services, security and privacy must be organically integrated into its design.

INES aims to design, build, and test an intelligent end-to-end network suitable for developing scenarios that integrate IoT and cyber-physical systems. In doing so, IMDEA Networks will create a network capable of fulfilling the promises of 6G by providing new and unique tools to the scientific community through its various national and international collaborations, highlighting its participation in the 5TONIC laboratory (www.5tonic.org).

More info

TEST-6G

(Scientific infrastructure for technical testing on B5G and 6G networks)

Funded by: Ministry of Economic Affairs and Digital Transformation (UNICO INFRAESTRUCTURAS 2023)

Duration: April 2023 to June 2025

The design of sixth-generation (6G) mobile networks has recently begun. The research, innovation, and co-creation laboratory 5TONIC, founded by the IMDEA Networks Institute—where its main headquarters are also located—and Telefonica, and of which such relevant entities in the development of 5G and 6G as Ericsson, Capgemini, Comscope, and Carlos III University of Madrid are also members, is playing a decisive role in the development of this new technological paradigm, leading several precursor projects of 6G technology. 5TONIC also develops cutting-edge research lines, having a significant presence in the SNS JU (Small Network and Services Joint Undertaking), a large-scale European public-private initiative for researching and developing advanced 5G and 6G technologies. However, to continue playing this role and ensure that Spain has a relevant role in research in this revolutionary field, it is essential to continue developing world-class experimental platforms that allow the evaluation and validation of new disruptive ideas and technologies in the field of 6G networks, such as the one hosted at IMDEA Networks/5TONIC, thus ensuring its practical viability. With the aim of creating this unique experimental platform, IMDEA Networks manages the 5TONIC laboratory node integrated into SLICES-RI (included in the ESFRI Roadmap 2021).

TEST-6G's main objective is to extend the infrastructure and scientific and technological equipment that will allow 5TONIC, together with SLICES-RI, to address an experimentation infrastructure in advanced 5G and 6G in an integrated manner, offering a catalog of resources and services available to the research community, not only at the national level but also internationally. The project focuses on three fundamental technical areas: deterministic networks, the use of artificial intelligence in 6G mobile networks, and open

virtualized and programmable networks, for which the acquisition of various equipment is proposed to build an experimental network infrastructure that supports these types of applications. The need to manage access to this infrastructure, define the experiments to be carried out, and obtain the results thereof is also considered, for which the acquisition of measurement equipment and support for the development of functionalities in the network are proposed.

More info

MLEDGE

(Cloud and Edge Machine Learning)

Fuded by: Ministry of Economic Affairs and Digital Transformation (UNICO CLOUD 2022)
Duration: January 2023 to June 2025

Data-driven decision-making powered by Machine Learning (ML) algorithms is changing the way society and the economy work, and is having a profound positive impact on our daily lives. In fact, ML applications are becoming even more ubiquitous and integrated, often invisibly, into our daily activities, having a direct impact on things like how we find our way around a city, how we decide what to buy or where to eat, while at the same time we can keep ourselves safe from financial fraud, or have tools that remind us to take medication or suggest new personalized habits for a healthier lifestyle.

However, for ML-based solutions to be effective at such tasks, data often has to be processed close to the end user. Furthermore, such data may be private and of a confidential nature. Distributed Learning and, in particular, Federated Learning (FL: Federated Learning) emerges as a leading paradigm within the ML branch satisfying these two properties. FL has grown in parallel with the expansion of cloud to the edge (CloudEdge) but, interestingly, both paradigms have mostly developed independently, despite their natural parallelism and potential synergistic gains.

In this project, Cloud and Edge Machine Learning (MLEDGE), we will work to reverse this trend by deploying FL as a standalone but optimized cross-industry layer on top of CloudEdge, using real-world data and applications to demonstrate that this synergy can produce great benefits for all. MLEDGE aims to enable a thriving ecosystem of secure and efficient ML edge services capable of facilitating the use of sensitive personal and B2B data to train ML models for consumers while protecting the privacy of the data and its owners. Recent studies in the field of the “European Data Strategy” estimated that the data economy will reach an impact of 827 billion euros for the EU27 as early as 2025. However, even today privacy concerns and property hinder their full development. MLEDGE will be instrumental in increasing these projections in the period 2025-2030.

More info

MAP-6G

(Machine Learning-based Privacy Preserving Analytics for 6G Mobile Networks)

Funded by: Ministry of Economic Affairs and Digital Transformation, European Union NextGeneration-EU

Duration: January 2022 to March 2025

Although there is not a unique understanding of what 6G will be, several initiatives are ongoing that have put forward highly advanced visions of potential concepts and preliminary technologies that will form 6G networks. With the current deployment of 5G networks, high data rate and low latency are provided for communication, in addition to some first steps towards deployments that also provide commercial localization services. 6G mobile networks, however, will go far beyond the use cases that can be covered by 5G, enabling not only significantly improved network performance but also substantially more complex services that rely on location and context information gathered by the network. In particular, 6G mobile networks will enable orders of magnitude higher localization accuracy and lower latency than prior technologies. This will be a unique opportunity to design new services and analytics, but also a threat for privacy. For this reason, this project will design native privacy-preserving machine learning mechanisms for 6G networks in order to manage the massive amount of data generated by services in 6G networks, based on emerging Federated Learning techniques. The final demonstrator will integrate the developed modules within the mobile network and will be demonstrated using testbeds comprising data servers, edge nodes and end-user devices.

More info

RISC-6G

(Reconfigurable Intelligent Surfaces and Low-power Technologies for Communication and Sensing in 6G Mobile Networks)

Funded by: Ministry of Economic Affairs and Digital Transformation, European Union NextGeneration-EU.

Duration: January 2022 to March 2025

The mobile communication industry is one of the few industry sectors that has been growing at a very fast pace for more than three decades. 5G mobile networks promised to change our modern society and vertical industries and are now gradually being rolled out commercially. The research focus is now shifting towards sixth generation (6G) mobile systems and architectures. While 5G is largely used for communications, 6G mobile networks will go far beyond 5G use cases, involving a vastly larger number of connected devices, significantly higher performance requirements, and support for detailed object and environment sensing in addition to communication. To this end, 6G networks will need to embrace new con-

cepts and capabilities. The overall objective of this project is to integrate such crucial new technologies into 6G to improve wireless communications, provide environmental sensing, and significantly lower the per-device energy footprint to avoid a vast increase in overall network power consumption. We will take a holistic approach, harnessing reconfigurable intelligent surfaces, visible light communication, and RF backscatter, that 6G networks will use. This project is timely, as the solutions that we will design during the project (concluding in December 2024) can be incorporated in the pre-6G systems that are expected to be ready for deployment around the same time, and in line with the roadmap proposed by the 5G Infrastructure Association (5GIA) and the Sustainable Development Goals set by the United Nations. We plan to provide one final demonstrator in collaboration with industry partners of the consortium, integrating communication, sensing and low-power design for the important and emerging use case of the Internet of Everything.

More info

FINALITY

(saFe learNIng for lArge scaLe InTerconnected sYstems)

Funded by: European Commision HORIZON EUROPE

Duration: March 2025 to February 2029

FINALITY is a MSCA Doctoral Networks project funded by the European Union in the call HORIZON-MSCA-2023-DN-01-01. The MSCA Doctoral Networks program aims to train entrepreneurial, innovative and resilient doctoral candidates, able to face current and future challenges and to convert knowledge and ideas into products and services for economic and social benefit.

In particular, FINALITY project evolves the theoretical computer science curriculum focusing on the mastery of prompt and safe learning techniques for interconnected systems. The trainee team will develop and integrate innovative methodological tools specialized for AI-intensive resource allocation, particularly in the context of large-scale critical infrastructures for communication and computing. They will combine AI methods that are safe by respecting system boundaries and are prompt in adapting to the environmental changes. Throughout their research training, the FINALITY candidates will prioritize the principles of fairness and computational parsimony of AI methods. The FINALITY doctoral team will be supported by a world-class team of academic and industrial advisors, who work routinely on all the tools used in AIbased RA, advancing their theoretical foundations and their application in the industrial domain. They possess extensive experience in training doctoral students, and an excellent track record of joint research activities across the consortium. International exposure and dissemination are ensured by an extra-EU supervisory board.

More info

Funded by the European Union
NextGenerationEU

GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA E INNOVACIÓN

ECOMOME

(Energy consumption measurements and optimization in mobile networks)

Funded by: European Union through the NextGenerationEU/PRTR Funds and the Spanish Scientific Agency/Ministry of Science and Innovation.
Duration: February 2022 to January 2025

The energy consumption of mobile networks has been the source of animated debates in the recent period, with the deployment of 5G technologies. However, the energy consumption estimations put forward by the different parties in the debate showed significant differences, up to two orders of magnitude. This is a result of a lack of accurate models and meaningful metrics in this field. More precisely, the control plane of a mobile network represents a significant share of the traffic exchanged between the user and the network infrastructure, much more than in any other network technology, and this role will become even more important with the development of network function virtualisation and orchestration. Models focusing on the application-level traffic are bound to make harsh approximations, leading to results that can not really help the involved parties.

Project ECOMOME addresses this problem of accurately modelling and optimising the energy consumption of a mobile network, with a focus on 4G and 5G technologies. This will be achieved through three main research axes. The first contribution will be represented by the first independent measurement study of energy consumption in a mobile network. We will address both user equipment and the radio access network, conducting a network metrology study on real operational networks and on experimental testbeds. The measurement data collected in this campaign will represent the input for other contributions in the project, but it will also be made openly available to the research community.

The second objective of the project is to use this measurement data in order to design accurate energy consumption models for mobile networks. In this sense, we take an original approach with respect to the literature, by focusing on modelling the impact of the building blocks of the mobile network, a series of “atomic” network mechanisms and functions which practically compose any service scenario and any user context. Modelling these atomic network mechanisms requires a detailed knowledge of the way a mobile network functions, but then allows the accurate modelling of any general scenario.

Finally, the project also targets the proposal of energy efficient networking solutions. Indeed, the measurement data and the energy consumption models will allow us to detect the most energy-hungry phases in a mobile network. To reduce their impact, we will propose network intelligence solutions, which are based on observing the traffic transported by the network, detecting whenever the network settings are over-consuming, and adapting the network configuration with energy efficiency metrics in mind.

More info

AEON-ZERO

(Network Intelligence for zero-touch orchestration and anomaly detection)

Funded by: the programme "UNICO 5G I+D" funded by the European Union-NextGenerationEU and the Ministry of Economic Affairs and Digital Transformation through the Spanish Recovery, Transformation and Resilience Plan.
Duration: December 2021 to December 2024

To meet the ambitious goals set for 5G evolution and 6G systems, the mobile network architecture is being redesigned for end-to-end softwarization and cloudification, completing the decoupling of network functions from the underlying hardware, and granting an unprecedented flexibility to the communication infrastructure. NI will play a paramount role in the effective operation of future softwarized and cloudified mobile networks.

Both industry and academia are making substantial efforts to accelerate the integration of solutions for automated network management into the mobile network environment. However, even in presence of a full ZSM deployment where a plethora of NI instances takes resource and VNF management decisions in a completely autonomous manner, interactions with network managers will still be needed at multiple levels.

Building upon the experience and results of the ongoing DAEMON project, funded by the European Commission, AEON-ZERO will focus on developing NI solutions that are in fact usable by mobile network operators. The target models will embed and present interfaces that make the interactions above as simple and smooth as possible and render final decisions that are interpretable and clearly explainable. In this way, AEON-ZERO will contribute to closing the current gap between the competences of network experts and the skills needed to configure the increasingly complex AI algorithms that underpin such NI.

More info

AEON-CPS

(Network Intelligence for cyber-physical system support)

Funded by: the programme "UNICO 5G I+D" funded by the European Union-NextGenerationEU and the Ministry of Economic Affairs and Digital Transformation through the Spanish Recovery, Transformation and Resilience Plan.
Duration: December 2021 to December 2024

AEON-CFS will focus on the monitoring and control operated by Network Intelligence (NI) on cyber-physical systems (CPSs) relying on 5G networks and their 6G evolutions. In AEON-CPS, we will study fundamental properties of automated machine learning (AutoML) and explainable artificial intelligence (XAI) to support the prompt and automatic identifica-

tion of performance anomalies of CPSs and the associated corrective actions (intelligent troubleshooting). We will use specific CPS applications for NI in CPS environments, and in particular for what concerns future solutions for intelligent transportation, i.e., assisted and automatic driving applications. The work will result in the design of novel interpretable and explainable automatic ML/AI technologies and SW tools. The validation of methodologies and tools will be carried out in realistically emulated cellular environments. AEON-CPS will benefit the society by making CPSs more controllable and optimizable in an automatic way, while at the same time offering the opportunity to support quick, precise and human-understandable troubleshooting actions.

More info

PROMIN

(IMDEA Network's plan for attracting talent and promoting degrees related to telecommunications, at national and international level)

Funded by: Ministry of Economic Affairs and Digital Transformation, European Union NextGeneration-EU.

Duration: January 2022 to December 2024

The main objective of the Plan for the Promotion of Telecommunications Studies (PPET) is to attract talent to telecommunications studies, thus helping to solve the shortage of talent in technologies such as advanced 5G and 6G, which are essential for research centers and industries.

This plan will deploy a series of actions for the dissemination of these studies among the different levels of students, so as to improve the attraction of good students to them, while emphasizing the incorporation of female talent, currently at very low levels, and international students for the master's and doctoral levels.

This promotion plan is considered unique, and the deployment of actions to be carried out will be developed throughout Spain, beyond the geographical scope or action of each of the beneficiary entities of the PPTE.

More info

ESFRI-SLICES-CM 2024

(Large-scale scientific infrastructure for experimental studies in computing/communication)

Funded by: Regional Government of Madrid

Duration: January 2024 to December 2024

The development of the SLICES 5TONIC node aims to deploy an advanced 5G and 6G experimentation infrastructure, offering a catalogue of resources and services available to the research community, not only nationally but also internationally. The main objectives during 2024 are threefold: (i) maintenance and extension of the SLICES blueprint for data processing with AI/ML techniques, (ii) use of channel emulator support equipment to generate multiple emulation channels with different parameters and as support for different wireless communication technologies and standards in the context of the SLICES node in Madrid, (iii) implementation of two transceiver nodes that allow the design and implementation of communication systems operating at wavelength frequencies looking for the best alternatives to 6G systems, and (iv) maintenance, configuration and extension of the infrastructure, equipment and personnel necessary for data storage generated by the SLICES node in Madrid.

More info

SOCIALPROBING

(Scalable and Cost Competitive Data Collection and Analysis Techniques for Social Probing)

Funded by: Ministry of Science and Innovation

Duration: December 2022 to November 2024

SocialProbing brings together an interdisciplinary group of researchers who will combine their knowledge and skills to develop techniques, technologies and tools that allow probing fundamental aspects of society in a scalable and affordable way.

Probing a certain population group provides information to be able to evaluate and improve their situation. The rapid digital deployment and the success of social networks have notably increased the possibility of probing society through these new channels. But to the same extent, problems have arisen in conducting digital surveys, due to the sense of lack of privacy on the part of the participants and the lack of incentives to participate. All this is aggravated if the information to be collected is of a sensitive nature (social, gender, economic, health, …). Furthermore, by leaving out of the survey a segment of the population that does not use digital platforms, it is possible that there is bias in the conclusions obtained.

SocialProbing proposes a new methodology to alleviate these issues, and at the same time to advance in the acquisition of data through digital channels. This methodology is based on the massive and continuous use of surveys by digital means in which information is

collected indirectly. The use of this type of survey has two great advantages over direct surveys. On the one hand, with the same number of participants, a much larger fraction of the population is reached, with the consequent increase in scalability and reduction in costs. On the other hand, it reaches segments of the population that do not use digital platforms.

In SocialProbing, a Computer Science group and a Statistics group have joined knowledge and skills. The first will be in charge of developing the computational aspects, proposing and deploying computer systems that serve for efficient storage and processing, while the second will propose the appropriate statistical techniques to generate knowledge of the new type of data that is generated via digital channels, which requires the development of new theory and techniques to ensure the consistency and reliability of the results. To show the utility and expand the potential impact of the project, the development of technological and methodological tools will be completed with their application to three timely problems of great relevance in society: (1) the COVID-19 pandemic, (2) social inequalities (such as gender), and (3) climate change (such as visibility and potential impact on society). These three are, indisputably, three of the most important problems in our society today, so their study is of great relevance both for scientific advancement and for the implementation of new technologies, transferable to the business fabric.

More info

COMET

(Understanding the Trail of the Malware Ecosystem from the Underground Markets to the Surface)

Funded by: Ministry of Science and Innovation.
Duration: December 2022 to December 2024

Supported by an underground economy, cyber-dependent crimes have rocketed in recent years. Knowledge, but more importantly, tools are exchanged in online markets. An example is crypto-mining malware, which has permeated from these underground communities to illicitly produced over 57M USD of revenues as shown later in a case-study that is as part of an on-going measurement. This income fuel the underground economy and gear other cyber-criminal activities.

The goal of this project is to better understand cyber-dependent crimes that are enabled by malware from a software development perspective. The purpose is threefold: a) to profile malware developers, b) to understand their business model, and c) to measure the support offered by online markets and forums. A central aspect of the project will be developing technology for malware characterization.

This is, ascribing malware to a given campaign, seller or author (namely, miscreant). This will be used to measure the trail left by malware developers and hacking groups when

trading software through anonymous markets. Malware characterization is a difficult task because it deals with active adversaries in a context where partial code reuse is common. Two separate communities have tackled the problem of malware characterization: the malware analysis community study malware found in the wild, while the cyber-crime community look at marketplaces where actors share malware. However, market places are not echoed chambers and the tools produced permeate through to the wild. This project aims to bridge the gap between these two disparate approaches, measuring the commonalities, and then delivering a new approach to understand this ecosystem through malware characterization which is stronger than the sum of its parts. As a key novelty, we will be looking at the exchange of malware source code together with binaries found on the wild.

More info

ESFRI-SLICES-CM 2023

(Large-scale scientific infrastructure for experimental studies in computing/communication)
Funded by: Regional Govermment of Madrid
Duration: January 2023 to October 2024

The development of the SLICES 5TONIC node aims to deploy an advanced 5G and 6G experimentation infrastructure, offering a catalogue of resources and services available to the research community, not only nationally but also internationally. The main objectives during 2023 are threefold: (i) deploy the blueprint developed in SLICES to provide an advanced programmable cellular network, (ii) deploy deterministic networks integrating different types of technologies; and (iii) develop the embryo of the system for making the infrastructure available to the research community (access control, resource reservation, remote control and management of experiments, etc.).

More info

RISE-MM

(Reconfigurable Intelligent Surface-Enabled millimeter Wave Communication for Beyond 5G Cellular Networks)
Funded by: European Union HORIZON-MSCA-2021-PF.
Duration: September 2022 to September 2024

The 5G mobile communication era has just started, and we are already experiencing the dominance of various new applications with enhanced broadband connectivity requirements. These requirements will become even more critical with the integration of cellular networks in different sectors of society. Conventional sub-6 GHz-based cellular networks

represent a short-term solution, where available spectral opportunities are limited and will unquestionably dry up soon. To this end, RISE-MM aims to set the ground for the THz spectrum-based cellular networks. Combining the researcher's experience on reconfigurable intelligent surfaces (RIS)- enabled networks and the expertise on mmWave communication and its practical implementation of IMDEA Networks, in RISE-MM, we will develop channel models for RISE-MM communication in indoor and outdoor deployment settings. Moreover, the project aims to develop an algorithm for joint communication and sensing (JCAS) through RISE-MM using machine learning techniques.

RISE-MM aims to validate the proposed channel models and the algorithm using system-level simulations (SLS) and software-defined radios (SDR)-based mmWave experimentation platforms. It will also implement the proposed channel models using a large testbed with tens of 60 GHz off-the-shelf devices, which will provide a more realistic performance analysis for large-scale deployments to complement the SLS and SDR-based results. The practical deployment of RISE-MM will also help formulate the optimal RIS placement policy, which is a critical factor for RIS-enabled network planning.

RISE-MM is a unique scientific advance because it capitalises on communication theory, machine learning, and practical experimentation to propose new networking models to design and characterise RISE-MM communication for beyond 5G/6G cellular networks. In addition, the specifically developed JCAS algorithm can be the basis of novel developments for passive object detection and identification.

More info

SLICES-SC

(Scientific Large-scale Infrastructure for Computing/Communication Experimental Studies – Starting Community)

Funded by: European Union H2020-INFRAIA-2020-1 (Integrating and opening research infrastructures of European interest. Integrating Activities for Starting Communities)

Duration: March 2021 to August 2024

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101008468.

Today we are experiencing the digital transformation happening with an unprecedented pace, with the community constantly researching on new solutions to support this transformation with ample computational power and connectivity. Towards addressing such research efforts, Research Infrastructure (RI) specific to addressing Digital Sciences research efforts have been deployed worldwide, towards trying to address key aspects contrary to off-the shelf commercial infrastructure:

1) **Full control over the parameters of an experiment**,
2) **Repeatable experiments regardless of the physical infrastructure**,
3) **Valid experimental results, which are easy to cross-reference and replicate**.

As such, several RIs have emerged, **offering experimentation services with bleeding edge resources**, that otherwise are only offered only in industrial R&D laboratories, with limited functionality. Towards combating these issues, SLICES Research Infrastructure is about to be deployed, aiming to provide high quality experimentation services with emerging technologies around the area of **digital sciences (5G/6G, NFV, IoT and Cloud Computing)**, in an Internet scale setup.

With SLICES-SC, we aspire to foster the community of researchers around this ecosystem, create and strengthen necessary links with relevant industrial stakeholders for the exploitation of the infrastructure, advance existing methods for research reproducibility and experiment repeatability, and design and deploy the necessary solutions for providing SLICES-RI with an **easy to access scheme for users from different disciplines**.

A set of detailed research activities has been designed to materialize these efforts in tools for **providing transnational (remote and physical) access to the facility**, as well as virtual access to the data produced over the facilities. The respective networking activities of the project aspire in fostering the community around these infrastructures, as well as open up to new disciplines and industrial stakeholders.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.101008468

More info

SOMIRO

(Soft Milli-robots)

Funded by: European Union H2020-ICT-2020-2 (Information and Communication Technology)
Duration: January 2021 to June 2024

Precision agriculture for rice farming and smart methods such as aquaponics are vital to ensure a safe supply of fresh food for Europe while reducing our environmental footprint. In line with the Digitising European Industry initiative under their description of smart agriculture, the SOMIRO project will develop a flat-worm-inspired mm-scale swimming robot with month-long energy autonomy, local intelligence, and ability to continuously generate data and optically communicate to reduce farming's environmental impact in terms of carbon footprint, over fertilization, pesticide use, and overfeeding. Swimming robots would cover a much larger area than stationary systems and could be rapidly deployed and self-redistribute where most needed. They may serve as a stand-alone monitoring solution for indoor farming or complement drone-based remote sensing in outdoors scenarios.

SOMIRO
SOFT MILLIROBOT

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.101016411.

Until today, no energy autonomous (untethered and with local intelligence) milli-robot capable of hours of continuous operation has been demonstrated. The major reason for this is power limitation: locomotion requires much power and small robots have very limited energy storage and energy harvesting. Our milli-robot will be less than 1 cm long and show how soft and stretchable systems, with undulating swimming like flat worms, require far less energy for locomotion than other systems of comparable size. For power, it will not rely on any dedicated infrastructure but only on ambient light.

The design of SOMIRO focuses on its industry transfer: industrial partners will use cutting-edge assembly technologies that can scale up to production volumes with no change in process. The bulk materials are low-cost elastomers and polymers and the electronic circuits will be based on commercial components. Throughout the project, all application scenarios and exploitation plans will be developed in close collaboration among the SOMIRO partner enterprises and end-users, and external industrial stakeholders.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.101016411

More info

GREENEDGE

(Energy-efficient Monitoring in the era of Edge Intelligence)

Funded by: Ministry of Science and Innovation.
Duration: September 2022 to June 2024

Monitoring a process/phenomenon of specific interest at the network edge is prevalent in Cyber-Physical Systems (CPS), remote healthcare, smart buildings, intelligent transport, etc., that are essential building blocks of smart cities. Todays monitoring systems extensively use Internet-of-Things (IoT) sensors. In the era of the Edge Intelligence, there is a major research thrust for deploying small Machine Learning (ML) models on the IoT sensors making them capable of doing local inference on the collected data. The small ML models consume lower energy at the cost of lower inference accuracy compared to large ML models, namely, Deep Neural Netowrks (DNNs) that run on edge servers. In this context, there are several unanswered questions on the Total System Energy (TSE) consumption in the monitoring systems. A natural question is: where should the inference be performed for a data sample so that TSE is reduced? Another impending question is: when should the sensors smaple in order to further reduce the TSE? The latter question is inspired by the fact that in today's system, the data collected sensors has high redundancy.

The GreenEdge project answers the above questions by exploring the TSE savings that can be achieved in a monitoring application using intelligent sampling and scheduling the inference between the edge server and the IoT sensors. GreenEdge will achieve this while respecting the applications' Quality of Service (QoS) requirements. This will be conducted in three stages: (1) performing measurements of energy consumption, processing times, and communication times on the IoT sensor and the edge server, (2) establishing models and algorithmic solutions that schedule the sampling and the inference by exploiting the trade-offs between the TSE consumption, inference accuracy, IoT battery limitation, delay in detecting essential events etc., and (3) applying the new findings and validating the efficacy of the proposed algorithms in two exemplary applications with varied characteristics, namely, a cognitive assistance application and a wildfire monitoring testbed.

More info

DIME

(Distributed Inference for Energy-efficient Monitoring at the Network Edge Note)

Funded by: European Union HORIZON-MSCA-PF.

Duration: June 2022 to May 2024

Today, Internet of Things (IoT) sensors are being extensively used for monitoring processes/phenomena in smart cities. The data samples generated by these IoT sensors are wirelessly transmitted to servers at the network edge where compute-intensive Machine Learning (ML) models, specifically Deep Neural Networks (DNNs), are used for providing inference. However, a large percentage of data samples are redundant because they do not (significantly) improve inference. This leads to an excessive and unjustified carbon footprint of these systems as each redundant data sample will contribute to the Total System Energy (TSE) consumption. However, there is a lack of research on the design of these systems to reduce the TSE by considering the redundancy in the data. In DIME, we explore the TSE energy savings in a distributed inference setup by envisaging the deployment of the emerging small DNN models on the IoT sensors. My objective is to maximize TSE energy savings by answering two key questions: 1) when should an IoT sensor sample the process (to reduce redundant samples) and 2) where to do the inference on the sample, on the IoT sensor or at the edge server (to reduce TSE)? I will develop a general modelling framework and subsequently design and validate scheduling algorithms and sampling techniques that minimize the TSE by reducing the redundant data and maximize accuracy in ML-based monitoring systems. To achieve the objective, I will leverage my theoretical research experience on modelling and design and analysis of algorithms and the expertise of IMDEA Networks in applied machine learning and systems research. DIME directly contributes to reducing the carbon footprint of monitoring in smart cities, which is in line with the goal of Horizon Europe to achieve 100 climate-neutral smart cities by 2030

More info

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101021377.

TRUST aWARE

(Enhancing Digital Security, Privacy and TRUST in softWARE)

Funded by: European Union H2020-SU-DS-2020 (Digital Security).
Duration: June 2021 to May 2024

Users often get exposed to security and privacy (S&P) threats when they use digital services for social networking, entertainment, banking, education, health, or home security. The factors behind digital S&P threats are numerous and interconnected, as a combined result of inappropriate software practices, bad user habits, and lack of regulatory enforcement and certification methods, among others. To define effective digital S&P policies and to establish a long-term vision, it is needed to have data, information, and a body of knowledge on privacy, data protection and the associated ethical, legal and socio-economic aspects.

TRUST aWARE aims to address this situation by providing actionable intelligence and tools for the different connected stakeholders, to offer effective mechanisms to protect the freedom, security, and privacy of citizens, enhancing TRUST on SoftWARE, cybersafety, and EU's market position. TRUST aWARE will facilitate this by delivering:

User-friendly tools to protect consumers against S&P cyberthreats (attacks, abusive practices, inappropriate behaviours of digital services) to enable them to better understand, control, detect and respond to S&P threats in a timely manner, and configuring their own S&P protection settings.

Collective intelligence for CERTs and Authorities in collaboration with citizens, CISOs and DPOs to ensure and audit that digital products and their S&P practices are transparent, secure and compliant with regulation.

Knowledge to foster S&P-by-design in software engineering by supporting developers and operators with standards and certification methods for compliance with S&P regulations.

By providing tools for key stakeholders along the whole cycle (TRUST aWARE virtuous cycle), and supporting cooperation and intelligence sharing, TRUST aWARE will minimize the impact of cyberthreats, empowering users, promoting collective awareness, and encouraging trustworthy S&P-preserving digital products in compliance with regulation.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101021377.

More info

BANYAN

(Big dAta aNalYtics for radio Access Networks)

Funded by: European Union H2020-MSCA-ITN-2019 (Marie Skłodowska-Curie Innovative Training Networks)

Duration: April 2020 to April 2024

As mobile services consumed by people and machines become increasingly diversified and heterogeneous, 4G/5G networks are asked to meet a growing variety of Quality of Service (QoS) requirements. Network slicing, enabled by Network Function Virtualization (NFV), is a promising paradigm to increase the agility and elasticity of the mobile network via logical slices that can be formed and composed dynamically, so as to adapt to the fluctuations in the demands for different mobile services. BANYAN pursues a tight academic-industrial cooperation, which will allow developing key tools for data-driven 5G RAN, as well as properly training early-stage researchers who are urgently needed by industry, academia, etc.

More info

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Marie Sklodowska-Curie grant agreement No.860239.

MINTS

Millimeter-wave Networking and Sensing for Beyond 5G

Funded by: European Union H2020-MSCA-ITN-2019 (Marie Skłodowska-Curie Innovative Training Networks)

Duration: November 2019 to April 2024

The global telecommunications market has become tremendously competitive due to the emergence of new Asian players and saturation of traditional products (e.g., mobile broadband), which has decelerated the growth of the EU's telecommunications market. Thus, without dramatic innovation to open up new markets, EU's telecommunications industry is at risk. However, new markets such as industry 4.0 and autonomous driving demands extremely high data rates which can only be provided at mmWave frequen- cies. To successfully overcome mmWave challenges, a closely integrated, skilled and multi-disciplinary team is needed to co-create innovative technology and applications. The ETN for MIllimeter-wave NeTworking and Sensing for Beyond 5G (MINTS) offers the first training program on mmWave networks that covers the full stack from physical layer to application.

More info

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Marie Sklodowska-Curie grant agreement No.861222.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.101017109.

DAEMON

(Network intelligence for aDAptive and sElf-Learning MObile Networks)

Funded by: European Union H2020-ICT-2020-2 (Information and Communication Technology)

Duration: January 2021 to March 2024

The success of Beyond 5G (B5G) systems will largely depend on the quality of the Network Intelligence (NI) that will fully automate network management. Artificial Intelligence (AI) models are commonly regarded as the cornerstone for NI design; indeed, AI models have proven extremely successful at solving hard problems that require inferring complex relationships from entangled and massive (e.g., traffic) data. However, AI is not the best solution for every NI task; and, when it is, the dominating trend of plugging 'vanilla' AI into network controllers and orchestrators is not a sensible choice.

Departing from the current hype around AI, DAEMON will set forth a pragmatic approach to NI design. The project will carry out a systematic analysis of which NI tasks are appropriately solved with AI models, providing a solid set of guidelines for the use of machine learning in network functions. For those problems where AI is a suitable tool, DAEMON will design tailored AI models that respond to the specific needs of network functions, taking advantage of the most recent advances in machine learning. Building on these models, DAEMON will design an end-to-end NI-native architecture for B5G that fully coordinates NI-assisted functionalities.

The advances to NI devised by DAEMON will be applied in practical network settings to: (i) deliver extremely high performance while making an efficient use of the underlying radio and computational resources; (ii) reduce the energy footprint of mobile networks; and (iii) provide extremely high reliability beyond that of 5G systems. To achieve this, DAEMON will design practical algorithms for eight concrete NI-assisted functionalities, carefully selected to achieve the objectives above. The performance of the DAEMON algorithms will be evaluated in real-world conditions via four experimental sites, and at scale with data-driven approaches based on two nationwide traffic measurement datasets, against nine ambitious yet feasible KPI targets.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.101017109.

More info

scientific activities

annual report 2024

www.networks.imdea.org

IMDEA Networks Institute monitors and evaluates its scientific results in order to obtain a sound appraisal of the degree of fulfillment of its strategy and objectives, optimizing the management of its resources and maximizing its impact. The pursuit of excellence is at the core of all of our activities.

5.1. Awards

5.1.1. Paper Awards

BEST DEMO RUNNER-UP AWARD
International Conference on Embedded Wireless Systems and Networks (EWSN 2024)
(December 2024)
Javier Talavante, Salvatore Corallo, Domenico Giustiniano
Demo: Streaming Video over 360 Degrees Visible Light Communication

ACM ARTIFACT BADGES: AVAILABLE AND FUNCTIONAL
ACM SIGCOMM 2024 (August 2024)
Rostand A. K. Fezeu, Claudio Fiandrino, Eman Ramadan, Jason Carpenter, Lilian Coelho de Freitas, Faaiq Bilal, Wei Ye, Joerg Widmer, Feng Qian and Zhi-Li Zhang
Unveiling the 5G Mid-Band Landscape: From Network Deployment to Performance and Application QoE

BEST PAPER AWARD
Mediterranean Communication and Computer Networking Conference (MedComNet) (June 2024)
Juan Marcos Ramírez, Vincenzo Mancuso, Marco Ajmone Marsan
The Rumble in the Millimeter Wave Jungle: Obstructions Vs RIS

BEST PAPER AWARD
IEEE INFOCOM 2024 (May 2024)
Claudio Fiandrino, Eloy Pérez Gómez, Pablo Fernández Pérez, Hossein Mohammadalizadeh, Marco Fiore and Joerg Widmer
AIChronoLens: Advancing Explainability for Time Series AI Forecasting in Mobile Networks

BEST PAPER HONORABLE MENTION
Annual AAAI Conference on Artificial Intelligence (February 2024)
Srivastava Ajitesh, Juan Marcos Ramirez, Sergio Díaz Aranda, Jose Aguilar, Antonio Ortega, Antonio Fernández Anta, Rosa Elvira Lillo
Nowcasting Temporal Trends Using Indirect Surveys

5.1.2. Researcher Awards

2024 ACM SIGMETRICS ACHIEVEMENT AWARD
Marco Ajmone Marsan (June 2024)
ACM SIGMETRICS selected Prof. Marco Ajmone Marsan of the Politecnico di Torino and the IMDEA Networks Institute as the recipient of the 2024 ACM SIGMETRICS Achievement Award in recognition of his fundamental contributions to stochastic modeling and analysis techniques and for application of the techniques to obtain a

wealth of pioneering results in the analysis of communication protocols and energy efficiency in computer systems and networks.

5.1.3. R&D Awards

OUTSTANDING REVIEWER: ACM MM 2024

Sergey Gorinsky (October 2024)
Our Research Associate Professor Sergey Gorinsky received the Outstanding Reviewer Award at ACM Multimedia 2024 in recognition of the quality of his reviews.

DISTINGUISHED REVIEWER AWARD

Guillermo Suárez-Tangil (August 2024)
Our Research Assistant Professor Guillermo Suárez-Tangil received the Distinguished Reviewer Award at USENIX Security'24 in recognition of the quality of his reviews.

DISTINGUISHED TPC MEMBER AWARD AT IEEE INFOCOM 2024

Marco Fiore (February 2024)
IMDEA Networks Research Professor Marco Fiore is among the few TPC members recognized as Distinguished Members by the TPC chairs. The recognition was based on peer ratings, fairness in review scores, and punctuality in meeting various deadlines during the review process.

YOUNG ENTREPRENEURSHIP AWARDS-CARNÉ JOVEN - COMUNIDAD DE MADRID

Javier Talavante (January 2024)
Javier Talavante, a PhD student at IMDEA Networks, has won second place in the II Edition of the Young Entrepreneurship Awards of the Community of Madrid in the innovative modality with the spin-off Sensory-FI, developing the greenhouse monitoring system LiFi4Food.

5.2. Publications

IMDEA Networks presented its scientific work in various formats and venues during 2024. There were **114** publications, out of which **106** were peer reviewed. This is how they are structured:

38 Journal Articles | 2 Magazine Articles | 58 Conference and Workshop Papers | 8 Conference and Workshop Posters & Demos | 2 Invited Papers, Keynotes, Invited Talks, Tutorials, Lectures, etc.

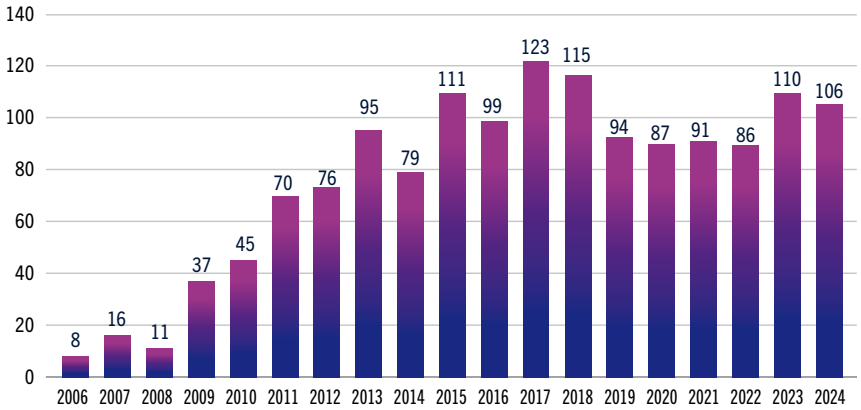
As well as the previous there were:
7 PhD Theses

According to **Google Scholar**, IMDEA Networks' researchers have received around **116.118 citations in total** along their research career, which corresponds to an **aggregated H-index of 146**.

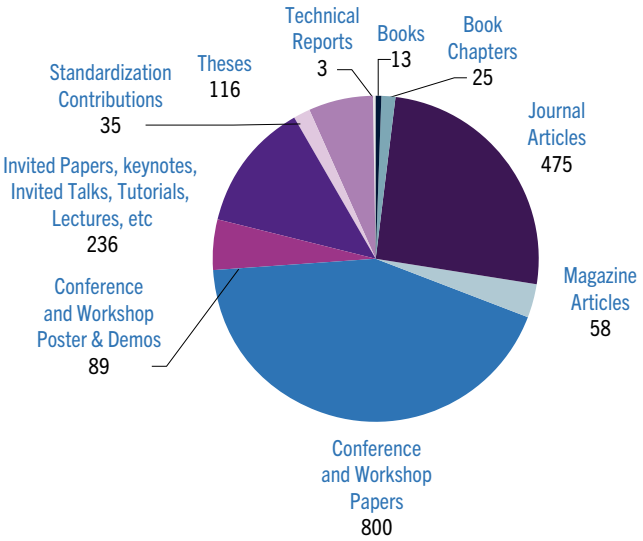
publications

2006-2024

number of publications (peer-reviewed)

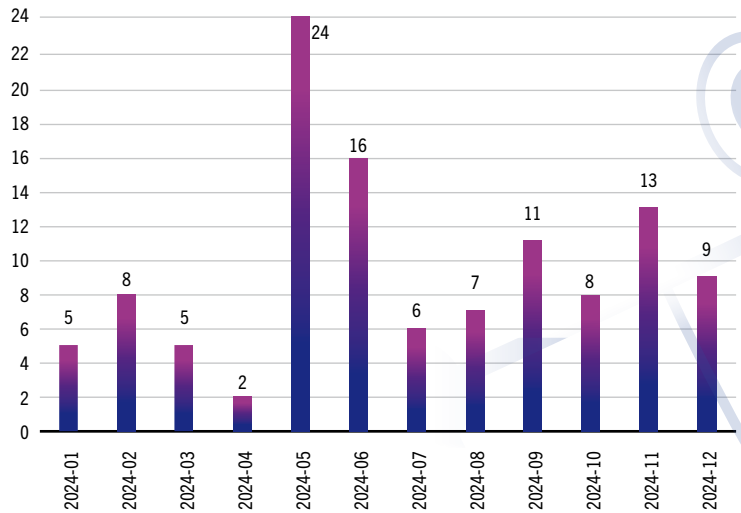


all publications by type



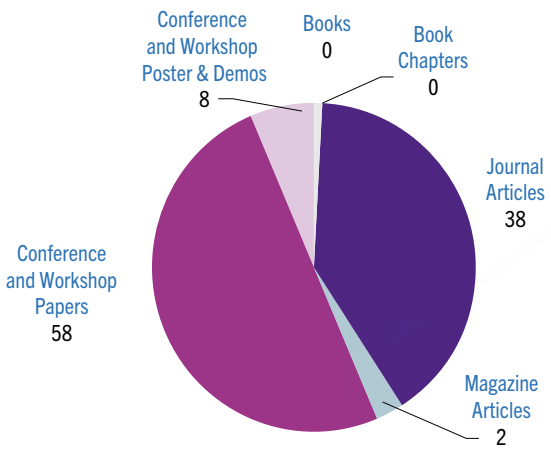
2024

total number of publications per month



Total = 114

publications by type (peer reviewed)



Total = 106

Publications 2024

Journal Articles [38]

1. **Kobra Mahdavipour, Farzam Nosrati, Stefania Sciara, Roberto Morandotti, Rosario Lo Franco (December 2024)**
Generation of Genuine Multipartite Entangled States via Indistinguishability of Identical Particles
PRX Quantum. 10.1103/PRXQuantum.5.040350. Volume 5, American Physical Society.

2. **William Hoyos, Kenia Hoyos, Rander Ruiz, Jose Aguilar (December 2024)**
An explainable analysis of diabetes mellitus using statistical and artificial intelligence techniques
BMC Medical Informatics and Decision Making. 10.1186/s12911-024-02810-x. Volume 24, BioMed Central Ltd. ISSN: 1472-6947.

3. **Feilong Wang, Donghui Shi, Jose Aguilar, Xinyi Cui (December 2024)**
A few-shot learning method based on knowledge graph in large language models
International Journal of Data Science and Analytics. 10.1007/s41060-024-00699-3. Springer. ISSN: 2364-415X.

4. **Ana Gutiérrez, Jose Aguilar, Ana Ortega, Edwin Montoya (December 2024)**
Using fuzzy cognitive maps to evaluate the innovation in micro, small and medium-sized enterprises
Management Decision. 10.1108/MD-09-2023-1619. Emerald Publishing Limited. ISSN: 0025-1747.

5. **Sergio Díaz-Aranda, Jose Aguilar, Juan Marcos Ramirez, David Rabanedo, Antonio Fernández Anta, Rosa Elvira Lillo (December 2024)**
Performance Analysis of NSUM Estimators in Social-Network Topologies
The American Statistician. Taylor & Francis on behalf of the American Statistical Association (United States). ISSN: 0003-1305.

6. **Paola Soto, Miguel Camelo, Ginés García-Avilés, Esteban Municio, Marco Gramaglia, Evangelos Kosmatos, Nina Slamnik-Krieštorac, Danny De Vleeschauwer, Antonio Bazco-Nogueras, Lidia Fuentes, Joaquin Ballesteros, Andra Lutu, Luca Cominardi, Ivan Paez, Sergi Alcalá-Marín, Livia Elena Chatzieleftheriou, Andres Garcia-Saavedra, Marco Fiore (December 2024)**
Designing the Network Intelligence Stratum for 6G Networks
Computer Networks. 10.1016/j.comnet.2024.110780. Volume 254, Elsevier. ISSN: 13891286.

7. **Tianyue Chu, Mengwei Yang, Nikolaos Laoutaris, Athina Markopoulou (November 2024)**
PriPrune: Quantifying and Preserving Privacy in Pruned Federated Learning
ACM Transactions on Modeling and Performance Evaluation of Computing Systems. 10.1145/3702241.

8. **Raul Toscano-Miranda, Jose Aguilar, Manuel Caro, Anibal Trebilcok, Mauricio Toro (November 2024)**
Precision farming using autonomous data analysis cycles for integrated cotton management
Information Processing in Agriculture. 10.1016/j.inpa.2024.10.002. Elsevier.

9. **Christian Quadri, Vincenzo Mancuso, Marco Ajmone Marsan, Gian Paolo Rossi (October 2024)**
Edge-Based Control of Multi-Platoons
IEEE Transactions on Vehicular Technology. 10.1109/TVT.2024.3401584. Volume 73, IEEE.

10. **Diego Javier Benito, Jesús Rufino, Juan Marcos Ramirez, Antonio Fernández Anta, Jose Aguilar (September 2024)**
An In-Depth Analysis of COVID-19 Symptoms Considering the Co-Occurrence of Symptoms Using Clustering Algorithms
IEEE Access. 10.1109/ACCESS.2024.3456246. Volume 12, IEEE Society. ISSN: 2169-3536.

11. **Syed Waqas Haider Shah, Marwa Qaraqe, Saud Althunibat, Joerg Widmer (September 2024)**
Optimizing QoS in Secure RIS-Assisted mmWave Network With Channel Aging
IEEE Transactions on Vehicular Technology.

12. **Arivarasan Karmegam, Ashish Tomar, Sachin Tripathi (September 2024)**
Blockchain-based cross-domain authentication in a multi-domain Internet of drones environment
The Journal of Supercomputing. 10.1007/s11227-024-06447-5.

13. **Vincenzo Mancuso, Paolo Castagno, Leonardo Badia, Matteo Sereno, Marco Ajmone Marsan (September 2024)**
Effectiveness of Distributed Stateless Network Server Selection under Strict Latency Constraints
Computer Networks. 10.1016/j.comnet.2024.110558.

14. **Carlos Quintero, Jose Aguilar (August 2024)**
A semi-supervised learning algorithm for multi-label classification and multi-assignment clustering problems based on a Multivariate Data Analysis
Engineering Applications of Artificial Intelligence. 10.1016/j.engappai.2024.109189. Volume 137, Elsevier. ISSN: 0952-1976.

15. **Gontzal Sagastabeitia, Josu Doncel, Jose Aguilar, Antonio Fernández Anta, Juan Marcos Ramirez (August 2024)**
COVID-19 seroprevalence estimation and forecasting in the USA from ensemble machine learning models using a stacking strategy
Expert Systems with Applications. 10.1016/j.eswa.2024.124930. Volume 258, Elsevier. ISSN: 0957-4174.

16. **Ivan Palamà, Yago Lizarribar, Lorenzo Maria Monteforte, Giuseppe Santaromita, Stefania Bartoletti, Domenico Giustiniano, Giuseppe Bianchi, Nicola Blefari Melazzi (August 2024)**
5G Positioning with Software-defined Radios
Computer Networks.

17. **Gabriel O. Ferreira, André Felipe Zanella, Stefanos Bakirtzis, Chiara Ravazzi, Fabrizio Dabbene, Giuseppe C. Calafiore, Ian Wassell, Jie Zhang, Marco Fiore (July 2024)**
A Joint Optimization Approach for Power-Efficient Heterogeneous OFDMA Radio Access Networks
IEEE Journal on Selected Areas in Communications. Volume Special Issue on Advanced Optimization Theory and Algorithms for Next Generation Wireless Communication Networks, IEEE.

18. **Diego Javier Benito, Carlos Quintero, Jose Aguilar, Juan Marcos Ramirez, Antonio Fernández Anta (July 2024)**
Explainability Analysis: An In-Depth Comparison between Fuzzy Cognitive Maps and LAMDA
Applied Soft Computing. 10.1016/j.asoc.2024.111940. Volume 164, Elsevier. ISSN: 1568-4946.

19. **Ricardo Dos Santos, Jose Aguilar (June 2024)**
A Synthetic Data Generation System based on the Variational-Autoencoder Technique and the Linked Data Paradigm
Progress in Artificial Intelligence. 10.1007/s13748-024-00328-x. Volume 13, Springer. ISSN: 2192-6352.

20. **Alan Collet, Antonio Bazco-Nogueras, Albert Banchs, Marco Fiore (June 2024)**
Explainable and Transferable Loss Meta-Learning for Zero-Touch Anticipatory Network Management
IEEE Transactions on Network and Service Management. 10.1109/TNSM.2024.3377442. Volume 21, IEEE. ISSN: 1932-4537.

21. **Jose Miguel Moreno, Sergio Pastrana, Jens Helge Reelfs, Pelayo Vallina, Savas Zannettou, Andriy Panchenko, Georgios Smaragdakis, Oliver Hohlfeld, Narseo Vallina-Rodríguez, Juan Tapiador (May 2024)**
Reviewing War: Unconventional User Reviews as a Side Channel to Circumvent Information Controls
Proceedings of the International AAAI Conference on Web and Social Media. 10.1609/icwsm.v18i1.31374. Volume 18

22. **Adarsh Prasad Behera, Satya Prakash, Siddhant Khanna, Shivangi Nigam, Shekhar Verma (May 2024)**
CNN based Metrics for Performance Evaluation of Generative Adversarial Networks
IEEE Transactions on Artificial Intelligence. 10.1109/TAI.2024.3401650. IEEE. ISSN: 2691-4581.

23. **Rubén Cuevas, Ángel Cuevas, Amir Mehrjoo (May 2024)**
Online advertisement in a pink-colored market
EPJ Data Science. Springer Berlin Heidelberg.

24. **Shivangi Nigam, Adarsh Prasad Behera, Shekhar Sherma, P. Nagabhushan (May 2024)**
Deformity Removal from Handwritten Text Documents using Variable CycleGAN
International Journal on Document Analysis and Recognition (IJDAR). 10.1007/s10032-024-00466-x. Springer Berlin Heidelberg. ISSN: 1433-2825.

25. **Jesus Pérez, Eladio Dapena, Jose Aguilar (May 2024)**
Emotions as implicit feedback for adapting difficulty in tutoring systems based on reinforcement learning
Education and Information Technologies. 10.1007/s10639-024-12699-8. Springer. ISSN: 1360-2357.

26. **Marvin Jimenez, Rodrigo García, Jose Aguilar (March 2024)**
A Many-Objective Optimization Approach for Weight Gain and Animal Welfare in Rotational Grazing of Cattle
Engineering Applications of Artificial Intelligence. 10.1016/j.engappai.2024.108264. Volume 133, Elsevier.

27. **Angelo Furno, André Felipe Zanella, Razvan Stanica, Marco Fiore (March 2024)**
Spatial and Temporal Exploratory Factor Analysis of Urban Mobile Data Traffic
Data Science for Transportation. 10.1007/s42421-024-00089-y. Volume 6, Springer.

28. **Musa Furkan Keskin, Carina Marcus, Olof Henricsson, Alvaro Alvarado, Joerg Widmer, Henk Wymeersch (March 2024)**
Integrated Sensing and Communications With MIMO-OTFS: ISI/ICI Exploitation and Delay-Doppler Multiplexing
IEEE Transactions on Wireless Communications. 10.1109/TWC.2024.3370501. Volume 23, IEEE.

29. **Stavros Eleftherakis, Giuseppe Santaromita, Maurizio Rea, Xavier Costa-Perez, Domenico Giustiniano (February 2024)**
SPRING+: Smartphone Positioning from a Single WiFi Access Point
IEEE Transactions on Mobile Computing. 10.1109/TMC.2024.3367241. IEEE.

30. **Dayrene Frómeta, Muhammad Sarmad Mir, Sergio Iglesias De Frutos, Borja Genovés Guzmán, Domenico Giustiniano (February 2024)**
Modulating LiFi for dual operation in the visible and infrared spectra
Computer Communications. 10.1016/j.comcom.2024.01.005. Elsevier.

31. **Vishnu Narayanan Moothedath, Jaya Prakash Champati, James Gross (February 2024)**
Getting the Best Out of Both Worlds: Algorithms for Hierarchical Inference at the Edge
IEEE Transactions on Machine Learning in Communications and Networking. 10.1109/TMLCN.2024.3366501. Volume 2

32. **Edgar Arribas, Vincenzo Mancuso, Vicent Cholvi (February 2024)**
Exact Resource Allocation for Fair Wireless Relay
IEEE Communications Letters. 10.1109/LCOMM.2024.3370248.

33. **Rodrigo García, Jose Aguilar (February 2024)**
A meta-learning approach in a cattle weight identification system for anomaly detection
Computers and Electronics in Agriculture. 10.1016/j.compag.2023.108572. Volume 217, Elsevier. ISSN: 0168-1699.

34. **Raul Toscano-Miranda, Jose Aguilar, William Hoyos, Manuel Caro, Anibal Trebilcok, Mauricio Toro (February 2024)**
Different Transfer Learning Approaches for Insect Pest Classification in Cotton
Applied Soft Computing. 10.1016/j.asoc.2024.111283. Elsevier. ISSN: 1568-4946.

35. **Dayrene Frómeta, Borja Genovés Guzmán, Giovanni Luca Mertena, Rui Bian, Harald Haas, Domenico Giustiniano (January 2024)**
A prediction-model-assisted reinforcement learning algorithm for handover decision-making in hybrid LiFi and WiFi networks
Journal of Optical Communications and Networking. 10.1364/JOCN.495234.

36. **Raul Martin, Pablo Saucedo De Miguel, Iván Vidal, Francisco Valera, Borja Nogales (January 2024)**
Service for Deploying Digital Twins of QKD Networks
MDPI. Applied Sciences. 10.3390/app14031018.

37. **Rodrigo García, Jose Aguilar, Angel Pinto (January 2024)**
An Autonomous System for the Self-supervision of Animal Fattening in the context of Precision Livestock Farming
Future Generation Computer Systems. 10.1016/j.future.2023.09.003. Volume 150, Elsevier. ISSN: 0167-739X.

38. **Jacopo Pegoraro, Jesus Omar Lacruz, Tommy Azzino, Marco Mezzavilla, Michele Rossi, Joerg Widmer, Sundeep Rangan (January 2024)**
JUMP: Joint communication and sensing with Unsynchronized transceivers Made Practical
IEEE Transactions on Wireless Communications. 10.1109/TWC.2024.3365853. IEEE. ISSN: 1558-2248.

Magazine Articles [2]

1. **Kai Wu, Jacopo Pegoraro, Francesca Meneghello, Andrew Zhang, Jesus Omar Lacruz, Joerg Widmer, Francesco Restuccia, Michele Rossi, Xiaojing Huang, Daqing Zhang, Giuseppe Caire, Y Jay Guo (November 2024)**
Sensing in Bi-Static ISAC Systems with Clock Asynchronism: A Signal Processing Perspective
IEEE Signal Processing Magazine. IEEE.

2. **Alan Collet, Antonio Bazco-Nogueras, Albert Banchs, Marco Fiore (November 2024)**
Learning to Learn How to Manage Network Resources with Loss Function Meta-Learning
IEEE Communications Magazine. IEEE. ISSN: 1558-1896.

Conference and Workshop Papers [58]

1. **Orlando E. Martínez-Durive, José Suárez-Varela, Jesús Omaña Iglesias, Andra Lutu, Marco Fiore (December 2024)**
An Evaluation of RAN Sustainability Strategies in Production Networks
IEEE International Conference on Computer Communications. London, United Kingdom.

2. **Mariella Mischinger, Sergio Pastrana, Guillermo Suarez-Tangil (December 2024)**
IoC Stalker: Early detection of Indicators of Compromise
Annual Computer Security Applications Conference.

3. **Leonardo Peroni, Sergey Gorinsky, Farzad Tashtarian (November 2024)**
In-Band Quality Notification from Users to ISPs
IEEE International Conference on Cloud Networking. Rio de Janeiro, Brazil.

4. **Leonardo Bonati, Ravis Shirkhani, Claudio Fiandrino, Stefano Maxenti, Salvatore D'oro, Michele Polese, Tommaso Melodia (November 2024)**
Twinning Commercial Network Traces on Experimental Open RAN Platforms
Proceedings of 18th ACM Workshop on Wireless Network Testbeds, Experimental Evaluation & Characterization. Washington, D.C., USA.

5. **Vahid Ghafouri, Jose Such, Guillermo Suarez-Tangil (November 2024)**
I love pineapple on pizza != I hate pineapple on pizza: Stance-Aware Sentence Transformers for Opinion Mining
Empirical Methods in Natural Language Processing. Miami, Florida.

6. **Vahid Ghafouri, Faisal Alatawi, Mansooreh Karami, Jose Such, Guillermo Suarez-Tangil (November 2024)**
Transformer-Based Quantification of the Echo Chamber Effect in Online Communities
ACM Conference on Computer Supported Cooperative Work. San Jose, Costa Rica. November 2024

7. **Timothé Albouy, Antonio Fernández Anta, Chryssis Georgiou, Mathieu Gestin, Nicolas Nicolaou, Junlang Wang (November 2024)**
AMECOS: A Modular Event-based Framework for Concurrent Object Specification
International Conference on Principles of Distributed Systems. Lucca, Italy.

8. **André Felipe Zanella, Diego Madariaga, Sachit Mishra, Orlando E. Martínez-Durive, Zbigniew Smoreda, Marco Fiore (November 2024)**
Characterizing, Modeling and Exploiting the Mobile Demand Footprint of Large Public Protests
Internet Measurement Conference. Madrid, Spain.

9. **Jacopo Pegoraro, Jesus Omar Lacruz, Michele Rossi, Joerg Widmer (November 2024)**
HiSAC: high-resolution sensing with multiband communication signals
Proceedings of the 22nd ACM Conference on Embedded Networked Sensor Systems. Hangzhou, China.

10. **Stavros Eleftherakis, Timothy Otim, Giuseppe Santaromita, Almudena Diaz-Zayas, Domenico Giustiniano, Nicolas Kourtellis (November 2024)**
Demystifying Privacy in 5G Stand Alone Networks
ACM International Conference on Mobile Computing and Networking. Washington, D.C., USA.

11. **Aristide Tanyi Jong Akem, Marco Fiore (October 2024)**
Towards Real-Time Intrusion Detection in P4-Programmable 5G User Plane Functions
International Conference on Network Protocols. Charleroi, Belgium.

12. **Orlando E. Martínez-Durive, Stefanos Bakirtzis, Cezary Ziemlicki, Jie Zhang, Ian James Wassell, Marco Fiore (October 2024)**
DeepMEND: Reliable and Scalable Network Metadata Geolocation from Base Station Positions
IEEE International Conference on Sensing, Communication and Networking. Phoenix, AZ, United States.

13. **Livia Elena Chatzieleftheriou, Jesús Pérez-Valero, Jorge Martin Perez, Pablo Serrano (October 2024)**
Sustainable Provision of URLLC Services for V2N: Analysis and Optimal Configuration
ACM Symposium on Mobile Ad Hoc Networking and Computing. Athens, Greece.

14. **Farzam Nosrati, Emebet Gelaw, Roberto Corallo, Silvia Schilleci, Alessio Vicario, Daniele Croce (October 2024)**
Cooperative Spectrum Sensing for Beyond-5G Networks in Fading Environments
MOBIHOC '24: Proceedings of the Twenty-fifth International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing.

15. **Leonardo Lo Schiavo, Ginés García-Avilés, Andres Garcia-Saavedra, Marco Gramaglia, Marco Fiore, Albert Banchs, Xavier Costa-Perez (October 2024)**
CloudRIC: Open Radio Access Network (O-RAN) Virtualization with Shared Heterogeneous Computing
10.1145/3636534.3649381. ACM International Conference on Mobile Computing and Networking. Washington, D.C., USA.

16. **Ghina Al Atat, Puranjay Datta, Sharayu Moharir, Jaya Prakash Champati (October 2024)**
Regret Bounds for Online Learning for Hierarchical Inference
ACM Symposium on Mobile Ad Hoc Networking and Computing. Athens, Greece.

17. **Orlando E. Martínez-Durive, Diego Madariaga, Prashant K. Ray, Daniel A. Amaro-Ramos, Marco Fiore (September 2024)**
Uncovering Latent Patterns in Service-Level Spatiotemporal Mobile Traffic
ACM SIGSPATIAL International Workshop on Geo-Privacy and Data Utility for Smart Societies. Atlanta, GA, USA.

18. **Carlos Quintero, Jose Aguilar, Rodrigo García (September 2024)**
Study of Explainability Analysis Methods for the LAMDA Family Algorithms in Classification and Clustering Tasks
IEEE International Joint Conference on Neural Networks. Yokohama, Japan.

19. **Michal Tereszkowski-Kaminski, Santanu Kumar Dash, Guillermo Suarez-Tangil (September 2024)**
A Study of Malicious Source Code Reuse Among GitHub, StackOverflow and Underground Forums
European Symposium On Research In Computer Security. Bydgoszcz, Poland.

20. **Mahsa Noroozi, Markus Fidler, Jaya Prakash Champati, Joerg Widmer (September 2024)**
Age-Of-Information in Tandem Queues With Delayed Feedback: Zero-Wait vs. Pipelining
IEEE International Symposium on Personal, Indoor and Mobile Radio Communications. Valencia, Spain.

21. **Alfonso Rodríguez Barredo De Valenzuela, Sergio Pastrana, Narseo Vallina-Rodríguez, Guillermo Suarez-Tangil (August 2024)**
Reversing the Virtual Maze: An Overview of the Technical and Methodological Challenges for Metaverse App Analysis
IEEE MetaCom. Hong Kong, China.

22. **William Seymour, Nuora Abdi, Kopo M. Ramokapane, Jide Edu, Guillermo Suarez-Tangil, Jose Such (August 2024)**
Voice App Developer Experiences with Alexa and Google Assistant: Juggling Risks, Liability, and Security
Usenix Security Symposium. Philadelphia, PA, USA.

23. **Gontzal Sagastabeitia, Josu Doncel, Antonio Fernández Anta, Jose Aguilar, Juan Marcos Ramírez (August 2024)**
A Stacking Ensemble Machine Learning Strategy for COVID-19 Seroprevalence Estimations in the USA Based on Genetic Programming
IEEE Congress on Evolutionary Computation. Yokohama, Japan.

24. **Rostand A. K. Fezeu, Claudio Fiandrino, Eman Ramadan, Jason Carpenter, Lilian Coelho De Freitas, Faaiq Bilal, Wei Ye, Joerg Widmer, Feng Qian, Zhi-Li Zhang (August 2024)**
Unveiling the 5G Mid-Band Landscape: From Network Deployment to Performance and Application QoE
ACM Special Interest Group on Management of Data Conference. Sidney, Australia.

25. **Juan Marcos Ramírez, Vincenzo Mancuso, Marco Ajmone Marsan (July 2024)**
The Rumble in the Millimeter Wave Jungle: Obstructions Vs RIS
Mediterranean Communication and Computer Networking Conference. Nice, France.

26. **Tianyue Chu, Mengwei Yang, Nikolaos Laoutaris, Athina Markopoulou (July 2024)**
Information-Theoretical Bounds on Privacy Leakage in Pruned Federated Learning
ISIT 2024 Workshop on Information-Theoretic Methods for Trustworthy Machine Learning. Athens, Greece.

27. **Blanca López, Iván Vidal, Francisco Valera, Diego R. López, Antonio Pastor (July 2024)**
Unleashing Flexibility and Interoperability in QKD Networks: The Power of Softwarized Architectures
International Conference on Quantum Communications, Networking, and Computing. Kanazawa, Japan.

28. **Tianyue Chu, Nikolaos Laoutaris (June 2024)**
FedQV: Leveraging Quadratic Voting in Federated Learning
ACM SIGMETRICS. Venice, Italy.

29. **Aristide Tanyi Jong Akem, Michele Gucciardo, Marco Fiore (June 2024)**
Ultra-Low Latency User-Plane Cyberattack Detection in SDN-based Smart Grids
ACM International Conference on Future and Sustainable Energy Systems. Singapore, Singapore.

30. **Ashwini Kumar Singh, Vahid Ghafouri, Jose Such, Guillermo Suarez-Tangil (June 2024)**
Differences in the Toxic Language of Cross-Platform Communities
International AAAI Conference on Web and Social Media. Buffalo, New York, USA.

31. **Nikos Salamanos, Pantelitsa Leonidou, Nikolaos Laoutaris, Michael Sirivianos, Maria Aspri, Marius Paraschiv (June 2024)**
HyperGraphDis: Leveraging Hypergraphs for Contextual and Social-Based Disinformation Detection
AAAI International Conference on Web and Social Media. Buffalo, New York, USA.

32. **Jose Miguel Moreno, Sergio Pastrana, Jens Helge Reelfs, Pelayo Vallina, Savas Zannettou, Andriy Panchenko, Georgios Smaragdakis, Oliver Hohlfeld, Narseo Vallina-Rodríguez, Juan Tapiador (June 2024)**
ReviewingWar: Unconventional User Reviews as a Side Channel to Circumvent Information Controls International AAAI Conference on Web and Social Media. Buffalo, NY, USA.

33. **Salil Sharma, Syed Waqas Haider Shah, Joerg Widmer (June 2024)**
A Low-Complexity Standard-Compliant PAPR Reduction Scheme for OTFS Modulation
IEEE Vehicular Technology Conference. Singapore, Singapore.

34. **Diletta Olliaro, Vincenzo Mancuso, Paolo Castagno, Matteo Sereno, Marco Ajmone Marsan (June 2024)**
Gaming on the Edge: Performance Issues of Distributed Online Gaming
IFIP International Conference on Networking. Thessaloniki, Greece.

35. **Vincenzo Mancuso, Paolo Castagno, Leonardo Badia, Matteo Sereno, Marco Ajmone Marsan (June 2024)**
Optimal allocation of tasks to networked computing facilities
ASMTA 2024 (workshop of ACM SIGMETRICS / IFIP Performance 2024). Venice, Italy.

36. **Syed Waqas Haider Shah, Marwa Qaraqe, Saud Althunibat, Joerg Widmer (June 2024)**
On the Impact of Age of Channel Information on Secure RIS-assisted mmWave Networks
IEEE Vehicular Technology Conference. Singapore, Singapore.

37. **Imran Khan, Moinak Ghoshal, Joana Angjo, Sigrid Dimce, Mushahid Hussain, Paniz Parastar, Yenchia Yu, Claudio Fiandrino, Charalampos Orfanidis, Shivang Aggarwal, Ana C Aguiar, Ozgu Alay, Carla Fabiana Chiasserini, Falko Dressler, Y. Charlie Hu, Steven Y. Ko, Dimitrios Koutsonikolas, Joerg Widmer (June 2024)**
How Mature is 5G Deployment? A Cross-Sectional, Year-Long Study of 5G Uplink Performance
IFIP International Conference on Networking. Thessaloniki, Greece.

38. **Livia Elena Chatzieleftheriou, Marco Gramaglia, Marco Fiore, Nina Slamnik-Kriještorac, Miguel Camelo, Paola Soto, Evangelos Kosmatos, Andres Garcia-Saavedra, Michele Gucciardo (June 2024)**
Network Intelligence in Action: the DAEMON Perspective
European Conference on Networks and Communications & 6G Summit. Antwerp, Belgium.

39. **Arivarasan Karmegam, Gabina Luz Bianchi, Margarita Capretto, Martín Ceresa, Antonio Fernández Anta, César Sánchez (June 2024)**
Implementación y evaluación de setchain
Jornadas de Concurrencia y Sistemas Distribuidos 2024.

40. **Livia Elena Chatzieleftheriou, Marco Gramaglia, Andres Garcia-Saavedra, Steffen Gebert, Ginés García-Avilés, Stefan Geissler, Marco Fiore, Paul Patras, Andra Lutu, Dimitris Tsolkas, Md Arifur Rahman (June 2024)**
Towards 6G: Architectural Innovations and Challenges in the ORIGAMI Framework
European Conference on Networks and Communications & 6G Summit. Antwerp, Belgium.

41. **Aristide Tanyi Jong Akem, Beyza Bütün, Michele Gucciardo, Marco Fiore (May 2024)**
Jewel: Resource-Efficient Joint Packet and Flow Level Inference in Programmable Switches
IEEE International Conference on Computer Communications. Vancouver, Canada.

42. **Michele Gucciardo, Beyza Bütün, Aristide Tanyi Jong Akem, Marco Fiore (May 2024)**
Evaluating the Impact of Flow Length on the Performance of In-Switch Inference Solutions
IEEE International Conference on Computer Communications. Vancouver, Canada.

43. **Jose A. Ayala-Romero, Leonardo Lo Schiavo, Andres Garcia-Saavedra, Xavier Costa-Perez (May 2024)**
Mean-Field Multi-Agent Contextual Bandit for Energy-Efficient Resource Allocation in vRANs
IEEE International Conference on Computer Communications. Vancouver, Canada.

44. **Leonardo Lo Schiavo, Jose A. Ayala-Romero, Andres Garcia-Saavedra, Marco Fiore, Xavier Costa-Perez (May 2024)**
YinYangRAN: Resource Multiplexing in GPU-Accelerated Virtualized RANs
IEEE International Conference on Computer Communications. Vancouver, Canada.

45. **Yago Lizarribar, Roberto Calvo-Palomino, Alessio Scalingi, Giuseppe Santaromita, Gerome Bovet, Domenico Giustiniano (May 2024)**
ORAN-Sense: Localizing Non-cooperative Transmitters with Spectrum Sensing and 5G O-RAN
IEEE International Conference on Computer Communications. Vancouver, Canada.

46. **Sachit Mishra, André Felipe Zanella, Orlando E. Martínez-Durive, Diego Madariaga, Cezary Ziemlicki, Marco Fiore (May 2024)**
Characterizing 5G Adoption and its Impact on Network Traffic and Mobile Service Consumption
IEEE International Conference on Computer Communications. Vancouver, Canada.

47. **Alessio Scalingi, Salvatore D'oro, Francesco Restuccia, Tommaso Melodia, Domenico Giustiniano (May 2024)**
Det-RAN: Data-Driven Cross-Layer Real-Time Attack Detection in 5G Open RANs
IEEE International Conference on Computer Communications. Vancouver, Canada.

48. **Aristide Tanyi Jong Akem, Marco Fiore (May 2024)**
Towards Data-Driven Management of Mobile Networks through User Plane Inference
IEEE Network Operations and Management Symposium. Seoul, South Korea.

49. **Aristide Tanyi Jong Akem, Guillaume Fraysse, Marco Fiore (May 2024)**
Encrypted Traffic Classification at Line Rate in Programmable Switches with Machine Learning
IEEE/IFIP Network Operations and Management Symposium. Seoul, South Korea.

50. **Devriş İşler, Elisa Cabana, Álvaro García-Recuero, Georgia Koutrika, Nikolaos Laoutaris (May 2024)**
FreqyWM: Frequency WaterMarking for the New Data Economy
International Conference on Data Engineering. Utrecht, Netherlands. **Yijing Zeng, Bangya Liu,**

51. **Yilong Li, Domenico Giustiniano, Suman Banerjee (May 2024)**
Sustainable Spectrum Crowdsensing
IEEE International Symposium on Dynamic Spectrum Access Networks. Washington DC, USA.

52. **Rostand A. K. Fezeu, Claudio Fiandrino, Eman Ramadan, Jason Carpenter, Daqing Chen, Yiling Tan, Feng Qian, Joerg Widmer, Zhi-Li Zhang (May 2024)**
Roaming across the European Union in the 5G Era: Performance, Challenges, and Opportunities
IEEE International Conference on Computer Communications. Vancouver, Canada.

53. **Claudio Fiandrino, Eloy Perez Gomez, Pablo Férnandez Pérez, Hossein Mohammadalizadeh, Marco Fiore, Joerg Widmer (May 2024)**
AICHRONOLENS: Advancing Explainability for Time Series AI Forecasting in Mobile Networks
IEEE International Conference on Computer Communications. Vancouver, Canada.

54. **Pablo Fernández, Claudio Fiandrino, Marco Fiore, Joerg Widmer (May 2024)**
An In-Depth Analysis of Advanced Time Series Forecasting Models for the Open RAN
IEEE International Conference on Computer Communications. Vancouver, Canada.

55. **Neharika Valecha, Jesus Omar Lacruz, Michael Lentmaier, Joerg Widmer, Fredrik Tufvesson (April 2024)**
Angle estimation using mmWave RSS measurements with enhanced multipath information
IEEE Wireless Communications and Networking Conference. Dubai.

56. **Farzad Tashtarian, Abdelhak Bentaleb, Hadi Amirpour, Sergey Gorinsky, Junchen Jiang, Hermann Hellwagner, Christian Timmerer (April 2024)**
ARTEMIS: Adaptive bitrate ladder optimization for live video streaming
USENIX Symposium on Networked Systems Design and Implementation. Santa Clara, CA, USA.

57. **Ajitesh Srivastava, Srivastava Ajitesh, Juan Marcos Ramirez, Sergio Díaz-Aranda, Jose Aguilar, Antonio Ortega, Antonio Fernández Anta, Rosa Elvira Lillo (March 2024)**
Nowcasting Temporal Trends Using Indirect Surveys
Annual AAAI Conference on Artificial Intelligence. Vancouver, Canada.

58. **Tianyue Chu, Devriş İşler, Nikolaos Laoutaris (February 2024)**
Strengthening Privacy in Robust Federated Learning through Secure Aggregation
Workshop on Artificial Intelligence System with Confidential Computing (AISCC 2024), co-located with NDSS Symposium 2024. San Diego, CA, USA.

Conference and Workshop Posters & Demos [8]

1. **Javier Talavante, Salvatore Corallo, Domenico Giustiniano (December 2024)**
Demo: Streaming Video over 360 Degrees Visible Light Communication (Demo)
International Conference on Embedded Wireless Systems and Networks (wasEuropean Conference on Wireless Sensor Networks). Abu Dhabi, United Arab Emirates.

2. **Leonardo Lo Schiavo, Ginés García-Avilés, Andres Garcia-Saavedra, Marco Gramaglia, Marco Fiore, Albert Banchs, Xavier Costa-Perez (November 2024)**
CloudRIC demo: Open Radio Access Network (O-RAN) Virtualization with Shared Heterogeneous Computing (Demo)
ACM International Conference on Mobile Computing and Networking. Washington D.C., USA.

3. **Sachit Mishra, André Felipe Zanella, Orlando E. Martínez-Durive, Diego Madariaga, Ziemlicki Cezary, Marco Fiore (October 2024)**
Examining 5G Adoption: Effects on Network Traffic and Mobile Service Usage (Poster)
NetMob 2024. Washington, D.C., USA.

4. **Orlando E. Martínez-Durive, Iñaki Ucar, Zbigniew Smoreda, Esteban Moro, Marco Fiore (May 2024)**
Mobile App Consumption and Political Orientation (Poster)
IEEE International Conference on Computer Communications. Vancouver, Canada.

5. **Pablo Fernández, Claudio Fiandrino, Marco Fiore, Joerg Widmer (May 2024)**
Dissecting Advanced Time Series Forecasting Models with AIChronoLens (Poster)
IEEE International Conference on Computer Communications. Vancouver, Canada.

6. **André Felipe Zanella, Orlando E. Martínez-Durive, Sachit Mishra, Diego Madariaga, Marco Fiore (May 2024)**
Impact of Public Protests on Mobile Networks (Poster)
IEEE International Conference on Computer Communications. Vancouver, Canada.

7. **Arivarasan Karmegam, Gabina Luz Bianchi, Margarita Capretto, Martín Ceresa, Antonio Fernández Anta, César Sánchez (May 2024)**
Setchain Algorithms for Blockchain Scalability (Poster)
IEEE International Parallel and Distributed Processing Symposium (was IPPS and SPDP). San Francisco, California, USA.

8. **Aniketh Girish, Tianrui Hu, Vijay Prakash, Daniel J. Dubois, Srdjan Matic, Danny Yuxing Huang, Serge Egelman, Joel Reardon, Juan Tapiador, David Choffnes, Narseo Vallina-Rodríguez February 2024)**
In the Room Where It Happens: Characterizing Local Communication and Threats in Smart Homes (Poster)
Usenix Network and Distributed System Security Symposium. San Diego, California.

Invited Papers, Keynotes, Invited Talks, Tutorials, Lectures, etc. [2]

1. **Rita Ingabire, Antonio Bazco-Nogueras, Vincenzo Mancuso, Luis M. Contreras, Luis M. Contreras, Jesus Folgueira (July 2024)**
Clearing Clouds from the Horizon: Latency Characterization of Public Cloud Service Platforms (Invited Paper)
International Conference on Computer Communications and Networks. Big Island, Hawaii, USA.

2. **Leonardo Peroni, Sergey Gorinsky (January 2024)**
Quality of Experience in Video Streaming: Status Quo, Pitfalls, and Guidelines (Invited Paper)
International Conference on COMmunication Systems & NETworkS. Bengaluru, India.

PhD Theses [7]

1. Aristide Tanyi Jong AKEM (September 2024)
"User-Plane Algorithms for Stateless and Stateful Inference in Programmable Networks"
PhD Thesis: Department of Telematics Engineering – Universidad Carlos III de Madrid, Spain
Supervisor: Marco Fiore, IMDEA Networks Institute, Madrid, Spain

2. André Felipe ZANELLA (September 2024)
"Characterizing Large-Scale Mobile Traffic Measurements for Urban, Social and Networks Sciences"
PhD Thesis: Department of Telematics Engineering – Universidad Carlos III de Madrid, Spain
Supervisor: Marco Fiore, IMDEA Networks Institute, Madrid, Spain

3. Alan COLLET (September 2024)
"Metric meta-learning in deep learning models for intent-based networking"
PhD Thesis: Department of Telematics Engineering – Universidad Carlos III de Madrid, Spain
Supervisors: Marco Fiore and Albert Banchs, IMDEA Networks Institute, Madrid, Spain

4. Francesco SPINELLI (June 2024)
"On Green Edge Computing with Machine Learning Applications"
PhD Thesis: Department of Telematics Engineering – Universidad Carlos III de Madrid, Spain
Supervisor: Vincenzo Mancuso, IMDEA Networks Institute, Madrid, Spain

5. Dayrene FRÓMETA (June 2024)
"Towards practical LiFi networks with hybrid radio-frequency and optical wireless communication technologies"
PhD Thesis: Department of Telematics Engineering – Universidad Carlos III de Madrid, Spain
Supervisor: Domenico Giustiniano, IMDEA Networks Institute, Madrid, Spain

6. Alessio SCALINGI (June 2024)
"Securing the Electromagnetic Spectrum: Large-Scale Detection, Analysis, and Management of Wireless Threats"
PhD Thesis: Department of Telematics Engineering – Universidad Carlos III de Madrid, Spain
Supervisor: Domenico Giustiniano, IMDEA Networks Institute, Madrid, Spain

7. Nina GROSHEVA (March 2024)
"Efficient network control for large and highly dense millimeter wave deployments"
PhD Thesis: Department of Telematics Engineering – Universidad Carlos III de Madrid, Spain
Supervisor: Joerg Widmer, IMDEA Networks Institute, Madrid, Spain

5.3. Scientific service

IMDEA Networks conducts its scientific activities with the final objective of ensuring the widest possible dissemination of the results of the work carried out by the Institute, both within the scientific community and towards the general public. Our scientific service includes participation by our researchers at different levels of involvement in leading conferences and journals in the field, R&D committees, standardization bodies, awards, publications, projects or sponsorships.

José AGUILAR

Professional posts and activities

- President of the Latin American Informatics Center

Journal editorial boards

- Member of the editorial board of the the Computer Journal and CLEI journal

Organization committees

- General Chair of the 17th International Conference on Advanced Computer Theory and Engineering (ICACTE 2024), 13-15 September 2024, Hefei, Anhui, China

TPC memberships

- Latin American Computer Science Conference, 12-16 August 2024, Sadio, Argentina
- IEEE World Congress on Computational Intelligence, 30 June – 5 July 2024, Yokohama, Japan

Marco AJMONE MARSAN

Journal editorial boards

- Advisory Board member: Performance Evaluation Journal (Elsevier)
- Editorial Board member: Computer Networks
- Evaluation of Computing Systems Journal (ACM ToMPECS)

Organization committees

- IEEE Eric E. Sumner Award

TPC memberships

- The First International Conference in Networking Science & Practice, ITC 36, 2-5 June, 2025, Trondheim, Norway

Albert BANCHS

Professional posts and activities

- Member of the Spanish Committee on Research Ethics

TPC memberships

- IEEE International Conference on Computer Communications (IEEE INFOCOM 2024), 20–23 May 2024, Vancouver, Canada
- IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM), 4-7 June 2024, Perth, Western Australia
- IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (IEEE PIMRC), 2-5 September 2024, Valencia, Spain

Antonio BAZCO-NOGUERAS

Professional posts & activities

- Lecturer, Dept. of Telematics Engineering, UC3M.
- Lecture on "Cloud Measurements with RIPE Atlas", at "Taller de formación dirigido a personal docente e investigador (PDI) de Escuelas de Telecomunicación", 28 November, 2024, Madrid, Spain.
- Session Chair - International Conference on Computer Communications and Networks (ICCCN), 29-31 July 2024, Hawaii, USA
- Seminar "RIPE Atlas: Can we find where the Cloud is?", at Summer School on advanced topics in 5G/6G Communication, 1-5 July, 2024, Cuenca, Spain
- Seminar "Understanding the Cloud through Data Analysis with RIPE Atlas", at Summer School on advanced topics in 5G/6G Communication, 1-5 July, 2024, Cuenca, Spain
- Outreach activity at Mobile World Congress (MWC) for PROMIN, 26-29 February 2024, Barcelona, Spain

Organizing Committee

- Registration Chair: ACM Internet Measurement Conference (ACM IMC), 4-6 November, 2024, Madrid, Spain
- Poster Workshop Chair: Annual IMDEA Networks Workshop, 28 May, 2024, Leganés, Spain

TPC memberships

- International Symposium on Modeling and Optimization in Mobile, Ad hoc, and Wireless Networks (WiOpt), 21-24 October 2024, Seoul, South Korea

Marco CANIL

TPC memberships

- 26th International Conference on Distributed Computing and Networking (ICDCN 2025), 4-7 January 2025, Hyderabad, India

Jaya Prakash Varma CHAMPATI

TPC memberships

- IEEE International Conference on Computer Communications (IEEE INFOCOM 2024), 20–23 May 2024, Vancouver, Canada

Livia Elena CHATZIELEFTHERIOU

Professional posts and activities

- Member of the WiTaR WP of 6G-SNS-IA, representing the ORIGAMI project, since July 2024.

TPC memberships

- International Workshop on Autonomous Network Management in 5G and Beyond Systems (ANMS), 06-10 May 2024, Seoul, South Korea

Nadezda CHUKHNO

Professional posts and activities

- Reviewer of journals: IEEE Communications Letters, IEEE Network Magazine, IEEE Transactions on Communications, IEEE Communications Standards Magazine, IEEE Transactions on Wireless Communications, Transactions on Emerging Telecommunications Technologies

TPC memberships

- WiMob Short Papers, Posters and Demos (WiMob-SPPDT'2024), 21-23 October 2024, Paris, France
- 29th IEEE Symposium on Computers and Communications (IEEE ISCC 2024), 26-29 June 2024, Paris, France
- IEEE 100th Vehicular Technology Conference (VTC2024-Fall), 7-10 October 2024, Washington D.C., USA

Antonio FERNÁNDEZ ANTA

Professional posts and activities

- Mercator Fellow at Collaborative Research Centre MAKI, TU Darmstadt, Germany, since November 2018 to December 2024

Journal editorial boards

- Deputy Editor of The Computer Journal, Oxford Journals

Organization committees

- General co-Chair of the 38th International Symposium on Distributed Computing, DISC 2024, 28 October - 1 November, 2024, Madrid, Spain.

TPC memberships

- The Thirty-eighth Annual Conference on Neural Information Processing Systems (NeurIPS 2024), 10-15 December 2024, Vancouver, Canada
- 28th International Conference on Principles of Distributed Systems (OPODIS 2024), 11-13 December 2024, Lucca, Italy
- The Ninth ACM/IEEE Symposium on Edge Computing (SEC 2024), 4-7 December 2024, Rome, Italy

- The 7th International workshop on Epidemiology meets Data Mining and Knowledge discovery (epiDAMIK 2024; held with ACM SIGKDD 2024), 26 August 2024, Barcelona, Spain
- Advanced tools, programming languages, and PLatforms for Implementing and Evaluating algorithms for Distributed systems Workshop (ApPLIED 2024; held with PODC 2024), 17 June 2024, Nantes, France

Claudio FIANDRINO

Professional posts and activities

- Voting Member for IEEE ComSoc Member and Global Activities Council for the EMEA region

Journal editorial boards

- IEEE Networking Letters
- Elsevier Computer Networks

Organization committees

- Steering Committee: DTwin Workshop at International Conference on Computer Communications (IEEE INFOCOM 2025), 19-22 May 2025, London, United Kingdom

TPC memberships

- IEEE International Conference on Computer Communications (IEEE INFOCOM 2025), 19-22 May 2025, London, United Kingdom
- IEEE Global Communications Conference (GLOBECOM), 8-12 December 2024, Cape Town, South Africa
- The 18th ACM Workshop on Wireless Network Testbeds, Experimental evaluation & Characterization 2024 (ACM WiNTECH 2024), 18 November 2024, Washington, D.C., USA
- IEEE International Conference on Communications (ICC), 9-13 June 2024, Denver, CO, USA
- IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM), 4-7 June 2024, Perth, Western Australia
- IEEE CCNC - AI/ML for Communication and Networking track, January 2024, Las Vegas, NV, USA
- 25th International Conference on Distributed Computing and Networking (ICDCN 2024), 4-7 January, Chennai, India

Marco FIORE

Professional posts & activities

- Co-founder and CTO at Net AI Tech Ltd
- HDR defense committees:
  - Dr. Francesco Bronzino (reviewer), École Normale Supérieure de Lyon, 2024
- PhD defense committees:
  - Emanuel Lima (reviewer), University of Porto, 2024
  - Raphael Azorin (reviewer), Institut EURECOM / Sorbonne Université, 2024
  - Karim Boutiba (reviewer), Institut EURECOM / Sorbonne Université, 2024
  - Andrea Monterubbiano (reviewer), Università di Roma La Sapienza, 2024

- Talks:
  - Invited seminar on “AI meets network requirements”, Comitê Tćnico de Monitoramento de Redes (CT-Mon), Rede brasileira para educação e pesquisa (RNP), September 2024
  - Invited seminar on “AI meets network requirements” University of Porto, Porto, Portugal, June 2024
  - Keynote speech on “AI meets network requirements” MedComNet, Nice, France, June 2024

Journal editorial boards

- Area Editor, Elsevier Computer Networks
- Editor, IEEE Transactions on Wireless Communications

Organization committees

- Steering Committee member: ACM Wireless of the Students, by the Students, and for the Students (S3) Workshop

TPC memberships

- ACM International Conference on emerging Networking EXperiments and Technologies (ACM CoNEXT 2025), 1-4 December 2025, Hkust, Hong Kong
- ACM Internet Measurement Conference 2025, 4-6 November 2025, Madid, Spain, 28-31 October, Madison, Wisconsin, USA
- IEEE International Conference on Computer Communications (IEEE INFOCOM 2025), 19-22 May 2025, London, United Kingdom

Domenico GIUSTINIANO

Professional posts & activities

- Chief Scientific Officer of SensoryFi, Madrid, Spain
- Board member of the not-for-profit Electrosense association
- PhD Defense Committee member of Seyed Keyarash Ghiasi, TU Delft (The Netherlands), June 2024.
- Talks:
  - Speaker at US FCC Technology Advisory Council 6G Working Group, Title: “Visible Light Communication: its Principles and Research towards 6G Networks”, 31 October 2024
  - Speaker at Networking Channel, Title: “Visible Light Communication: its Principles and Research towards 6G Networkss”, 2 October 2024

Journal editorial boards

- Editor: Computer Networks Journal (Elsevier)

TPC memberships

- IEEE International Conference on Computer Communications (IEEE INFOCOM 2025), 19-22 May 2025, London, United Kingdom
- ACM Annual International Conference on Mobile Computing and Networking (ACM MOBICOM 2025), 4-8 November 2025, Hong Kong, China

Sergey GORINSKY

Professional posts & activities

- Networking and Communication Subcommittee Member: ACM/IEEE Computing Curricula Task Force

Journal editorial boards

- Editorial Board Member: ACM SIGCOMM Computer Communication Review

Organization committees

- Steering Committee Member: COMSNETS Association
- Panel Chair: COMSNETS 2025
- Chair: 1st IMDEA Networks Alumni Workshop

TPC memberships

- USENIX Symposium on Networked Systems Design and Implementation (NSDI 2025), 13-15 August, Seattle, WA, USA
- IEEE International Conference on Computer Communications (IEEE INFOCOM 2025), 19-22 May 2025, London, United Kingdom
- ACM International Conference on Multimedia (ACM MM 2024), 28 October – 1 November 2024, Melbourne, Australia
- Area chair: IEEE International Conference on Network Protocols (IEEE ICNP 2024), 28-31 October 2024, Charleroi, Belgium

Vincenzo MANCUSO

Professional posts & activities

- Associate professor at University of Palermo, Italy
- Project reviewer for RESTART cascade projects (PNRR ITALIA)

TPC memberships

- IEEE International Conference on Computer Communications (IEEE INFOCOM 2025), 19-22 May 2025, London, United Kingdom
- IEEE Wireless Communications and Networking Conference (IEEE WCNC 2025), 24-27 March 2025, Milan, Italy
- Wireless On-demand Network systems and Services Conference (WONS 2025), 27-29 January 2025, Hintertux, Zillertal, Tyrol, Austria
- 4th ACM Workshop on 5G and Beyond Network Measurements, Modeling, and Use Cases (5G-MeMU), CoNEXT 2024, 9 December 2024, Los Angeles, USA
- The 33rd International Conference on Computer Communications and Networks (ICCCN 2024), 29 -31 July, 2024, Big Island, Hawaii, USA
- Mediterranean Communication and Computer Networking Conference (MedComNet 2024), 11-13 June 2024, Nizza, France
- IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM), 4-7 June 2024, Perth, Western Australia
- IFIP/IEEE Networking 2024, 3-6 June 2024, Thessaloniki, Greece

- IEEE International Conference on Computer Communications (IEEE INFOCOM 2024), 20-23- May 2024, Vancouver, Canada
- Wireless On-demand Network systems and Services Conference (WONS 2024), 29-31 January 2024, Chamonix, France

Marius PARASCHIV

Professional posts & activities

- DFG Grant Reviewer

Journal editorial boards

- Reviewer: QIP 2024 (Quantum Information Processing conference)

Guillermo SUÁREZ-TANGIL

Professional posts & activities

- Expert Evaluator for the AEI (PID: TIC-INF-2024: Comisión de evaluación de la convocatoria Plan General de Conocimiento).
- Expert Evaluator for The Linz Institute of Technology: Evaluation for the Austrian Federal Ministry of Education, Science and Research, by the State of Upper Austria and by the Johannes Kepler University (JKU)

Organization committees

- General Chair of ACM IMC (Internet Measurement Conference) 2024, role that was co-chaired with Narseo Vallina-Rodríguez

TPC memberships

- Usenix Security Symposium 2024, 14-16 August 2024, Philadelphia, PA, USA
- IEEE Symposium on Security and Privacy 2024, 20-23 2024, San Francisco, CA, USA

Narseo VALLINA-RODRÍGUEZ

Professional posts & activities

- Advisory Board Member - AppCensus

Organization committees

- General Chair: ACM Internet Measurement Conference (ACM IMC 2024), 4-6 November 2024, 2024
- Organizer of the EU Cyber Resilience Act: Socio-Technical and Research Challenges Dagstuhl Seminar

TPC memberships

- Usenix Security Symposium 2025, 13-15 August 2025, Seattle, WA, USA

- IEEE European Symposium on Security and Privacy (IEEE Euro S&P), 30 June – 4 July 2025, Venice, Italy
- IEEE European Symposium on Security and Privacy (IEEE Euro S&P), 8-12 July 2024, Vienna, Austria

Syed WAQAS HAIDER SHAH

TPC memberships

- TPC Chair of IEEE Vehicular Technology Conference (VTC2025)-Spring workshop on Advanced and Lightweight Security Solutions for V2X Networks, 17-20 June 2025, Oslo, Norway
- Track Chair of IEEE International Mediterranean Conference on Communications and Networking (IEEE MeditCom 2024), 8-11 July 2024, Madrid, Spain
- Program Chair of IEEE PIMRC 2024 workshop on Advanced & Lightweight Security Solutions for 6G Systems (ALSS-6G), September 2024, Valencia, Spain
- Session Chair of "Transmission and Reception 1" at the IEEE Vehicular Technology Conference Spring 2024 (VTC2024), 24-27 June 2024, Singapore
- Track Chair of Wireless Communications Symposium at IEEE International Conference on Communications (IEEE ICC 2024), 9-13 June 2024, Denver, CO, USA

Joerg WIDMER

Professional posts & activities

- Member of the IEEE Infocom Test of Time Paper Award Committee 2024

Journal editorial boards

- Editor: Computer Networks Journal (Elsevier)

TPC memberships

- Area Chair: IEEE International Conference on Computer Communications (IEEE INFOCOM 2024), 20-23- May 2024, Vancouver, Canada
- ACM Annual International Conference on Mobile Computing and Networking (ACM MOBICOM 2024), 18-22 November 2024, Washington, D.C., USA
- ACM International Conference on Mobile Systems, Applications, and Services (MobiSys), 3-7 June 2024, Tokyo, Japan
- ACM International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing (MobiHoc), 14-17 October 2024, Athens, Greece
- Wireless On-Demand Network Systems and Services (WONS), 29-31 January 2024, Chamonix, France

dissemination events

dissemination events


instituto
IMDEA


La Ciencia que ayuda
al Planeta (I)
Ciencia, ¿qué haríamos sin ti?

5.4. Outreach

5.4.1 Major events

Science and Innovation Week of Madrid 2024

11 November 2024

NEWS

Inspiring STEM vocations is one of IMDEA Networks' main objectives. As part of Science and Innovation Week, organized by the madri+d Foundation for Knowledge, the institute opened its doors this Monday, November 11, to more than 70 sixth-grade students from Ángel González School in Leganés, offering them an engaging introduction to the powerful applications of machine learning.

During the visit, Marta Dorado, Operations & Communications Manager at IMDEA Networks, guided the students in a step-by-step workshop to create an intelligent assistant capable of controlling the lighting and temperature of a virtual classroom using natural language commands. For this activity, they used the 'Machine Learning for Kids' tool to develop artificial intelligence systems, which they then integrated into Scratch 3, a block-based programming language designed to make programming accessible to everyone.

More info

1st IMDEA Networks Alumni Workshop

7 November 2024

IMDEA Networks Institute organized its 1st Alumni Workshop on November 7th, which brought together alumni from diverse career paths in industry, academia and public administration. This event provided a unique opportunity to reconnect, share experiences and foster new collaborations.

In addition to a keynote address by Professor Paul Patras, alumnus No. 1, the program included two technical sessions with presentations by alumni and two panel discussions on entrepreneurship and career counseling. Whether exchanging views, discussing the latest developments or exploring new career opportunities, the event celebrated alumni achievements, strengthened our network and helped shape the future of the institute.

More info

ACM IMC 2024

3-6 November 2024

IMDEA Networks organized the 24th edition of the prestigious international conference ACM IMC 2024, held at the Espacio Fundación Telefónica from November 3th to 6th. IMDEA Networks' researchers Narseo Vallina Rodríguez and Guillermo Suarez-Tangil served as general chairs of the event, which welcomed 260 participants from 119 academic and industry institutions across 28 countries. This year's edition made an effort to reach out to participants from under-represented African and South American institutions thanks to geo-diversity travel grants.

More info

NEWS

IMDEA Institutes. Science that helps the planet (I)

27 September 2024

Our professor Narseo Vallina Rodríguez participated on September 27th in the fifteenth edition of the European Researchers' Night at the Residencia de Estudiantes in Madrid together with his colleagues from the IMDEA Institutes. This annual event is coordinated by the Fundación para el Conocimiento madri+d and is part of an action framed within the European program Horizon Europe.

In his speech, Narseo explained how he ended up becoming an entrepreneur and how digital progress and human development do not always go hand in hand with environmental protection. He emphasized how research on the Internet, cybersecurity, and digital privacy is essential for a more sustainable, humane, and just planet and society, as it seeks to protect fundamental human rights such as privacy, anonymity, free access to information, avoid discrimination, and guarantee freedom of expression.

More info

14th IMDEA Networks Annual International Workshop

28 May 2024

IMDEA Networks Institute holds an annual invitation-only workshop in Madrid. The workshop accompanies a meeting of our Scientific Council, composed of leading international researchers.

In 2024 it focused on presenting ongoing work on the various research directions being explored by the IMDEA Networks team and on identifying future directions and synergies between the Institute's and renowned international researchers and our Alumni network.

In addition to talks by members of the Scientific Council, invited international professors, faculty members and IMDEA Networks alumni, the workshop included a poster session for IMDEA Networks students to showcase their work.

More info

Researchers at Schools

17 May 2024

On the occasion of Telecommunications Day, on May 17th, IMDEA Networks held at its headquarters an educational activity in which 4thESO students carried out a virtual escape room (designed by IMDEA Networks with other partners such as COIT, UPM, etc., within the framework of the PROMIN-Teleco Renta project) to learn in a fun way concepts about these studies.

In addition, the students had the opportunity to do a workshop to learn how Electrolab works, the first educational case of electronic prototyping to teach, create and program. With this arduino kit and through the Hello Blocks application, they did a group practice in which they designed a sound traffic light designed to help visually impaired people to cross the streets with autonomy and safety. They also visited some of our laboratories.

More info

4ESO+Enterprise Program

18-19 March 2024

On March 18 and 19, 20 students from IES Isaac Albéniz (Leganés), IES Arquitecto Peridis (Leganés), IES Maestro Matías Bravo (Valdemoro) and Centro Enriqueta Aymer (Madrid) enjoyed an educational stay at IMDEA Networks. This is the seventh year that we have participated in the 4ESO+company program, promoted by the Community of Madrid with the aim of better preparing students to make decisions about their academic future and to acquire the necessary professional skills required by the labor market.

More info

13th Madrid is Science Fair

7-9 March 2024

IMDEA Networks participated in the XIII Madrid is Science Fair, a science outreach event aimed at school communities and the general public organized by the Madri+d Knowledge Foundation.

IMDEA Networks showed the public through educational and fun games how computers "see" the world, how we can transmit information wirelessly and how to detect anomalies in the electromagnetic spectrum thanks to artificial intelligence.

In addition, our research team taught practical examples of how to use networks for the benefit of society. Blockchain, quantum communications and data analytics are other topics that were immersed in at our booth.

More info

Science for Industry 2024

18-19 January 2024

IMDEA Networks participated on January 18th and 19th in the Science for Industry – S4i event, organized by the Universidad Autónoma de Madrid and BeAble Capital at the Nave de Madrid. This is the largest international meeting point around the 'Deep Science', which brings together universities, research centers, leading companies and Science Equity funds from around the world with the aim of enhancing the national and international industrial technology ecosystem. This initiative is the evolution of Patents for Innovation (P4I), held in 2022, which served to boost relations between science, society and business.

More info

5.4.2. Workshops, seminars & lectures

Weekly seminars alternated invited talks with presentations by internal researchers. These events were organized together with prestigious institutions such as University Carlos III of Madrid, TU Darmstadt, Northeastern University, Politecnico di Milano, Queen Mary University of London, and ETH Zürich. The topics ranged from scientific presentations to technology-transfer oriented talks. All events were held in Madrid. Out of the 42 total number of events in which the Institute participated during 2024, 18 of our events were conducted by invited speakers. We list the latter here:

Advancing Cloud-Network Slicing: Insights from LANCE's Testbed and ML-Driven Load Balancing
Augusto V. Neto, Associate Professor at the Department of Informatics and Applied Mathematics of the UFRN, Brazil
19 December 2024

Sparsity, modularity, and structural plasticity in deep neural networks
Constantine Dovrolis, Director of the center for Computational Science and Technology (CaSToRC) at the Cyprus Institute
17 December 2024

CML-IDS: Enhancing Intrusion Detection in SDN through Collaborative Machine Learning
Pegah Golchin, Postdoc at the Technical University of Darmstadt, Germany
11 December 2024

Improving resource utilization in nowadays data centers
Andrea Marin, Professor of Computer Science at the University Ca' Foscari of Venice, Italy
6 November 2024

Foundations of Reliable Cooperation under Asynchrony, Byzantine Faults and Message Adversaries
Timothé Albouy, PhD Student, University of Rennes, France
5 November 2024

AIoT for Rural and Extreme Environments
Pietro Manzoni, Computer Engineering Professor at the Universitat Politècnica de València, Spain
25 October 2024

Towards Network-Assisted Data Collection Systems
Gianni Antichi, Associate Professor at Politecnico di Milano (Italy) and Senior Lecturer (Associate Professor) at the School of Electronic Engineering and Computer Science of Queen Mary University of London
26 September 2024

Advancing mmWave Communications for Mobile Devices
Mohaned Chraiti, Assistant Professor at Sabanci University, Tuzla, Turkey
13 June 2024

The Dawn of AI-Native Networks and Transforming Connectivity with AI-as-a-Service
Dr. Merve Saimler, Senior Researcher at Ericsson Research, Istambul, Turkey
13 June 2024

Catching Malware in Memory: Challenges and Issues
Ricardo Rodríguez, Associate Professor at the University of Zaragoza
24 May 2024

Securing location-based mobile computing
Prof. Panos Papadimitratos from KTH Royal Institute of Technology, Stockholm, Sweden
26 April 2024

New 6G Wireless Security Threats and Capabilities
Zhambyl Shaikhanov, PhD Student in Electrical and Computer Engineering at Rice University
10 April 2024

Distributed Cellular Network Research - and how it Mirrors Architectural and Structural Security Problems at Large
Adrian Dabrowski, Postdoctoral researcher at CISPA, Germany
20 March 2024

CVE-2022-23491, or Why PO boxes can't be root certificate authorities anymore
Prof. Joel Reardon, University of Calgary, Canada
14 March 2024

How the National Internet Observatory can support your research
Álvaro Feal, Senior Research Scientist researcher at Northeastern University, USA
8 March 2024

Can Today's 5G Networks Support 5G "Killer Apps"?
Dimitrios Koutsonikolas, Associate Professor in the Electrical and Computer Engineering Department at Northeastern University, USA
6 March 2024

Dynamics of P2P Blockchain Networks
Lucianna Kiffer, Postdoctoral researcher, ETH Zürich, Switzerland
27 February 2024

Accelerated and Sparse Algorithms for Approximate Personalized PageRank
David Martínez-Rubio, Post-Doc researcher at Zuse Institute Berlin
19 February 2024

Some models of automata networks: convergence and complexity
Prof. Eric Goels from Universidad Adolfo Ibáñez, Santiago, Chile
17 January 2024

Overview of Research and Standards in ETSI
David Boswarthick, ETSI Director of New Technologies
17 January 2024

AI Hits the Streets: Real-time Mapping with Edge AI
Prof. João Barros, University of Porto, Portugal
15 January 2024

5.4.3 Media impact

Media impact 2024

22
Web news

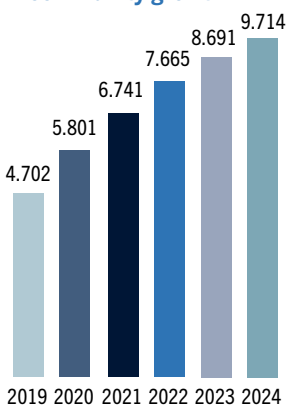
11
Press releases

554
Social networks posts

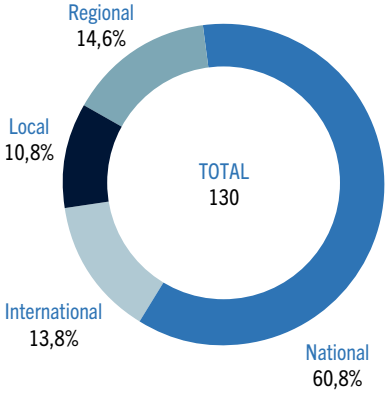
9.714
Social networks followers 2024

2.049	378	706	5.964	617

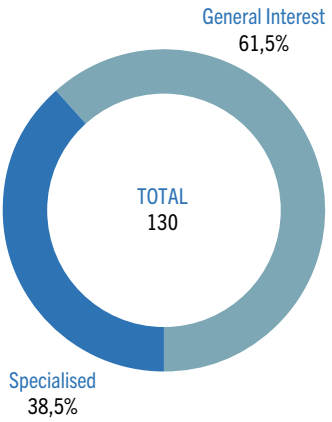
community growth



Impacts by coverage



Impacts by content



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Globedia

SER

EL MUNDO

10 años dtyt

total telecom

rtve

Newtral

ABC

Tech Xplore

innovaspain 10 años
PERIÓDICO LÍDER DE LA INNOVACIÓN

EL PAÍS

Science X

LA VANGUARDIA

R&T REDES&TELECOM

fundación para el conocimiento madrid

EFE

ZONA MOVILIDAD

ACTIVO LEGANÉS

europa press

LA RAZÓN

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Some media impacts

SER

Las amenazas a la seguridad y privacidad en los hogares inteligentes

More info

TeleMadrid

La Carlos III e Imdea Networks estrenan una infraestructura europea de computación

More info

TeleMadrid NOTICIAS A LA CARTA ONDA MADRID PROGRAMACIÓN 32º/21º DIRECTO

TECNOLOGÍA

La Carlos III e Imdea Networks estrenan una infraestructura europea de computación

— Para realizar experimentos complejos en el área de las tecnologías de la información y las comunicaciones

Sede del centro Imdea Networks, en Leganés | IMDEA NETWORKS

R&T REDES&TELECOM

ENLIGHT'EM logra un nuevo hito en las comunicaciones por luz

More info

NOTICIAS

ENLIGHT'EM logra un nuevo hito en las comunicaciones por luz

Home > Noticias

Tras varios años de investigación, han conseguido diseñar una nueva generación de sistemas inalámbricos basados en la comunicación por luz visible (VLC) y en el bajo consumo energético de los diodos emisores de luz (LED) para diversos escenarios de IoT

Publicado el 29 feb 2024

Redacción RedesTelecom

LA VANGUARDIA

El Instituto IMDEA Networks amplía sus instalaciones para aumentar capacidad investigadora

More info

LA VANGUARDIA

INVESTIGACIÓN MUNICIPIOS

El Instituto IMDEA Networks amplía sus instalaciones para aumentar capacidad investigadora

• Leganés, 5 mar (EFE). La Comunidad de Madrid ha ampliado las instalaciones del Instituto Madrileño de Estudios Avanzados (IMDEA) Networks, situadas en el municipio de Leganés, para incrementar su capacidad investigadora en este espacio, centrado fundamentalmente en las redes de telecomunicaciones.

AGENCIAS
05/03/2024 13.15

Leganés, 5 mar (EFE).- La Comunidad de Madrid ha ampliado las instalaciones del Instituto Madrileño de Estudios Avanzados (IMDEA) Networks, situadas en el municipio de Leganés, para incrementar su capacidad investigadora en este espacio, centrado fundamentalmente en las redes de telecomunicaciones.

innovaspain 10 AÑOS
PERIÓDICO LÍDER DE LA INNOVACIÓN

Arturo Azcorra (IMDEA Networks): “Las empresas de telecomunicaciones tienen que reinventarse”

More info

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PERIÓDICO LÍDER DE LA INNOVACIÓN

INNOVACIÓN AL DÍA EDUCACIÓN #2030 MUJERES STEAM #ALIMENTAFUTURO FRONTERA OPINIÓN ESPECIALES ROMPER EL PARADIGMA

> ENTREVISTAS

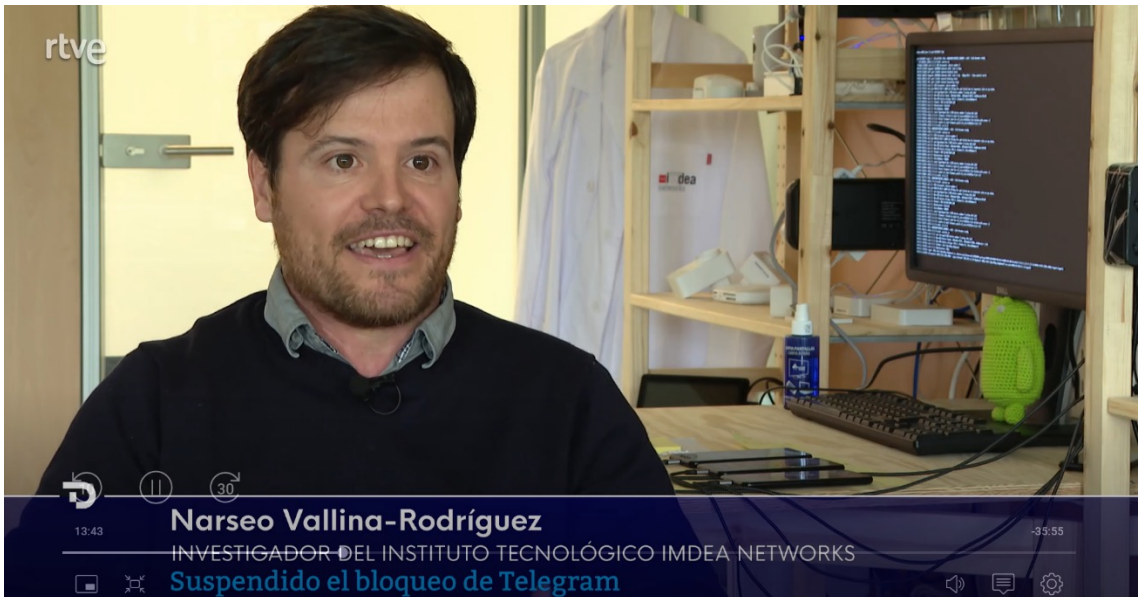
Arturo Azcorra (IMDEA Networks): "Las empresas de telecomunicaciones tienen que reinventarse"

Entrevistamos a Arturo Azcorra, director de IMDEA Networks, y hablamos sobre la liberalización de espectro 5G y los retos para proteger la privacidad, entre otros asuntos

rtve

Suspendido el bloqueo de Telegram

More info



SER

El IMDEA Networks de Leganés arranca su proyecto ORIGAMI para desarrollar redes móviles con menos retardo y más fiables

More info

Hora 14 Madrid Sur | Ciencia y tecnología | Actualidad | LEGANÉS

El IMDEA Networks de Leganés arranca su proyecto ORIGAMI para desarrollar redes móviles con menos retardo y más fiables

Es una investigación financiada por la Unión Europea para mejorar las futuras redes de internet 6G

Un conector de internet con fibra óptica / Niels Swan

ABC

Una hoja de ruta para moldear las grandes autopistas de la era del dato

More info

ESPECIAL INFRAESTRUCTURAS

Una hoja de ruta para moldear las grandes autopistas de la era del dato

La colaboración público-privada será decisiva para desarrollar y optimizar una red que responda al crecimiento exponencial de la demanda de servicios digitales

La regulación frena el despliegue de las grandes autopistas digitales

R&T REDES&TELECOM

Concluye el proyecto DAEMON sentando las bases para las redes 6G

More info

NOTICIAS

Concluye el proyecto DAEMON sentando las bases para las redes 6G

Home > Noticias

Esta iniciativa europea ha demostrado cómo la Inteligencia Artificial puede integrarse de forma práctica en las arquitecturas de redes móviles a nivel de producción y ayudar a automatizar la gestión

Publicado el 6 may 2024

Redacción RedesTelecom

Concluye el proyecto DAEMON sentando las bases para las redes 6G

DAEMON, un proyecto europeo coordinado por IMDEA Networks Institute que comenzó en enero de 2021, acaba de llegar a su fin, logrando importantes **hitos en el avance de la tecnología de las comunicaciones móviles**. Como indican los artífices, esta iniciativa "ha allanado el camino hacia unas **redes 6G** eficaces, con claros beneficios para la sociedad en general en términos de infraestructuras de comunicación móvil más rápidas y ubicuas que pueden soportar nuevos servicios".

New algorithm enhances disinformation detection on social media

More info

New algorithm enhances disinformation detection on social media

by IMDEA Networks Institute

Editors' notes

Credit: IMDEA Networks

Disinformation is a growing phenomenon on digital platforms, significantly impacting social, political, and economic events. It has long posed a threat to freedom and democracy. However, it is now even more pressing due to the speed at which campaigns spread through digital media.

Researchers from IMDEA Networks, Cyprus University of Technology, and LSTECH ESPAÑA SL have developed the HyperGraphDis algorithm, which enables the detection of disinformation on social media, helping to combat the proliferation of fake news.

Una investigación revela la existencia de una ‘tasa rosa’ oculta en la publicidad digital

More info

MUJER Y SALUD

Una investigación revela la existencia de una ‘tasa rosa’ oculta en la publicidad digital

Este concepto hace referencia a que, a menudo, se cobra más a las mujeres por productos y servicios comercializados expresamente para ellas. Ahora, una investigación de la Universidad Carlos III de Madrid y de IMDEA Networks muestra que las empresas anunciantes tienden a pagar más por mostrar anuncios *online* a las mujeres que a los hombres, especialmente en países con rentas altas.

SINC 11/7/2024 14:09 CEST

La 'tasa rosa' es una discriminación de precios basada en el género en el marketing digital. / UC3M/IMDEA Networks

LA RAZÓN

Arturo Azcorra, director de IMDEA Networks: «Con el 6G, la red va a ser un inmenso océano de información»

More info

LA RAZÓN

MADRID VIVI\

Directo ● Última hora de la guerra Ucrania - Rusia

Arturo Azcorra, director de IMDEA Networks: «Con el 6G, la red va a ser un inmenso océano de información»

Este madrileño nacido en Bilbao dirige uno de los siete centros de investigación de excelencia establecidos por la Comunidad de Madrid hace 15 años

▲Arturo Azcorra, director de IMDEA Networks, el pasado miércoles 5 de junio en las instalaciones del centro de investigación en Leganés D Jar

D+I invertia | EL ESPAÑOL

Una investigación española revela las amenazas ocultas de las aplicaciones móviles que ponen en riesgo la privacidad

More info

EL ESPAÑOL invertia

MENÚ DISRUPTORES

Una investigación española revela las amenazas ocultas de las aplicaciones móviles que ponen en riesgo la privacidad

Trust eWare, disponible ya en código abierto, analiza en tiempo real el comportamiento de las aplicaciones para alertar de posibles fugas de datos.

25 julio, 2024 - 01:39 GUARDAR

EN: DISPOSITIVOS MÓVILES PROTECCIÓN DE DATOS CIBERSEGURIDAD PRIVACIDAD INVESTIGACIÓN •••

Noelia Hernández

La tecnología móvil juega ya un papel primordial en nuestras vidas, sobre todo con la proliferación de aplicaciones que permiten hacer casi de todo desde un teléfono. Sin embargo, en un mundo cada vez más conectado, ese pequeño dispositivo también es **la puerta de entrada a cuantiosos peligros**.

Son pocas las personas que no han recibido alguna vez mensajes de *spam* o estafas con las que tratan de engañarles y hacerse con sus datos personales. Por ello, **proteger la privacidad y la seguridad se ha convertido en una prioridad** tanto para los ciudadanos como para empresas y organizaciones de todo tipo.

Para hacer frente a este desafío creciente –pero no nuevo–, en Imdea Networks llevan tiempo trabajando en una técnica capaz de **monitorizar y analizar en tiempo real el comportamiento de las aplicaciones**, identificando posibles riesgos para la privacidad, como fugas de datos de información de identificación personal (PII, por sus siglas en inglés).

TM Broadcast
MEDIA. BROADCAST & INSTALACIÓN

El proyecto BANYAN concluye con importantes avances en la modelización del tráfico y la planificación automatizada de redes 5G

More info

El proyecto BANYAN concluye con importantes avances en la modelización del tráfico y la planificación automatizada de redes 5G

15 octubre 2024

El proyecto europeo «BANYAN: Big Data Analytics for Radio Access Networks», financiado por la Unión Europea a través del programa H2020-ICT-2019, ha culminado con resultados destacados que podrían transformar la gestión de las redes de acceso radioeléctrico (RAN) y el futuro de las telecomunicaciones más allá del 5G. Liderado por Marco Fiore, Profesor de Investigación en IMDEA Networks, el proyecto h logrado avances significativos en el uso de big data y herramientas basadas en inteligencia artificial para mejorar la planificación y gestión de redes 5G, sentando las bases para las redes del futuro.

Madrid Sur
92.7FM

La Brújula de la Economía | Imdea Networks y Consorcio de Compensación de Seguros

More info

La Brújula de la Economía | Imdea Networks y Consorcio de Compensación de Seguros

Ante un desastre natural ¿qué tenemos que hacer con nuestros seguro? Encar Ferreiro, directora General de Generación Plus nos habla de estos siniestros y del Consorcio de Compensación de Seguros.

Además, ponemos el foco en Leganés para conocer Imdea Networks un polo de innovación referente europeo y mundial. Lo hacemos con Arturo Azcorra, director de Imdea Networks.

Financial News

GenAI4ED: the project set to transform secondary education with Generative Artificial Intelligence

More info

IMDEA Networks participates in this innovative project funded by the European Commission under the Horizon Europe program

The Innovative Training Networks (ITN) project "BANYAN: Big Data Analytics for Radio Access Networks," funded by the European Union through In October 2024, the GenAI4ED project officially began—a groundbreaking international initiative funded by Horizon Europe in which IMDEA Networks is actively involved. The project aims to explore how generative artificial intelligence (GenAI) tools can revolutionize secondary education. Scheduled to run until September 2027, GenAI4ED focuses on **developing a digital platform to assess and select GenAI-based educational software**, promoting its effective integration into classrooms.

CASADOMO.com
Todo sobre Edificios Inteligentes

El proyecto DIME sienta las bases para crear aplicaciones de IA en el borde rápidas, seguras y sostenibles

More info

CASADOMO.com
Todo sobre Edificios Inteligentes

El proyecto DIME sienta las bases para crear aplicaciones de IA en el borde rápidas, seguras y sostenibles

Publicado: 11/12/2024

El proyecto DIME, liderado por el Instituto Madrileño de Estudios Avanzados (IMDEA) Networks, ha sentado las bases para aplicaciones de inteligencia artificial (IA) en el borde más rápidas, seguras y sostenibles. La inteligencia artificial en el borde está permitiendo que el procesamiento de datos y la toma de decisiones se tomen en tiempo real directamente en los dispositivos, reduciendo la latencia y el uso de ancho de banda a la vez que mejora la privacidad al minimizar la transmisión de datos a la nube.

SER

IMDEA Networks investiga desde Leganés las oportunidades y riesgos de incluir la IA en Educación Secundaria

More info

Hoy por Hoy Madrid Sur | Sociedad | Leganés

IMDEA Networks investiga desde Leganés las oportunidades y riesgos de incluir la IA en Educación Secundaria

Prueban una plataforma que puede realizar resúmenes de temas o preparar y corregir exámenes

5.5 Local Scientific Partnership

IMDEA Networks Institute has a strong scientific collaboration with a number of the local universities in the Madrid region. Notably, IMDEA Networks maintains strong partnerships with the University Carlos III of Madrid (UC3M) and the University of Alcalá (UAH). These collaborations involve stable research cooperation on joint activities and projects, further reinforced by the participation of both UC3M and UAH on the Institute's Board of Trustees.

The cooperation also extends to joint participation in funded research projects. For instance, IMDEA Networks coordinates the regional project TUCAN6-CM, which includes UC3M, UPM, and UAH as participants. Furthermore, UC3M and IMDEA Networks are active in several other ongoing projects and are both members of the 5TONIC laboratory.

With respect to teaching, IMDEA Networks is providing an M.Sc. degree on 5G, SDN and NFV, jointly with Ericsson and UC3M and with the participation of UAH. This Master is very successful and is strengthening the technological profile of the Madrid region.

Another important activity where IMDEA Networks is collaborating in the Scientific Society of Telematic Engineering (SCITEL). IMDEA Networks, UC3M and UAH are important members of this association, and are contributing to organize various activities in the framework of this association, such as the national conference on Telematics (JITEL).

IMDEA Networks, UC3M and UAH are also taking advantage of the physical proximity between the three institutions to share many of their daily activities, such as the scientific seminars organized by IMDEA Networks. Finally, it is worth highlighting the personnel mobility between IMDEA Networks and University Carlos III and University of Alcalá.

Through these collaborations with local scientific partners, IMDEA Networks provides an important contribution to strengthening the scientific standing of the Madrid region in the area of Telematics.

impact and technology transfer

annual report 2024

www.networks.imdea.org

6.1. Patents

Patents are important steps in the process of **transferring technology to marketplace**. Patent creation has strong implications for the Institute: patents are incentives for their creators, as they imply recognition for their creativity and material reward when these inventions are marketable. These incentives encourage innovation, the guarantee to the continuous improvement in the quality of research and, ultimately, of human life. It is IMDEA Networks Institute's policy to share a very high percentage of financial proceeds with inventors (our researchers) as reward for their excellence and hard work.

International patent application in October 2024

Title: LiFi Access Point and LiFi Communication Network Comprising the Same
Inventors: Dayrene FRÓMETA, Borja GENOVÉS GUZMÁN, Domenico GIUSTINIANO, Joerg WIDMER
Rights: IMDEA Networks Institute
Overview: The present invention refers to a LiFi access point (1) for sending data to at least one LiFi-enabled Internet of Things, IoT, device (6); the LiFi access point (1) comprising: an RF-based wireless unit (1.1) configured to receive at least one RF signal with data from a RF wireless communication network (2); a control unit (1.2) coupled with the RF-based wireless unit (1.1) and a LiFi unit (1.3). The control unit (1.2) comprises a signal demodulator (1.2.1) and a first conversion module (1.2.2). The LiFi unit (1.3) comprises at least one light-emitting diode (1.3.1) and a driver circuit (1.3.2). The invention also refers to a LiFi communication network (4) comprising the LiFi access point (1) and a method for sending data to at least one LiFi-enabled IoT device (6) which is carried out by the LiFi communication network (4).
Application number (International application No.): EP23383009 | PCT/EP2024/077805

International Patent Application (PCT) in August 2024

Title: Systems and Methods for Incorporating Millimeter Waves into Wireless Devices
Inventors: Omid Salehi-Abari, Mohammad Hossein Mazaheri Kalahrody, Joerg WIDMER, Domenico GIUSTINIANO, Rafael RUIZ
Rights: IMDEA Networks Institute
Overview: Systems and methods for incorporating mmWaves into low frequency wireless devices in accordance with embodiments of the invention are illustrated. One embodiment includes a system that can be connected to antenna ports of wireless devices to provide wireless devices with millimeter wave (mmWave) communication over the air capabilities. The system includes at least one RX antenna and at least one TX antenna, where the RX and TX antennas are positioned at a distance from each other and configured to mutually

couple with each other to generate a feedback loop, wherein the distance is determined by a desired resonant frequency of a mmWave resonance signal to be generated by the feedback loop, wherein the mmWave resonance signal is mixed with a received low frequency radio frequency (RF) signal to generate a mmWave transmit signal.
Application number (International application No.): US20240080098A1 | PCT/US2024/044857

European patent granted in December 2024

Title: RF backscatter system based on light fidelity
Inventors: Domenico GIUSTINIANO, Borja GENOVÉS GUZMÁN, Sarmad MIR
Rights: IMDEA Networks Institute
Overview: The present invention is related to a low-power backscatter system comprising a LiFi, "Light Fidelity", transmitter configured for generating and transmitting an optical signal comprising a sequence of a downlink data signal and a chirp signal and an IoT, "Internet of Things", tag.
Application number: EP4164143A1
Application number (International application No.): WO2023057618A1
Application number USA, Canada and Singapore: US20240080098A1 | CA3204806A1 | 11202306367X

6.2. Technology transfer

We direct our work towards strengthening collaboration ties with industry, particularly through joint participation in projects and technology transfer. We aim to develop technologies that have genuine socio-economic impact; that is to say, projects that deliver value and that can be transferred to industry and, ultimately, to society. In order to ensure that our focus remains on addressing real-world problems and that our development activities result in generating value, we continue to build on our strong links with the business community both in the Madrid region of Spain and in the rest of the World.

Our technology transfer strategy is aimed to ensure that the Institute's research activities remain relevant, that its innovations are diffused and their full value to society realized through various transfer processes such as licensing and the sale of patents, creation and support of spin-off companies in the region that seek to commercialize products exploiting innovations developed within the Institute. We carry out several forms of collaboration, including direct contracts with industry, as well as participation in joint projects financed by public entities. Our projects include both types of partnerships with specific listings of those enterprises and organizations currently working with us.

Joint, funded research projects enable us to establish solid ties to business. We are engaged in various research projects with private sector collaborators:

6.2.1. Ongoing contracts

MIMORPH-5G

Funded by: Technische Universitat Darmstadt
Duration: October 2022 to December 2050
NR Computer Software Program Usage License Agreement.

SUNRISE

Funded by: Technology Innovation Institute of Abu Dhabi
Duration: September 2024 to March 2027
Sunrise-secure unmanned aerial optical systems.

MM-SENSE

Funded by: HUAWEI TECHNOLOGIES DUESSELDORF GmbH
Duracion: March 2024 to March 2026
Multi-static micro-doppler-based sensing for object detection and recognition.

Contrato de servicios para el acceso a un laboratorio con infraestructura 5G y asistencia técnica para desarrollar prototipos que incorporen tecnología 5G, para su empleo en las Fuerzas Armadas.

Funded by: Ministry of Defence
Duration: January 2024 to November 2025

ICATALIST

Funded by: “Cheque Innovación PYMES” from the Regional Government of Madrid
Duration: November 2023 to December 2024
Prototipo de plataforma blockchain que permita certificar la sostenibilidad y legalidad de los recursos hídricos que se utilizan en la producción agrícola de frutos rojos.

SPIRS

Funded by: Telefónica
Duration: February 2024 to August 2024
Secure Platform for ICT systems rooted at the silicion manufacturing process.

6.2.2. Other forms of collaboration with the private sector

Telefónica - IMDEA Networks Joint Research Unit in 5G technologies

IMDEA Networks and Telefónica Research and Development continue collaborating on their Joint Research Unit (JRU), which was created in May 2014. The JRU is also known under the name «Telefónica - IMDEA Networks Joint Research Unit in 5G technologies». The development of 5G has already become a landmark in the global competition for technologi- cal leadership. Over a period of seven years up to 2020, this private-public alliance will share a wealth of know-how and in-house capabilities to tackle the challenge of creating a blueprint for the new technology and the standards that are to define future ICT networks.

Located at IMDEA Networks' headquarters in Madrid, the aim of the JRU Telefónica I+D - IMDEA Networks is to establish a strategic partnership that provides an operational framework for close interaction in a varied set of scientific activities. In particular, the JRU brings together a team comprising highly specialized multidisciplinary profiles ready to work collaboratively on externally funded R&D projects. One of the main areas in which this collaboration is reflected is the program «Advanced 5G Network Infrastructure for Future Internet PPP», sponsored by the EU Commission within the Horizon 2020 program.

The private-public alliance shares a wealth of know-how and in-house capabilities to tackle the challenge of creating a blueprint for the new technology and the standards that are to define future ICT networks. Work led by experienced researchers Diego R. López from Telefónica I+D and Arturo Azcorra, Joerg Widmer and Albert Banchs, from IMDEA Networks, focuses on key 5G enablers such as flexible functional split, joint handover optimization, 60GHz wireless networks, network function operating systems, secure virtual computing and green networking.

5TONIC - An Open Research and Innovation Laboratory focusing on 5G technologies

5TONIC is an open research and innovation laboratory focusing on 5G technologies that was founded by Telefonica and IMDEA Networks Institute in 2015. The first laboratory of 5G excellence in Spain also counts with Ericsson Spain, INTEL, Commscope, University Carlos III of Madrid, InterDigital and Capgemini Engineering amongst its members. During 2020, Juan Carlos García, Innovaton VP at Telefónica, became the new 5TONIC Chairman, and Carlos Bernados, professor at Universidad Carlos III Madrid, the 5TONIC Vice-chairman, substituting David del Val and Arturo Azcorra, respectively.

The objective of 5TONIC is to create a global open environment where members from industry and academia work together in specific research and innovation projects related to 5G technologies with a view to boost technology and business innovative ventures. The laboratory promotes joint project development and entrepreneurial ventures, discussion fora, events and conference sites, all in an international environment oriented to achieve the highest technological impact in the area of 5G.

5G networks are considered the gateway to the age of “intelligent everything” that awaits us. The development of 5G and its evolution towards 6G has thus become a landmark in the global competition for technological leadership.

5TONIC will serve to show the capabilities and interoperation of pre-commercial 5G equipment, services and applications by leading global companies in the 5G arena. Apart from the initial members, 5TONIC welcomes new members to join and gain from the benefits of an advanced research and innovation laboratory, oriented to research, debate, field-testing and demonstration of all technologies and equipment to support 5G communications, services and applications.

The main 5TONIC Research & Innovation Laboratory site is located at IMDEA Networks. The Institute is one of the main leaders at European level in the field of 5G and 6G networks. Among 5G European research projects supported by the lab are the ongoing &G VR, TrialsNet, DESIRE6G, and Hexa-X-II.

5TONIC Members

Telefónica
institute imdea networks
ERICSSON
InterDigital
COMMSCOPE
uc3m
Capgemini engineering

5TONIC Collaborators

ABB ASTI MOBILE ROBOTICS
intel
ybvr
AEROTOOLS UNMANNED AERIAL TECHNOLOGY
Atos
NEC
gmv INNOVATING SOLUTIONS
ROHDE&SCHWARZ
Open Nebula
Telcaria
NOKIA Bell Labs
Fivecomm

New collaborators

wings.

6.2.3 Industry partners

Our technology transfer activities have led to a significantly increased portfolio of companies we collaborate with. During 2024, they were the following:

Amped Software

Apple Technology Engineering BV&CO

BubbleRAN

COSMOTE Kinites Tilepikoinonies

Cumucore Oy

DigitalSign

eBOS Technologies Ltd

EMNIFY

FOGUS INNOVATION & SERVICES

Ford Otosan

Found.Ation

Fundación Vithas

GMV Aerospace and Defence S.A.U.

Guardtime OU

Interdigital Europe, Ltd

Interuniversity Microelectronics Centre (IMEC)

IoT Lab

ISRD

Konnekt Able Technologies Limited

Lstech Espana SL

NEC Europe Ltd.

Nokia Bell Labs Deutschland AG

Nokia Solutions and Networks Oy

Nova Telecommunications SMSA

NXP Semiconductors

Orange

pureLiFi Ltd.

Qascom

Bosch

Securiq Sistemas Slu

Siemens AG

Telecom Italia S.p.a

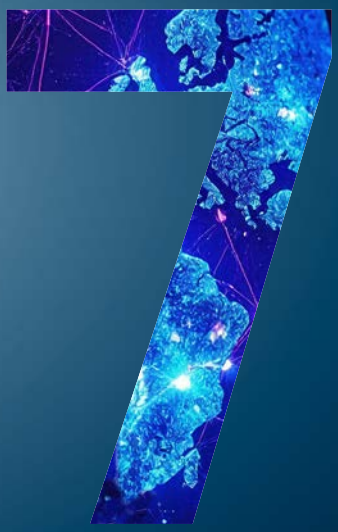
Televic Healthcare

Thales

Turn Key Ai Solutions

We continue to build firm relationships and sound collaborative arrangements with these companies and other key players in the field, including various regional, national and international bodies.

personnel



director

The Director is the CEO of the Institute. He is appointed by the Board of Trustees amongst scientists with a well-established international reputation in computer networking. The Director fosters and supervises the activities of IMDEA Networks Institute, and establishes the distribution and application of the available funds in accordance with the Institute's strategic goals and within the limits established by the Board of Trustees. The Director reports regularly to the Board. He is aided by the Scientific Council in determining the scientific research strategy and associated policies. The Deputy Director, the Research Director and the General Manager also assist the Director.

Dr. Arturo AZCORRA

Director

Research: 5G Networks and Services; Network Virtualization and Softwarization; Drone Communications; On-line Social Networks Data Analytics; Mammal Brain Cartography and Topology
Personal Site

Short Bio

Dr. Arturo Azcorra graduated in 1980 from Loy-Norrix High School, Michigan. He received his Telecommunication Engineering degree from Universidad Politécnica de Madrid in 1986, and the Doctor degree in 1989 from the same University. He currently is a full professor at Universidad Carlos III de Madrid, and he's also Director of the International Research Institute IMDEA Networks, a very relevant research institution in Europe. On the professional area, Arturo Azcorra is an IEEE Communications Society Senior Member, an Internet Society member, an ACM-SIGCOMM member, a founding member of the Association for Telematics, and also president of the said Association.

deputy director

The Deputy Director provides assistance to the Director in the fostering and supervision of the scientific activities of the Institute and of its administrative management.

Dr. Albert BANCHS

Deputy Director

Research: Beyond 5G; Mobile Networks; Network Algorithms and Protocols; Smart Networks; Computational-aware networking
Personal Site

Short Bio

Dr. Albert Banchs received his M.Sc. and Ph.D. degrees from the Polytechnic University of Catalonia (UPC-BarcelonaTech) in 1997 and 2002, respectively. He is currently a Full Professor with the University Carlos III of Madrid (UC3M), with double affiliation as Deputy Director of the IMDEA Networks institute. Before joining UC3M, he was at ICSI Berkeley in 1997, at Telefonica I+D in 1998, and at NEC Europe Ltd. from 1998 to 2003. He was an Academic Guest at ETHZ in 2012, a Visiting Professor at EPFL in 2015 and 2013 and a Fulbright scholar at University of Texas at Austin in 2019. Prof. Banchs authors over 150 publications in international conferences and journals, and is the co-inventor of several patents.

research professors

Research Professors are our most published and cited researchers. They are recognized and respected leaders in their field of research. They have already made a difference. Their expertise and research interests have a significant impact on the Institute's scientific output and on the careers of their charges.

Dr. Joerg WIDMER

Research Professor (tenured) & Research Director

Research: Wireless Networking; Millimeter-Wave Communication; Wireless Sensing and Localization; Mobile Network Architectures

Personal Site

Short Bio

Dr. Joerg Widmer is Research Professor and Research Director of IMDEA Networks in Madrid, Spain. Before, he held positions at DOCOMO Euro-Labs in Munich, Germany and EPFL, Switzerland. His research focuses on wireless networks, ranging from extremely high frequency millimeter-wave communication and MAC layer design to mobile network architectures. He authored more than 200 conference and journal papers, 3 IETF RFCs, and 13 patents. He received an ERC consolidator grant, the Friedrich Wilhelm Bessel Award of the Humboldt Foundation, a Ramon y Cajal grant, as well as nine best paper awards. He is Fellow of the IEEE and Distinguished Member of the ACM.

Dr. Marco AJMONE MARSAN

Research Professor

Research: Networking; Performance evaluation

Personal Site

Short Bio

Marco Ajmone Marsan is a part-time research professor at the IMDEA Networks Institute in Spain and an Emeritus Professor of Politecnico di Torino. From 1974 to 2021 he was at the Politecnico di Torino, in the different roles of an academic career, with an interruption from 1987 to 1990, when he was a full professor at the Computer Science Department of the University of Milan. He obtained degrees in EE from the Politecnico di Torino and the University of California, Los Angeles (UCLA). He served in the editorial board of several international journals, and chaired the steering committee of the ACM/IEEE Transactions on Networking. He was the General Co-chair of Infocom 2013, and of ICC 2023. He is a Fellow of the IEEE, and a member of the Academia Europaea and of the Academy of Sciences of Torino. He is qualified as "ISI Highly Cited researcher" in computer science. He received a honorary degree in Telecommunication Networks from the Budapest University of Technology and Economics. He was named Commander of the Order of Merit of the Republic of Italy. He was the Vice-Rector for Research, Innovation and Technology Transfer at the Politecnico di Torino, and the Director of IEIIT-CNR. He was the Italian delegate in the ICT and IDEAS Committees of FP7.

Dr. Antonio FERNÁNDEZ ANTA

Research Professor

Research: Distributed Computing; Networks; Algorithms; Distributed Logs; Data Analysis; Crowdsourcing

Personal Site

Short Bio

Dr. Antonio Fernández Anta is a Research Professor at the IMDEA Networks Institute. Previously, he was a professor at the Universidad Rey Juan Carlos (URJC), and at the Universidad Politécnica de Madrid (UPM), where he received an award for his research productivity. He completed a postdoctoral stay at MIT from 1995 to 1997, and sabbaticals at Bell Labs in Murray Hill in 2008-2009 and at the MIT Media Lab in 2016-2017. He has over 30 years of research experience and more than 200 scientific publications. He received the "Aritmel" National Computer Science Award in 2019 and has been a Mercator Fellow at SFB MAKI in Germany from 2018 to 2024. Recently, his scientific work has won awards such as the Honorary Mention (2nd Best Paper) Award at the Social Impact Track of AAAI 2024, the Mario Gerla Best Paper Award at MedComNet 2022, and the Best Teaser Award at WoWMoM 2021. He has been Chair of the Steering Committee of DISC, and has chaired and served on the Scientific Committee of numerous conferences. He is Deputy Editor of The Computer Journal, Oxford Journals. Antonio Fernández Anta received his M.Sc. and Ph.D. in Computer Science from the University of Louisiana in 1992 and 1994, respectively. Previously, he completed his undergraduate and graduate studies in Computer Science at the UPM, in 1988 and 1991, having received national and university awards for his academic performance. He has been a senior member of IEEE since 2002 and of the ACM since 2007.

Dr. Marco FIORE

Research Professor

Research: Mobile Networks, Data Science, Network Intelligence, Computational social science

Personal Site

Short Bio

Marco Fiore is a Research Professor at IMDEA Networks Institute, where he leads the Networks Data Science group, and co-founder and CTO at Net AI, a UK-based network intelligence company. He received MSc degrees from University of Illinois at Chicago and Politecnico of Torino, a PhD degree from Politecnico di Torino, and a Habilitation à Diriger des Recherches from Université de Lyon. Marco has held tenured positions at Institut National des Sciences Appliquées de Lyon and National Research Council of Italy, and has been a visiting researcher at Rice University, Universitat Politècnica de Catalunya, and University College London. Marco's research is at the interface of mobile networks and data science, and has received multi-million Euro funding from the European Commission and national agencies in Spain, France and Italy, as well as a number of recognitions that include two best paper awards at IEEE INFOCOM. Marco is a former Marie Curie fellow and Royal Society visiting research fellow, and a Senior Member of IEEE and ACM.

Dr. Nikolaos LAOUTARIS

Research Professor

Research: Privacy; Transparency/ Data Protection; Economics of Networks and Information; Intelligent Transportation; Distributed Systems; Protocols; Network Measurements

Personal Site

Short Bio

Dr. Nikolaos Laoutaris is a research professor at IMDEA Networks Institute in Madrid. Prior to that, he was director of data science at Eurecat and chief scientist of the Data Transparency Lab, which he cofounded in 2014 during his 10-year tenure as a researcher and senior researcher of Telefonica Research in Barcelona. Before Telefonica, he was a postdoc fellow at Harvard University and Marie Curie postdoc fellow at Boston University. He got his PhD in computer science from the University of Athens in 2004.

Dr. Katia OBRACZKA
Research Professor

Research: Computer networks; dostrobited systems
Personal Site

Short Bio

Katia Obraczka is a part-time research professor at the IMDEA Networks Institute in Spain and Professor of Computer Science and Engineering at UC Santa Cruz. Prof. Obraczka's research interests span the areas of computer networks, distributed systems, and Internet information systems. She is currently serving as Associate Editor for the IEEE Transactions on Mobile Computing as well as ACM Letters in Computer Science.

research associate professors

Research Associate Professors are typically researchers with several years' experience who assume a position of responsibility in leading the day-to-day activities of our research teams.

Dr. Domenico GIUSTINIANO
Research Associate Professor

Research: Battery-free IoT Networks; Large-scale Spectrum Analytics; 5G and Beyond Localization Systems
Personal Site

Short Bio

Giustiniano has made to his field of research are exemplified by publications in international and highly competitive conference venues such as ACM MobiCom (5), ACM Mobisys (2), ACM CoNEXT (9), ACM Mobihoc, IEEE INFOCOM (6), ACM/IEEE IPSN (5), IEEE ICNP, and journals such as IEEE Journal on Selected Areas in Communications (3), IEEE/ACM Transactions on Networking (4) and IEEE Transaction on Mobile Computing (3). He has been General Vice-Chair of ACM Mobicom 2023, General Chair of EWSN 2018 and of IFIP/IEEE SustainIT 2015, and regularly serves as TPC member in top conferences. He has been the project coordinator of the H2020 European Training Network ENLIGHT'EM on low-energy Visible Light Communication for IoT (2019-2023). He is senior member of IEEE and ACM societies.

Dr. Sergey GORINSKY

Research Associate Professor

Research: Computer Networks; Distributed Systems; Network Economics

Personal Site

Short Bio

Dr. Sergey Gorinsky is a tenured Research Associate Professor at IMDEA Networks Institute where he leads the NetEcon (Network Economics) research group. He joined IMDEA in 2009 and held a Ramón y Cajal Fellowship funded by the Government of Spain from 2010 to 2014. Prior to that, Dr. Gorinsky served on the tenure-track faculty at Washington University in St. Louis from 2003 to 2009. He received his Ph.D. and M.S. degrees from the University of Texas at Austin and an Engineer degree from Moscow Institute of Electronic Technology. Dr. Gorinsky's research focuses on computer networking, distributed systems, and network economics. He has made contributions in areas such as CDN caches and their deployment, interconnection economics, real-time scheduling, congestion control, video streaming, and data-plane algorithms. His work has been published in top venues including SIGCOMM, NSDI, INFOCOM, CoNEXT, IEEE/ACM Transactions on Networking, and IEEE Journal on Selected Areas in Communications. Dr. Gorinsky has contributed extensively to the research community as TPC chair of ICNP 2017, general chair of SIGCOMM 2018 and ICNP 2020, and TPC member of numerous major conferences. He is a seven-time recipient of the INFOCOM Distinguished TPC Member Award and evaluates research for agencies such as the European Research Council.

Dr. Vincenzo MANCUSO

Research Associate Professor

Research: Performance Evaluation; Efficient and sustainable wireless access and edge networks; Network-embedded machine learning; Edge-assisted autonomous driving; Design of opportunistic and sliced mobile networks; Measurements and assessment of mobile networks

Personal Site

Short Bio

Dr. Vincenzo Mancuso is tenured Research Associate Professor at IMDEA Networks Institute, Madrid, Spain. Previously, he was with INRIA (Sophia Antipolis, France), Rice University (Houston, TX, USA) and University of Palermo (Italy), from where he obtained his MSc and PhD. He authored more than 160 peer-reviewed publications focusing on the analysis, design, and experimental evaluation of opportunistic and adaptive protocols and architectures for wireless and edge networks. He is currently focusing on performance evaluation and optimization of connect-compute architectures for wireless access/edge networks, which includes measurements and assessment of mobile networks and services, and on the use of machine learning techniques for the identification of the causes of network performance problems of networked cyber-physical systems.

Dr. Narseo VALLINA-RODRÍGUEZ

Research Associate Professor

Research: Cybersecurity; Network Measurements; Privacy

Personal Site

Short Bio

Narseo Vallina (Ph.D. at Cambridge University) is an Associate Research Professor at IMDEA Networks where he leads the Internet Analytics Group (IAG). He is also one of AppCensus' co-founders. Narseo's research interests fall in the areas of network measurements, cybersecurity, online privacy, and digital rights. Before joining IMDEA, he was a research scientist at ICSI at Berkeley (USA). Narseo's research efforts received best paper awards at prestigious conferences such as IEEE Symposium on S&P, USENIX Security, and ACM IMC, amongst others. For his contributions, he has been selected as ACM Senior Member and a Ramon y Cajal Fellow in 2021 and recceived the Medal "Jóvenes Investigadores" awarded by the Royal Academy of Engineering in Spain. Data Protection Agencies and key industry players have recognized the societal, regulatory and technical value of his work through distinctions such as a Google Faculty Fellowship, the AEPD Emilio Aced Award, the CNIL-INRIA Privacy Protection Award, or the Caspar Bowden PETS Award.

research assistant professors

Research Assistant Professors at IMDEA Networks Institute are bright researchers at the beginning of their research career, who want to establish a strong research group based on their research vision. They lead their own team of PhD Students and post-doctoral researchers. Research Assistant Professors are not required to teach, so they can focus full-time on research if they so wish.

Dr. Jaya Prakash Varma CHAMPATI

Research Assistant Professor

Research: Edge Intelligence, Quantum Networking
Personal Site

Short Bio

Jaya Prakash Champati is an Assistant Professor at IMDEA Networks Institute, where he leads the Edge Networks group. His current research focus is on efficient inference in Edge AI systems. Before joining IMDEA, he was a post-doctoral researcher at EECS, KTH Royal Institute of Technology, Sweden, where he significantly contributed to the Age of Information Analysis and Optimization. He obtained his PhD in Electrical and Computer Engineering from the University of Toronto, Canada in 2017. His PhD work on generalizations for scheduling on parallel processors was recognized through the Doctoral Completion Award and the Paul Biringer Scholarship, both awarded by the Department of Electrical and Computer Engineering, University of Toronto. He obtained his master of technology degree from the Indian Institute of Technology (IIT) Bombay, India in 2010, and worked at Broadcom Communications for two years, where he contributed to the 4G LTE MAC layer development. He was a Marie Skłodowska-Curie Actions (MSCA) postdoctoral fellow and recipient of the best paper award at the IEEE National Conference on Communications, India, 2011.

Dr. Claudio FIANDRINO

Research Assistant Professor

Research: Explainable AI; 5G networks
Personal Site

Short Bio

Claudio is a Research Assistant Professor (Ramón y Cajal Fellow) at IMDEA Networks Institute, Madrid, Spain where he leads the Resilient AI Networking Lab. His primary research interests include explainable and robust AI in 5G/6G networks, AI/ML for the Open RAN and 5G network performance characterization. For his research, Claudio has been awarded with several grants including, besides the Ramón y Cajal Fellowship, Juan de la Cierva grants (Formación and Incorporación), a José Castillejo/Fulbright mobility grant and six Best Paper Awards in renewed events.

Dr. Lucianna KIFFER

Research Assistant Professor

Research: Peer-to-peer networks; security and privacy of blockchain systems; network measurements; game theory

Personal Site

Short Bio

Lucianna Kiffer is a Research Assistant Professor at IMDEA Networks, heading the newly formed Distributed Systems and Networks (DistSys) group. Her research focuses on the foundations of peer-to-peer networks and blockchain systems, including measurement studies, analytical evaluations, and building new protocols. Prior to joining IMDEA Networks, she spent two years as a postdoctoral researcher at ETH Zürich in the Disco (Distributed Computing) lab under the supervision of Roger Wattenhofer and as a distinguished posdoctoral fellow at the Cyber Defense Center of Switzerland. She received her PhD in 2022 from Northeastern University in Computer Science under the supervision of Alan Mislove and Rajmohan Rajaraman, and her B.S. in Mathematics and Computer Science from Tulane University.

Dr. Guillermo SUÁREZ-TANGIL

Research Assistant Professor

Research: Cibersecurity and Cibercrime; Malware Analysis; Mass marking fraud; security and privacy in the social web

Personal Site

Short Bio

Guillermo Suarez-Tangil is Assistant Professor IMDEA Networks and a Ramon y Cajal Fellow. His research focuses on modeling emerging threats in online communities and ing effective mitigation strategies. His background is on systems security and malware analysis and detection. In particular, in the study of smart malware, ranging from the detection of advanced obfuscated malware to automated analysis of targeted malware. Guillermo has been Assistant Professor at King's College London (KCL). Before joining KCL, he has been senior research associate at University College London (UCL) where he has explored the use of program analysis to study malware. He has also been actively involved in other research directions aiming at detecting and preventing of Mass-Marketing Fraud (MMF) and security and privacy in the social web. Prior to that, he held a post-doctoral position at Royal Holloway, University of London (RHUL) where he was part of the development team of CopperDroid, a tool to dynamically test malware that uses machine learning to model malicious behaviors. He also holds a solid expertise on building novel data learning algorithms for malware analysis. He obtained his PhD on smart malware analysis in Carlos III University of Madrid with distinction and received the Best National Student Academic Award, a competitive award given to the best Thesis in the field of Engineering between 2014-2015 with about 1% acceptance rate (about 100 Cum Laude Thesis were invited to compete for the only award).

IMDEA Networks Faculty researchers

senior researchers

Senior Researchers at IMDEA Networks Institute are experienced post-doctorate researchers who are starting to establish their own research area and building their own team of pre-doctorate researchers (PhD students).

Dr. Jose AGUILAR

Senior Researcher

Research: Artificial intelligence; parallel and distributed systems; control systems; combinatorial optimization

Personal Site

Short Bio

Jose Aguilar received the B. S. degree in 1987 (Universidad de Los Andes-Venezuela), the M. Sc. degree in 1991 (Universite Paul Sabatier-France), and the Ph.D degree in 1995 (Universite Rene Descartes-France). He was a Postdoctoral Research Fellow in the Department of Computer Sciences at the University of Houston (1999-2000), and of the H2020-MSCA-COFUND-EU programme in the Department of Automática at the Universidad de Alcala (2020-2022). He has been full Professor at the Universidad de Los Andes, Venezuela, and EAFIT University, Medellín, Colombia. He is a Senior Researcher at IMDEA (Madrid Institute for Advanced Studies), in Madrid, Spain. He is member of the Mérida Science Academy and President of CLEI (Centro Latinoamericano de Estudios en Informática). He has published more than 650 papers and 10 books in journals, books and proceedings of international conferences. Dr. Aguilar has been a visiting research/professor in different universities/laboratories, coordinator or inviting research in more than 20 research/industrial projects, and supervised more than 20 Doctoral Thesis.

Dr. Jesús Omar LACRUZ

Senior Researcher

Research: Integrated Sensing and Communications; System on Chip Design; Embedded Systems; FPGAs

Personal Site

Short Bio

He is a Senior Researcher at IMDEA Networks Institute. Previously he was Assistant Professor at Universidad de Los Andes, Venezuela. He leads the Wireless Networks on SoCs sub-group within the Wireless Networking Group (WNG). He obtained his Ph.D. (cum laude) from Universitat Politècnica de València in 2016. He is PI of the DISCO-6G regional project and co-PI of the Multi-X SNS-JU European projects with strong focus on Integrated Sensing and Communications. He regularly publishes in top-tier venues—including ACM MobiSys, IEEE INFOCOM, and IEEE Transactions on Mobile Computing—focusing on embedded systems for wireless communication and sensing applications.

Dr. Marius PARASCHIV

Senior Researcher

Research: Quantum Information; Entanglement detection and classification; Tensor Networks

Personal Site

Short Bio

Joined the Human Centric Data Economy group of Prof. Nikolaos Laoutaris in April 2019. His primary research interests are in geometric deep learning (application of machine learning algorithms to graph data). Prior to this, he has worked on a series of projects and collaborations with other IMDEA faculty members, including a comprehensive study of domain classification services and their relative inconsistencies as well as producing a computer vision model. A second research interest is related to the notions of “data value” and the value of individual data providers to a particular service, from an economic but also an information-theoretic perspective.

post-doc researchers

Post-doctoral Researchers at IMDEA Networks Institute are early-stage, post-doctorate researchers who are looking to establish their research career, working with top research professors and a team of young, pre-doctorate researchers (PhD students).

Dr. Santiago ANDRÉS

Post-Doc Researcher

Research: Data Economics; Artificial Intelligence; Machine Learning; Federated Learning; Data Marketplaces; Business Models; Regulation; Networking; Network Economics and Techno-economic analysis

Personal Site

Short Bio

Santiago works as a post-doctoral researcher in the field of data economics at IMDEA Networks Institute in Madrid. He has wide experience in ICT consulting with relevant projects relating to regulation, public policy, strategy, and operations, working for telcos, regulatory authorities, and governments in more than 25 countries in America and EMEA. He received a PhD in Telematics Engineering from UC3M, a Master of Arts in Economics from UNED, and an MSc in Telecom Engineering from UPM. He has published relevant papers related to the value of data in top computer science conferences and journals like IEEE ICDE, ACM Sigmod Record, and ACM SIGSPATIAL.

Dr. Antonio BAZCO-NOGUERAS

Post-Doc Researcher

Research: Edge Computing; Machine Learning; Wireless Networking; Information theory

Personal Site

Short Bio

Dr. Antonio Bazco-Nogueras is a postdoctoral researcher at IMDEA Networks and recipient of the "Atracción de Talento" grant. He joined both the Network Data Science group and the Opportunistic Architectures Lab in 2021. His research interests include embedding intelligence in the network, distributed systems, information theory, and artificial intelligence. He obtained a Ph.D. degree in Telecommunications from Sorbonne Université in 2019. He was a post-doctoral researcher at EURECOM (France) during 2020, and previously he was a predoctoral researcher at Mitsubishi Electric R&D Centre Europe (France) from 2016 to 2019. He was also a Visiting Scholar at University of California–Irvine in 2017 and at University of Edinburgh in 2025.

Dr. Andrea BEDIN

Post-Doc Researcher

Research: Wireless Communication; Integrated Sensing and Communication (ISAC); Wireless localization

Personal Site

Short Bio

Andrea Bedin is a postdoctoral researcher at IMDEA Networks, currently working on next-generation wireless communication systems with a focus on wireless localization and sensing. He previously pursued his PhD at Nokia Bell Labs Finland under the MINTS MSCA project, focusing on wireless communications for industrial applications.

Dr. Adarsh Prasad BEHERA

Post-Doc Researcher

Research: Machine Learning, Edge Intelligence, Computer Vision, Wireless Communication, and IoT

Personal Site

Short Bio

Adarsh is working as a Postdoc researcher at IMDEA Networks Institute, Spain, in the Edge Networks lab. He received his Master's degree in Wireless Communication Engineering and PhD degree in Machine Learning from the Indian Institute of Information Technology (IIIT) Allahabad, India, in 2022. Prior to joining IMDEA, he worked as a Decision Scientist in FIGHTRIGHT Technologies Private Limited, India for 9 months (March-December 2022). He also worked as a Teaching and Research Assistant (TRA) in IIIT Allahabad, India, in 2021-2022.

Dr. Marco CANIL

Post-Doc Researcher

Research: ISAC; mmWave sensing; 6G; data fusion
Personal Site

Short Bio

Marco Canil is a Post-Doc Researcher at IMDEA Networks in Madrid, Spain. He earned his B.Sc. and M.Sc. in 2019 and 2020, respectively, from the University of Padova, Italy. At the same university, he received his Ph.D. in 2024 under the supervision of Prof. Michele Rossi. In 2023, he was a visiting researcher at New York University with Prof. Sundeep Rangan, and in 2020 he was intern at Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), with Dr. Paolo Dini. He received the "Francesco Carassa" Award, jointly awarded by GTTI and CNIT, in 2022, and received the Fondazione "Ing. Aldo Gini" Grant from the University of Padova to sponsor research visit periods. His primary research interests include ISAC, mmWave sensing, 6G, and data fusion.

Dr. Livia Elena CHATZIELEFTHERIOU

Post-Doc Researcher

Research: Network intelligence; autonomous vehicles; mathematical modeling; mathematical optimization; algorithm design; algorithm analysis; queueing theory
Personal Site

Short Bio

Livia Elena Chatzieleftheriou is a Juan de la Cierva awardee and postdoctoral researcher with the IMDEA Networks Institute, and a part-time Lecturer with the University Carlos III of Madrid (UC3M). She holds an M.Sc. in applied mathematics and a Ph.D. in Computer Science. Her current research interests include mathematical modeling and optimization, algorithm design and analysis, and queueing theory for autonomous vehicles, network intelligence, and next-generation mobile networks.

Dr. Nadezda CHUKHNO

Post-Doc Researcher

Research: Wireless communications; machine learning for networking
Personal Site

Short Bio

Nadezda Chukhno is a postdoctoral researcher at IMDEA Network Institute, Spain. She graduated from RUDN University, Russia, and received her B.Sc. in Business Informatics (2017) and M.Sc. in Fundamental Informatics and Information Technologies (2019). She received her double Ph.D. degree in Information Engineering (2023) from Mediterranea University of Reggio Calabria, Italy and Jaume I University, Spain, within the H2020 MSCA ITN A-WEAR project. Her research activity has focused on wireless networks, with an interest on wearable technologies, multicast, and device-to-device communications. Her current research activity focuses on ML for network traffic forecasting.

Dr. Javad DOGANI

Post-Doc Researcher

Research: Distributed Systems, Cloud/Edge/Fog Computing, Federated Deep Learning, Parallel Computing, and Big-Data Processing

Personal Site

Short Bio

Javad Dogani is a postdoctoral researcher at IMDEA Networks Institute, Madrid, Spain, where he joined the Data Transparency research group in October 2023. His ongoing research pursuits include the development of federated learning models customized to the specific requirements of distributed platforms, such as those employed in edge and fog computing. Javad received his M.Sc. degree in software engineering from Shiraz University in 2012 and completed his Ph.D. in software engineering from the same university in 2023. Before joining IMDEA, he served as a Teaching and Research Assistant at Shiraz University in Iran for nine months, from January to September 2023. Over the last eight years, he has amassed substantial teaching experience, instructing various computer science courses. He also held the Teaching and Research Assistant position at University of Hormozgan in Bandar-abbas, Iran, from 2014 to 2018.

Dr. Edson DOS SANTOS

Post-Doc Researcher

Research: Visible Light Communication; Wireless Communication Transceiver Circuits; IoT and Embedded Systems

Personal Site

Short Bio

Dr. Edson Leonardo dos Santos is a postdoctoral researcher at the IMDEA Networks Institute, in the Pervasive Wireless Systems Group. Before joining IMDEA in 2024, he worked as a professor at SENAI-PR since 2013. He obtained his PhD and Master's degrees in Electrical Engineering from the Federal University of Paraná (UFPR) in 2021 and 2015, respectively. He has been a reviewer for several conferences and journals since 2017. His current research focus is on optical wireless communication systems.

Dr. Dayrene FRÓMETA

Post-Doc Researcher

Research: Next Generation Wireless Networks; Visible Light Communication (VLC); LiFi systems; Millimeter-wave (mm-wave) systems

Personal Site

Short Bio

Dayrene Frómeta is a Postdoctoral researcher of the Pervasive Wireless Systems Group at IMDEA Networks Institute. She obtained her PhD from IMDEA Networks and Universidad Carlos III de Madrid back in June 2024. Her research targets a topic which is how to provide backhaul connectivity to hundreds or thousands of VLC Apps under dense VLC deployments of the IoT.

Dr. Nina GROSHEVA

Post-Doc Researcher

Research: Network Simulation (ns-3); Millimeter Wave Networking; Performance Analysis
Personal Site

Short Bio

Nina Grosheva is a postdoctoral researcher in the Wireless Networking Group at IMDEA Networks. She obtained her PhD from IMDEA Networks and Universidad Carlos III de Madrid back in March 2024. Previously, she completed an MSc in Communications Engineering at RWTH Aachen University and a BSc in Electrical Engineering at Saint Cyril and Methodius University in Skopje. Her research interest is in mmWave networks, with a particular focus on MAC and network layer design and analysis.

Dr. Michele GUCCIARDO

Post-Doc Researcher

Research: Network Programmability, Network Intelligence, Beyond 5G
Personal Site

Short Bio

Michele Gucciardo is a postdoctoral researcher at IMDEA Network Institute, Spain. He received his B.Sc. and M.Sc. degrees in Telecommunications engineering respectively from Politecnico di Milano, Italy, and from the University of Palermo, Italy. He received a Ph.D. in ICT from the University of Palermo, Italy. His research activity has focused on wireless networks, with an interest on IoT access networks. More recently, he has focused on ML in programmable data planes for beyond 5G systems.

Dr. Blas KOLIC

Post-Doc Researcher

Research: Mathematical Modeling; Opinion Dynamics; Network Science; Agent-based Modeling; and Complex and Dynamic Systems.
Personal Site

Short Bio

Blas is a postdoctoral fellow at IMDEA Networks and IBiDat Institute at Universidad Carlos III de Madrid. His research draws from dynamical systems, complex systems, and network science. It focuses, on the one hand, on studying the behavior and evolution of norms and opinions in social networks, and, on the other hand, on estimating the latent states of statistical and agent-based models based on aggregate observations. Lately, he has drawn interest in the interpretability and fairness of machine learning models. Blas has a PhD in Mathematics from the University of Oxford under the supervision of Prof. Doyne Farmer, where he formed part of the Complexity Economics group of the Institute for New Economic Thinking at the Oxford Martin School. He has also worked with the World Bank Group as a data analyst and participated in numerous conferences, seminars, and competitions. Blas did his undergraduate studies in Physics at the Universidad Nacional Autónoma de México, Mexico. Besides his academic career, he is passionate about music.

Dr. Diego MADARIAGA

Post-Doc Researcher

Research: Machine Learning for Networking; Data Science; Network Measurements
Personal Site

Short Bio

Diego Madariaga is a postdoctoral researcher at IMDEA Networks Institute, in the Network Data Science (NDS) group. He received his PhD in Computer Science from the University of Chile in 2023. During his PhD, he carried out substantial research grounded on traffic measurements and the realization of experimental platforms for anticipatory networking, mainly focusing on topics related to network protocols and network monitoring. Currently, his research focuses on the analysis, characterization, and modeling of mobile network traffic.

Dr. Farzam NOSRATI

Post-Doc Researcher

Research: quantum information theory; quantum computing; quantum optics; quantum network
Personal Site

Short Bio

Farzam Nosrati is a postdoctoral researcher at IMDEA Networks Institute in Madrid, Spain. He earned his double Ph.D. in 2023 from the University of Palermo in (Italy) and INRS (Canada). His research spans quantum algorithms, indistinguishability in quantum networks, photonic processors, and quantum optimization. He has co-authored 19 papers in top-tier journals, including Nature Photonics and NPJ Quantum Information, and frequently reviews for leading publishers. His current work explores quantum secure quantum communications and distributed quantum computing.

Dr. Timothy OTIM

Post-Doc Researcher

Research: Positioning and navigation systems; mobile communications; channel modelling; transportation research; statistical modelling
Personal Site

Short Bio

Dr. Timothy Otim is a postdoctoral researcher specializing in wireless communication. He earned his PhD in Positioning and Navigation Systems from Universidad de Deusto, Spain, in 2020, with a focus on the impact of the human body on ultrawideband indoor positioning systems. Prior to his current role, he held a postdoctoral position at the German Aerospace Centre (DLR) in Wessling, Germany, in 2021, where he worked on statistical models for Intelligent Transport Systems.
At IMDEA Networks, Dr. Otim contributes to the Pervasive Wireless Systems Group, participating in projects such as the EU-ENABLE-6G, which investigates AI, privacy, and network efficiency for next-generation wireless systems, and the EUSPA project, which aims to develop a unified hybrid user terminal supporting both 5G Terrestrial Networks (TN) and Non-Terrestrial Network (NTN) communications. His recent publications cover 5G positioning, privacy in 5G standalone networks, and COVID-19 contact tracing through multipath profile similarity.

Dr. Juan Marcos RAMIREZ

Post-Doc Researcher

Research: Interpretable Models; Machine Learning; Mobile Networks

Personal Site

Short Bio

Juan Marcos Ramírez Rondón received the B.S. diploma in electrical engineering, the Master's degree in biomedical engineering, and the Doctor's degree in applied sciences at the Universidad de Los Andes (ULA), Mérida, Venezuela, in 2002, 2007, and 2017, respectively. In 2004, he joined as a teaching and research staff of the Electrical Engineering Department at ULA, Venezuela. He worked as a postdoctoral intern at the High Dimensional Signal Processing (HDSP) Group, Universidad Industrial de Santander, Colombia (2017-2019). He also worked as Marie Curie Postoctoral fellow at the Universidad Rey Juan Carlos (2017-2019). Currently, he is working as a Postdoctoral Researcher at IMDEA Networks Institute.

Dr. Giuseppe SANTAROMITA

Post-Doc Researcher

Research: Wireless Networks; 5G; Localization

Personal Site

Short Bio

Dr. Giuseppe Santaromita joined the Pervasive Wireless Systems Group led by Dr. Domenico Giustiniano at IMDEA Networks in May 2020. He received his Ph.D. in Information and Communication Technologies at the University of Palermo (Italy), with a focus on physical layer flexibility to improve the performance of high-capacity and ultra-dense wireless networks. He is a member of IEEE and ACM. His main research interest at IMDEA involves low latency-high accuracy localization methods for wireless networks, and the implementation of an experimental 5G New Radio framework based on the popular opensource software OpenAirInterface and able to collect useful measurements for positioning.

Dr. Syed WAQAS HAIDER SHAH

Post-Doc Researcher

Research: 5G and beyond cellular networks; device-to-device communication; reconfigurable intelligent surfaces; analytical analysis of mobile networks; quality-of-service provisioning

Personal Site

Short Bio

Syed is a Marie Skłodowska-Curie Actions postdoctoral fellow at IMDEA Networks, Madrid, Spain. He joined the Wireless Networking Group in September 2022. He received a master's degree in electrical engineering from the National University of Science and Technology, Islamabad, Pakistan in 2016, and a Ph.D. degree in electrical engineering from Information Technology University, Lahore, Pakistan in 2021. From 2019 to 2021, he was a split-site Ph.D. Scholar with the Computer Laboratory, Department of Computer Science and Technology, University of Cambridge, UK, where he worked under the supervision of Prof. Jon Crowcroft. He has published in highly reputed venues, such as IEEE *INFOCOM, IEEE ICC, IEEE Wireless Communication Letters, IEEE Transactions on Vehicular Technology, IEEE Transactions on Green Communication and Networking, Elsevier Computer Networks, and Transactions on Emerging Telecommunication Technologies.* He is also a reviewer of many international journals and conferences.

visiting professors/researchers

Visiting Professors share our research interests and spend their sabbatical with us for either one or two terms. They usually have several years' post-doctoral research experience and are interested in extending their horizons with a temporary assignment in a new environment.

Dr. Joaquín ÁLVAREZ

University of origin: Universidad de Alcalá, Madrid, Spain

Short Bio

Joaquín Álvarez-Horcajo (PhD'20) obtained his PhD in Information and Communication Technologies engineering from the University of Alcala in 2020. After having worked at Telefonica as a test engineer for COFRE and RIMA networks, he was awarded a grant for university professor training (FPU) at the University of Alcala. At present, he currently works as an Assistant Professor in the University of Alcala where his current research interests encompass Software Defined Networks (SDN), Internet protocols, new generation protocols and data center networks. He has participated in various competitive projects funded through the Community of Madrid plan, such as TIGRE5-CM and TAPIR-CM.

pre-doc researchers

Our PhD Students are young, aspiring researchers who occupy a salaried position in our research team whilst undertaking their Ph.D. at a leading Madrid University for up to five years. Most of these pre-doc researchers enter the Ph.D. program at University Carlos III of Madrid (UC3M). IMDEA Networks Institute has a far-reaching collaboration agreement with UC3M, which includes the provision of a Postgraduate program for our early-stage researchers. In the future, we may have similar arrangements with other Madrid Universities.

IMDEA Networks research team of postdocs, pre-doctoral researchers, engineers and internship students

Ghina AL ATAT
Pre-Doc Researcher

BSc: Physics with minors in Mathematics, Computer Science, and Computational Science - American University of Beirut (AUB). Beirut, Lebanon.
MSc: Computational Science – AUB. Beirut, Lebanon.
Previous Position: Research Assistant at Suliman S. Olayan School of Business, AUB, Beirut, Lebanon. Teaching Assistant at Physics Department, AUB, Beirut, Lebanon.
Research: Learning at the Edge; Edge Computing; Edge Intelligence; Design of Algorithms; Decision Making

Nikolaos APOSTOLAKIS
Pre-Doc Researcher

Integrated Master (BSc + MSc): Eletrical and Computer Engineering - National Technical University of Athens. Athens, Greece
Previous position: Network Software Engineer - Intracom Telecom. Paiania, Greece
Research: Network automation; Cloud orchestration; Deep Reinforcement Learning

Vinuri BANDARA
Pre-Doc Researcher

BSc: Information Systems - University of Colombo. Sri Lanka
MSc: Sofware and Systems - Universidad Politécnica de Madrid (UPM). Madrid, Spain
Previous Position: Research Engineer, Score Lab, Sri Lanka
Research: Android Privacy and Security; Network security

Iñaki BRAVO
Pre-Doc Researcher

BSc: Aerospace Engineering - Polytechnic University of Madrid. Madrid, Spain
MSc: Applied and Computational Mathematics – University Carlos III of Madrid. Madrid, Spain
Research: Explainable AI; Wireless Sensing

Beyza BÜTÜN
Pre-Doc Researcher

BSc: Computer Engineering - Middle East Technical University. Ankara, Turkey
MSc: Computer Engineering - Middle East Technical University. Ankara, Turkey
Research: Machine Learning, Programmable Networks, Sustainable Network Intelligence, Energy Consumption Measurements and Optimization

David DE ANDRÉS HERNÁNDEZ
Pre-Doc Researcher

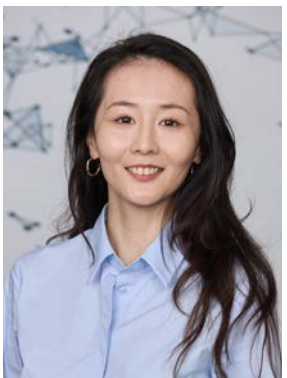
BSc: Telecommunication Technologies and Services - Universidad Politécnica de Madrid. Madrid, Spain
MSc: Electrical Engineering and Information Technology - Technical University of Munich. Munich, Germany
Previous Position: Working Student at DE-CIX R&D | Systems Engineer at Juniper Networks
Research: Machine Learning, Programmable Networks

Tianyue CHU
Pre-Doc Researcher

BSc: Double Bachelor's Degree. Mathematics and Applied Mathematics & Finance - Shenzhen University. Shenzhen, China
MSc: Statistics - Shenzhen University. Shenzhen, China
Previous position: Research Assistant. Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences. Shenzhen. China
Research: Machine learning; Statistics

Sai Pavan DERAM
Pre-Doc Researcher

BSc: Electronics and communications engineering - SASTRA University. India
MSc: Communication and signal processing - TU Ilmenau, Germany
Previous position: Research Assistant. Communications Reseach Laboratory, TU Ilmenau, Germany
Research: mmWave communications, Physical layer signal processing, parameter estimation techniques



Ángela DÍAZ-BRICIO
Pre-Doc Researcher

BSc: Physics and Mathematics – University Carlos III of Madrid. Madrid, Spain
MSc: Quantum Technlogies and Engineering - University Carlos III of Madrid. Madrid, Spain
Research: Quantum Key Distribution; Quantum networks; Quantum security

Sergio DÍAZ ARANDA
Pre-Doc Researcher

BSc: Mathematics – Complutense University. Madrid, Spain
MSc: Mathematics – Complutense University. Madrid, Spain
MSc: Statistical-Computational Treatment of Information – Complutense University. Madrid, Spain
Previous position: Research Assistant at the UC3M-Santander Big Data Institute, Madrid, Spain
Research: social networks; statistics; data science; discrete mathematics

Abhishek DUTTAGUPTA
Pre-Doc Researcher

BSc: Tech - KIIT University. India
MSc: Electronics Information Engineering - Trinity College Dublin. Dublin, Ireland
Previous Position: Industrial Automation Engineer at Voltas Limited, UAE
Research: Reinforcement Learning; Explainable AI

Stavros ELEFTHERAKIS
Pre-Doc Researcher

BSc: Mathematics - University of Crete. Heraklion, Greece
MSc: Applied and Computational Mathematics - University of Crete. Heraklion, Greece
MSc: Telecommunications Engineering – University Carlos III of Madrid. Madrid, Spain
Previous position: Teaching Assistant. Department of Mathematics and Applied Mathematics. University of Crete
Research: 5G Localization, Wireless Sensing, Artificial Intelligence, Network Privacy, Applied Mathematics

Andrea FRESA
Pre-Doc Researcher

BSc: Computer Engineering - University Federico II. Naples, Italy
MSc: Computer Engineering - University Federico II. Naples, Italy
Previous Position: Master Thesis Worker. Ericsson Research. Jorvas, Finland
Research: Edge Computing; Edge Intelligence; Design of Algorithms; IoT

Vahid GHAFOURI
Pre-Doc Researcher

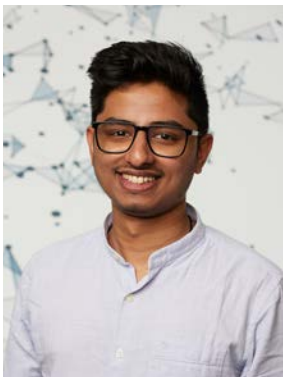
BSc: Industrial Engineering - Sharif University. Tehran, Iran
MSc: Business Analytics - Sabanci University. Istanbul, Turkey
Research: Polarization and Radicalization on Social Media

Aniketh GIRISH
Pre-Doc Researcher

BSc: Computer Science - Amrita Vishwa Vidyapeetham. Kerala, India
MSc: Cybersecurity - University Carlos III de Madrid. Madrid, Spain
Previous position: Research Associate - IIJ Innovation Institute, Tokyo, Japan
Research: Privacy and Security; Regulatory Compliance; IoT

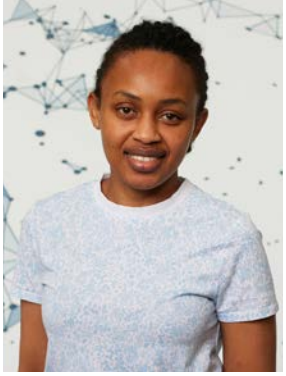
Alexandr GOULTIAEV TOLSTOKOROV
Pre-Doc Researcher

BSc: Electronic Engineering - Trinity College Dublin. Dublin, Ireland
MSc: Electronic Engineering - Trinity College Dublin. Dublin, Ireland
Research: Distributed Machine Learning; Data Economy; Data Valuation; and Federated Learning



Behafarid HEMMATPOUR
Pre-Doc Researcher

BSc: Physics - Ferdowsi University of Mashhad. Mashhad, Iran
MSc: Statistical Physics and Complex Systems - Shiraz University. Shiraz, Iran
Research: Machine Learning; Intelligent Transportation; Spatiotemporal Data; Smart Cities; Computational Epidemiology



Rita INGABIRE
Pre-Doc Researcher

BSc: Electrical Engineering - Makerere University. Kampala, Uganda
MSc: Information Systems - Makerere University. Kampala, Uganda
Previous Position: Senior Engineer. MTN Uganda
Research: Interpretable machine learning; Edge/Cloud design; Intelligent Network design

Devriş IŞLER
Pre-Doc Researcher

BSc: Computer Science and Engineering - Gaziantep Zirve University. Gaziantep, Turkey
MSc: Computer Science and Engineering - Koç University. İstanbul, Turkey
Previous position: Research Assistant. KU Leuven. Leuven, Belgium
Research: Applied cryptography privacy; usable security; data transparency and protection

Arivarasan KARMEGAM
Pre-Doc Researcher

BSc: Computer Science and Engineering - Ramco Institute of Technology. Rajapalayam, India
MSc: Computer Science and Engineering - Indian Institute of Technology (Indian School of Mines). Dhanbad, India
Research: Blockchain and Distributed Ledger Technology

Aninda LAHIRI
Pre-Doc Researcher

BSc: Physics - Mumbai University. India
MSc: Quantum Science and Technology - Trinity College Dublin, Ireland
Research: Quantum Tensor Networks; Quantum Machine Learning

Naicheng LI
Pre-Doc Researcher

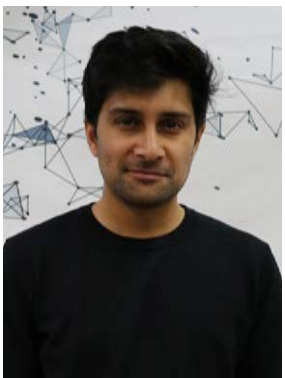
BSc: Optoelectronic Information Science and Technology - Nanjing University of Science and Technology. China
MSc: Computer Systems and Networks - Chalmers University of Technology. Sweden
Research: Federal Learning; Privacy Preserving

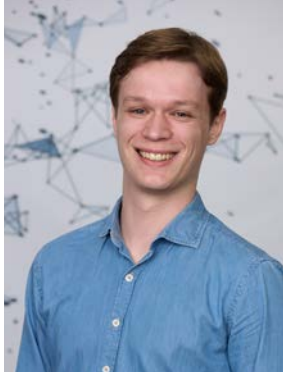
Blanca LÓPEZ
Pre-Doc Researcher

BSc: Physics - University of Seville. Seville, Spain
MSc: Physics and Mathematics – University of Granada. Granada, Spain
Research: Quantum communications

Orlando E. MARTÍNEZ-DURIVE
Pre-Doc Researcher

BSc: Computer Science - University of Havana. Havana, Cuba
MSc: Computer Science - University of Havana. Havana, Cuba
Previous position: Researcher at the Faculty of Physics, University of Havana, Cuba
Research: Remote sensing; population estimation; land usage detection; mobile networks metadata





Louis MIERMONT
Pre-Doc Researcher

MSc: ESIEA - Graduate School of Engineering, France
Research: Cybersecurity, Machine Learning, AI

Mariella MISCHINGER
Pre-Doc Researcher

BSc: Computer Science - Technical University of Munich. Munich, Germany
MSc: Computer Science - Technical University of Munich. Munich, Germany
Previous position: IT Product Owner / Project Manager at Unternehmer-TUM GmbH, Munich, Germany
Research: Cybersecurity; Malware; Crime; Fraud

Sachit MISHRA
Pre-Doc Researcher

BSc: Electronics and Communication Engineering - Jaypee University of Engineering and Technology. Guna, India
MSc: Computer Engineering - Politecnico di Torino. Turin, Italy
Previous position: Software Developer. Accenture Private Ltd.
Research: Mobile traffic analysis and modeling

Serly MOGHADAS GOLIAN
Pre-Doc Researcher

BSc: Electrical and Electronics Engineering – Urmia University of Technology (Urmia, Iran)
MSc: Communications Systems Engineering – Urmia University (Urmia, Iran)
Research: Explainable AI, Machine Learning, Mobile Networks

Reza NAMVAR
Pre-Doc Researcher

BSc: Computer Engineering - Shiraz Branch of Azad University. Shiraz, Iran
MSc: Computer Engineering - Software - Shiraz University. Shiraz, Iran
Research: Wireless Communication; Mobile Networks; Large Language Models

Bei OUYANG
Pre-Doc Researcher

BSc: Electrical and Information Engineering - Beijing Institute of Technology. Beijing, China
MSc: Electrical and Computer Engineering - Rice University. Houston, United States
Previous Position: Research Intern, Microsoft Research Asia, Shanghai, China
Research: Integrated Sensing and Communication; mmwave; wireless systems

Francesco PIGATO
Pre-Doc Researcher

BSc: Electronic Engineering - University of Padova. Padova, Italy
MSc: Telecommunication Engineering - Politecnico di Milano. Milano, Italy
Research: Localization techniques; signal processing for sensing applications

Máximo PIRRI
Pre-Doc Researcher

BSc: Communications Systems Engineer - Facultad de Ingeniería, Universidad de la República. Montevideo, Uruguay
Previous Position: Research and teacher assistant - Instituto de Ingeniería Eléctrica, Facultad de Ingeniería, Universidad de la República.
Research: Data Science; Mobile traffic analysis

Alfonso RODRÍGUEZ
Pre-Doc Researcher

BSc: Computer Science and Engineering - Carlos III University. Madrid, Spain
MSc: Informatics Engineering - Carlos III University. Madrid, Spain
MSc: Cybersecurity - Carlos III University. Madrid, Spain
Research: Metaverse, Security & Privacy, Reversing XR/VR Applications

Salil SHARMA
Pre-Doc Researcher

BSc: Electronics & Communications Engineering - Rajasthan Technical University. Kota, India
MSc: Communication Systems Design - Indian Institute of Information Technology, Design & Manufacturing, Kancheepuram. Chennai, India
MSc: Mobile Computing Systems - Eurecom. Sophia Antipolis, France
Research: Integrated Sensing and Communication; Signal Processing Algorithms; mm-wave

Islomjon SHUKHRATOV
Pre-Doc Researcher

BSc: Computer Science and Engineering - Inha University. Incheon, South Korea
MSc: Internet of Things and Wireless Technologies - Skoltech
Research: computer vision; 3D objects; large language models; deep learning

Javier TALAVANTE
Pre-Doc Researcher

BSc: Audiovisual Systems Engineering - University Carlos III of Madrid. Madrid, Spain
MSc: Telecommunication Engineering - University Carlos III of Madrid. Madrid, Spain
Previous Position: Research assistant. Infrared Lab UC3M. Madrid, Spain
Research: Visible Light Communication (VLC), LiFi systems, VLC backscatter, Battery-free IoT devices

Junlang WANG
Pre-Doc Researcher

BSc: Information Security - Xi'an University of Posts and Telecommunications, China
MSc: Computer Systems and Networks - Chalmers University of Technology, Sweden
Research: Distributed system

Nipuna WEERASEKARA
Pre-Doc Researcher

BSc: Information Systems (Honors) - University of Colombo. Colombo, Sri Lanka
MSc: Sofware and Systems - Universidad Politécnica de Madrid (UPM). Madrid, Spain
Research: Android Privacy and Security; Network security

external PhD students

Our External PhD Students are young, aspiring researchers who are supervised or co-supervised by a member of the IMDEA Networks' research team. Most of the External PhD Students to IMDEA Networks are undertaking the Ph.D. program at University Carlos III of Madrid (UC3M).

Sergi ALCALÁ-MARÍN

Pre-Doc Researcher

BSc: Telecommunications Engineering - Universitat Politècnica de Catalunya. Spain
MSc: Advanced Telecommunication Technologies - Universitat Politècnica de Catalunya. Spain
Previous Position: Manager. Universitat de Barcelona. Spain
Research: Beyond 5g, Deep Learning, Wireless communications, Network performance analysis, Network performance measurement; Mobile networks

Miguel Ángel BERMEJO

Pre-Doc Researcher

BSc: Telecommunications Engineering - Universidad Politécnica de Madrid (UPM). Madrid, Spain
MSc: Data Science - Universitat Oberta de Catalunya (UOC). Barcelona, Spain
Previous Position: Telecommunications Engineer. Lisbon, Portugal
Research: Online advertising; Internet measurements; Data Analytics; Machine Learning

Yago LIZARRIBAR

Pre-Doc Researcher

BSc: Industrial Technologies Engineering - University of Navarra. San Sebastián, Spain
MSc: Mechanical Engineering - University of Navarra. San Sebastián, Spain
Previous Position: Research Assistant. Massachusetts Institute of Technology. Cambridge. MA. USA
Research: Collaborative Spectrum Sensing; Distributed Systems; Machine Learning

Leonardo LO SCHIAVO

Pre-Doc Researcher

BSc: Computer Science Engineering - Università degli Studi di Catania. Catania, Italy
MSc: Communications and Computer Networks Engineering - Politecnico di Torino. Turin, Italy
Previous position: Project Implementation Engineer at Amadeus IT Group. Nice. France
Research: Software-defined Networking; 5G cellular networks; O-RAN; Machine Learning

Amir MEHRJOO
Pre-Doc Researcher

BSc: Mechanical Engineering - Shiraz University. Shiraz, Iran
MSc: Business and Finance (Marketing Specialization) - University Carlos III of Madrid. Madrid, Spain
Previous position: Teaching Assistant. University Carlos III of Madrid. Spain
Research: Algorithmic Bias, Social conflict, Fraud detection

Leonardo PERONI
Pre-Doc Researcher

BSc: Informatic and automatic engineering - Università "La Sapienza" di Roma. Rome, Italy
MSc: Mechatronic Engineering - Politecnico di Torino. Turin, Italy
Previous position: Technology Consultant. Hesplora. Florence. Italy.
Research: Machine learning; Computer Networks; Control theory

Vittorio PRODOMO
External PhD Student

BSc: Computer Engineering - University of Naples Federico II. Naples, Italy
MSc: Computer Engineering - Networks and Internet - University of Naples Federico II. Naples, Italy
Research: Machine Learning for Mobile Networks

Antonio RUSSO
External PhD Student

BSc: Computer Science Engineering. Università degli Studi di Napoli Federico II. Naples. Italy
MSc: Computer Science Engineering. Università degli Studi di Napoli Federico II. Naples. Italy
Previous Position: Teaching Assistant. Cybersecurity Academy (Università di Napoli Federico II). Naples. Italy
Research: blockchain; applied cryptography; network security; distributed systems

Pablo SAUCEDO DE MIGUEL
Pre-Doc Researcher

BSc: Computer Engineering - Autonomous University. Madrid, Spain
MSc: Internet of Things - Politechnic University. Madrid, Spain
Research: TinyML, Distributed Computing, Integrated Sensing and Communications, mmWave

Lucía UGUINA
External PhD Student

BSc: Telecommunication Technologies Engineering - University Carlos III of Madrid. Madrid, Spain
MSc: Computer Science and Mathematics - Universitat Rovira i Vigili / Universitat Oberta de Catalunya. Tarragona, Spain
Previous Position: Junior Assistant. Management Solutions. Madrid. Spain
Research: Learning Analytics; Data Mining; Real-Time Data

research engineering and support

The Research Engineering & Support unit at IMDEA Networks is dedicated to supporting the continued growth in our research capacity and maximizing the impact of our research output by providing specific technical and professional expertise and assistance to ongoing research endeavors in a variety of ways. Research Engineering & Support personnel work either at the level of the entire Institute, or closely with researchers and their groups. There are roles with an engineering background that take care of the design, installation and maintenance of the IT infrastructure. Other roles may, for instance, provide administrative or operational support to project or lab management.

Typical jobs include systems administration, research (software and/or hardware) engineering, project or research administrator and laboratory technician. These positions are similar to their industry equivalents. They enable our employees to work on cutting-edge research problems and technology in a stimulating and innovative environment.

Admin and research support team

Josué Miguel AGUILAR
Research Engineer

BSc: Electric Engineering - Technological University of Havana. Havana, Cuba
Research: High Performance Computing; Programmable Networks; Network Energy Consumption

Diego BENITO
Research Engineer

BSc: Computer Science – University of Alcalá de Henares. Madrid, Spain
MSc: Data Analysis and Big Data - University of Alcalá de Henares. Madrid, Spain
Research: Data Analysis; Explainability Analysis; Machine Learning

Ignacio BERBERANA
Senior Research Engineer

MSc: Mining Engineer. School of Mining Engineering - Polytechnic University of Madrid. Madrid, Spain
Research: 5G; Radio Communications; RAN Virtualization

Celia CABELLO
Research Engineer

BSc: Psychology - UNED
MSc: Advanced Studies in Brain and Behavior – University of Seville
Research: Biometric SDKs. Cybersecurity & Internet Analytics

Nicolás BORRAJO
Research Engineer

BSc: Computer Science and Engineering - Universidad Carlos III de Madrid. Madrid, Spain
Research: Quantum computing

Elvira CONTI
Project Manager

BSc: International Relationships - Rey Juan Carlos University. Madrid, Spain
MSc: Business Innovation and Project Management - Mondragon University. Basque country. Spain

Paula DE DIOS
Project Administrator

BSc: Journalism. Complutense University of Madrid (UCM). Madrid, Spain
MSc: European Political and Social Integration. Vrije Universiteit Brussel. Belgium
MSc: Feminism and Gender Complutense University of Madrid (UCM). Madrid, Spain

Gonzalo DÍAZ
Research Engineer

BSc: Bioinformatics - University of San Jorge. Zaragoza, Spain.
MSc: Bioinformatics applied to personalized medicine and health - Instituto de Salud Carlos III (ISCIII). Madrid, Spain

Pablo FERNÁNDEZ
Research Engineer

BSc: Mining Engineering - Polytechnic University of Madrid. Madrid, Spain
MSc: Mining Engineering - Polytechnic University of Madrid. Madrid, Spain
Research: AI, Machine Learning, Deep Learning, Explainable AI

Neftalí GONZÁLEZ
Systems Administrator

BSc: Technical Computer Systems Engineering. Universidad Rey Juan Carlos. Móstoles. Spain

Susana HERNÁNDEZ
Project Administrator

MSc: Biology (Specialization: Biotechnology) - EQF Level 7 Certificate (Master). Complutense University of Madrid. Madrid. Spain
MSc: Food Science and Technology - EQF Level 7 Certificate. Complutense University of Madrid. Madrid. Spain

Francisco Javier HERVÁS
Project Administrator

BSc: Business Administration - Universidad Autónoma de Madrid. Madrid, Spain
MSc: Management of Human Resources - Universidad Autónoma de Madrid. Madrid, Spain

MohammadErfan JABBARI
Research Engineer

BSc: Electrical Engineering (Telecom) - University of Tehran. Tehran, Iran

Nirlay KUNDU
Senior Research Engineer

BSc: Electrical Engineering, Jadavpur University, Calcutta, India
MSc: Design Engineering, Leicester University, Leicester, UK, British Commonwealth Scholarship Indian Institute of Technology, Kharagpur MBA, Babson College, Wellesley, MA, USA
Research: Nest generation telecom technologies

Daniel LORENZO
Research Engineer

BSc: Telematics Engineering – University Carlos III of Madrid. Madrid, Spain
Research: 5G Platform; O-RAN; Open Air Interface; Radio Access Network (RAN)

José Pedro MARTÍN YUBERO
Research Engineer

BSc: Telecommunications Engineering – University Carlos III of Madrid. Madrid, Spain
MSc: Quantum technologies and engineering – University Carlos III of Madrid. Madrid, Spain
Research: Quantum Internet

Beatriz MARTÍN
Project Administrator

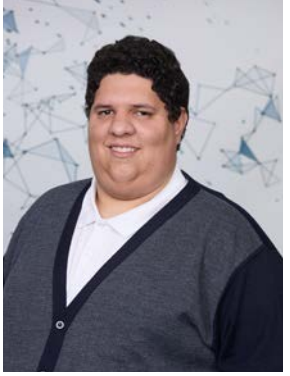
BSc: Law – Rey Juan Carlos University. Madrid, Spain
MSc: Training of Secondary Education, High School, Vocational Training and Language Teachers – Rey Juan Carlos University. Madrid, Spain

Andrés MARTÍN
Research Engineer

BSc: Physics & Mathematics – University of Zaragoza. Spain
MSc: Quantum Technologies and Engineering – University Carlos III of Madrid
Research: Quantum cryptography; Quantum Internet; network security

Pablo MARTÍNEZ FREILE
Project Administrator

BSc: Political Sciences and Public Administration - University of Salamanca. Salamanca, Spain
MSc: International Master in Contemporary Latin American Studies - Complutense University of Madrid. Madrid, Spain



José Manuel PANDELO
Research Engineer

BSc: Law – Pontificia Universidad Católica Madre y Maestra – Dominican Republic
MSc: Digital Business – Spain Business School and UCAM Murcia

Javier PÉREZ
Research Engineer

BSc: Telematics Engineering – University Carlos III of Madrid. Madrid, Spain
Research:

Rafael RUIZ
Systems Administrator

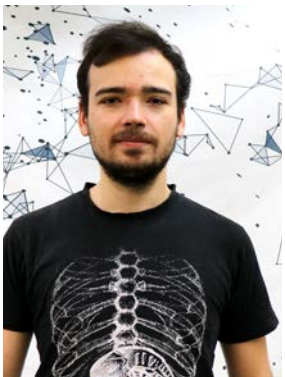
BSc: Industrial Electronics and Automation Engineering - Universidad Politécnica de Cartagena. Murcia, Spain
MSc: Industrial Electronics - Universidad Politécnica de Madrid. Madrid, Spain

Rubén RUPÉREZ
Program Manager

BSc: Industrial Technology Engineering - University Carlos III of Madrid. Madrid, Spain
MSc: Industrial Engineering - University Carlos III of Madrid. Madrid, Spain

Anthony SÁNCHEZ
Research Engineer

BSc: Electrical Engineer Universidad de los Andes Mérida - Venezuela
Research: Software Defined Radio (SDR); millimeter wave; Integrated Sensing and Communication (ISAC); MIMO and beamforming.



internship students

IMDEA Networks offers a Research Internship program. Eligible candidates are students who are currently undertaking a B.Sc., M.Sc. or equivalent in Computer Science, Electrical Engineering, Computer Engineering, Telecommunications, Telematics or a related field, and who wish to enhance their research potential developing the Science of Networks. Interns work closely with members of our research team, which allows them to acquire on-the-job training and gain valuable experience in computer networking science and technology.

The minimum expected internship duration is usually 3 months, but longer stays are accommodated depending on individual circumstances. Successful interns also receive a special consideration for future positions on our PhD Student team.

We also have a program in place for Visiting PhD Students from partner universities or research organizations to undertake an internship at IMDEA Networks under the direction of one of our faculty members. This program enables them to develop new skills and gain expertise in an enriching new environment.

Julio ÁLVAREZ
University of origin: Universidad de Alcalá. Madrid. Spain

Salvatore CORALLO
University of origin: University of Palermo (Italy)

Lubin DU CHEN
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Carlota GALOCHA
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Genoveva GARCÍA
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Sergio GARCÍA
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Alfonso GARCÍA
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Vincenzo GENTILE
University of origin: University of Palermo (Italy)

Amalia GÓMEZ
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Natalie MOLINA
University of origin: HE BRIDGE | Digital Talent Accelerator (Madrid, Spain)

Bryan PEÑA
University of origin: Spain Business School (Madrid, Spain)

Marcos PÉREZ
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Isabella QUINTERO
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Iker ROSALES
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Marta SIERRA
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Juan Carlos VILLEN
University of origin: Universidad Carlos III de Madrid (Madrid, Spain)

Mina AGHAEI DINANI
University of origin: Institute of Informatics, University of applied Science and Arts of Western Switzerland (HES-SO Valais - Wallis)

Daniel Alejandro AMARO
University of origin: Universidad de La Habana (Cuba)

Daniele BACCEGA
University of origin: Universita di Torino (Italy)

Zaman BHALLI
University of origin: Università degli Studi di Padova (Italy)

Antonio BOIANO
University of origin: Politecnico Milano (Italy)

Xingda CHEN
University of origin: University of Massachusetts (USA)

Yunfei CHEN
University of origin: Durham University (United Kingdom)

Paulis DAUBARIS
University of origin: University of Helsinki (Finland)

John GITAHI
University of origin: University of North Texas (USA)

Amisha GUPTA
University of origin: University of North Texas (USA)

Raúl HERNÁNDEZ
University of origin: IES El Cañaveral (Madrid, Spain)

Florian HOLZBAUER
University of origin: Univesrity of Vienna (Austria)

Benjamin JAUREGUI
University of origin: Universidad de Chile (Chile)

Anirudh KAMATH
University of origin: University of Utah (USA)

AmirMahdi KOUSHESHI
University of origin: Sharif University of Technology (Iran)

Weihe LI
University of origin: University of Edinburgh (United Kingdom)

Gabriele NUNZIATI
University of origin: University of Bologna (Italy)

Diego PIRES
University of origin: The University of Cagliari (Italy)

Javier REDONDO
University of origin: University of Turin (Italy)

Alessandro SANNA
University of origin: The University of Cagliari (Italy)

administrative unit

Ramón GIRONA
General Manager

Qualifications: BSc: Computer Science. Universidad de las Palmas de Gran Canaria (ULPGC). Canary Islands. Spain; Industrial Engineering. Universidad Politécnica de Canarias (UPC). Canary Islands. Spain; MBA: Instituto Universitario de Empresa. Madrid. Spain

Marta DORADO
Operations & Communications Manager

Qualifications: BSc: Dual Bachelor's degree in Journalism and Audiovisual Communication - University Carlos III of Madrid (UC3M). Madrid, Spain. MSc: Journalism and Digital Communication ABC - Complutense University of Madrid (UCM). Madrid, Spain

Brian DUNNE
Senior Human Resources Manager

Qualifications: BBS in Business Studies and French - Trinity College Dublin. Ireland

Ana GONZÁLEZ
Senior Projects & Funding Manager

Qualifications: BA (Hons) "Modern European Studies". University of West London. UK; Postgraduate Diploma in "European Studies". University of West London. UK

Pilar SÁEZ
HR Administration Manager

Qualifications: Labour Relations. Complutense University of Madrid. Madrid. Spain; Postgraduate Diploma in "Executive Compensation and Benefits". Centro de Estudios Garrigues. Madrid. Spain

alumni network

The Institute's Alumni Network is built upon graduate PhD Students who have obtained their Ph.D. and have left the team to further their research career in other organizations. Networking is about making contacts and building relationships. The alumni frame provides its members a supportive community of graduates who have shared experiences, values and goals that will last a lifetime. It also provides a venue through which former PhD Students can maintain a long-term collaborative relationship with the Institute. Alumni are IMDEA Networks Institute's ambassadors worldwide, creating awareness and opening up new communication channels with the global scientific community.

The members of the alumni network appear listed here following the most recent graduation date up to the end of 2024.

Dr. Aristide Tanyi Jong AKEM

Current Position: Postdoctoral Researcher at the University of Oxford, United Kingdom
Ph.D. Date: 27 September 2024

Dr. André Felipe ZANELLA

Current Position: Researcher at Telefónica. Barcelona. Spain
Ph.D. Date: 25 September 2024

Dr. Alan COLLET

Current Position: Postdoctoral fellow at CEA Paris Saclay, France
Ph.D. Date: 19 September 2024

Dr. Francesco SPINELLI

Current Position: Researcher. I2CAT. Spain
Ph.D. Date: 28 June 2024

Dr. Dayrene FRÓMETA

Current Position: Post-Doc Researcher. IMDEA Networks Institute. Madrid. Spain
Ph.D. Date: 28 June 2024

Dr. Alessio SCALINGI

Current Position: Post-Doc Researcher. University Carlos III of Madrid. Madrid. Spain
Ph.D. Date: 18 June 2024

Dr. Nina GROSHEVA

Current Position: Post-Doc Researcher. IMDEA Networks Institute. Madrid. Spain
Ph.D. Date: 5 March 2024

Dr. Santiago ANDRÉS

Current Position: Assistant Professor at Universidad Politécnica de Madrid, Spain
Ph.D. Date: 10 May 2023

Dr. Pelayo VALLINA

Current Position: Senior Data Privacy Specialist. MAPFRE. Madrid. Spain
Ph.D. Date: 17 January 2023

Dr. Oluwasegun OJO

Current Position: Postdoctoral Research Fellow. UC3M-Santander Big Data Institute (IBIDAT), UC3M. Madrid
Ph.D. Date: 30 November 2022

Dr. Álvaro FEAL

Current Position: Internet Measurements Researcher, Cisco Systems, USA
Ph.D. Date: 29 November 2022

Dr. Dolores GARCIA MARTI

Current Position: Senior Fellow at CERN. Geneva, Switzerland
Ph.D. Date: 28 September 2022

Dr. Julien GAMBA

Current Position: Data scientist. Cisco Systems. Madrid, Spain
Ph.D. Date: 15 September 2022

Dr. Mohamed Lamine MOULAY

Current Position: Technical Product Owner. Signicat. Madrid, Spain
Ph.D. Date: 20 July 2022

Dr. Víctor SÁNCHEZ AGÜERO

Current Position: UAS Engineer at GMV. Madrid. Spain
Ph.D. Date: 5 July 2022

Dr. Alejandro BLANCO

Current Position: RAN Innovator Engineer. Telefonica. Madrid, Spain
Ph.D. Date: 19 May 2022

Dr. Constantine AYIMBA

Current Position: Post-Doc Researcher. University Carlos III of Madrid. Madrid, Spain
Ph.D. Date: 19 May 2022

Dr. Noelia PERÉZ PALMA

Current Position: Postdoctoral Research Assistant. Universidad de Murcia. Spain
Ph.D. Date: 3 February 2022

Dr. Pablo JIMÉNEZ MATEO

Current Position: DevOps Engineer. Exheus. Barcelona. Spain
Ph.D. Date: 17 December 2021

Dr. Luis F. CHIROQUE

Current Position: Data Scientist. TAPTAP Digital. Madrid, Spain
Ph.D. Date: 15 November 2021

Dr. Nuria MOLNER

Current Position: R&D engineer. iTEAM Research Institute of Universitat Politècnica de València. Valencia, Spain
Ph.D. Date: 30 September 2021

Dr. Elizaveta DUBROVINSKAYA

Current Position: Board Member. Teleone OÜ. Tallinn. Estonia.
Ph.D. Date: 9 June 2021

Dr. Vitalii DEMIANIUK

Current Position: Post-Doc Researcher. Ariel University. Israel
Ph.D. Date: 24 February 2021

Dr. Joan PALACIOS

Current Position: Antenna Research Engineer. Pivotal Commware. Kirkland, Washington, USA
Ph.D. Date: 23 October 2020

Dr. Patricia CALLEJO

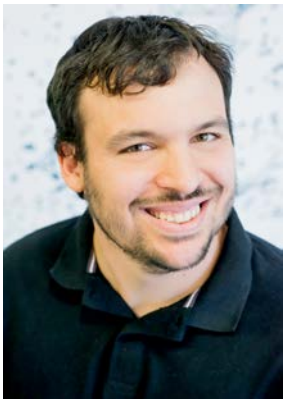
Current Position: Visiting Professor. University Carlos III of Madrid. Madrid. Spain
Ph.D. Date: 8 September 2020

Dr. Edgar ARRIBAS

Current Position: Profesor Doctor. Department of Mathematics and Data Science - CEU San Pablo University. Madrid. Spain
Ph.D. Date: 29 July 2020

Dr. Maurizio REA

Current Position: Project Manager at ICT consulting, Italy
Ph.D. Date: 12 June 2020



Dr. Ander GALISTEO

Current Position: Senior Firmware Engineer. Dojo Five: The Embedded Experts. St. Paul, Minnesota. USA
Ph.D. Date: 3 June 2020

Dr. Dario BEGA

Current Position: Network System Automation Researcher. Nokia Bell Labs Core Research. Munich. Germany
Ph.D. Date: 17 April 2020

Dr. Yonas Mitike KASSA

Current Position: Research Scientist. Eurecat. Spain
Ph.D. Date: 14 February 2020

Dr. Pavel CHUPRIKOV

Current Position: Post-Doc Researcher. Universita della Svizzera Italiana. Lugano. Switzerland
Ph.D. Date: 14 November 2019

Dr. Carlos DONATO

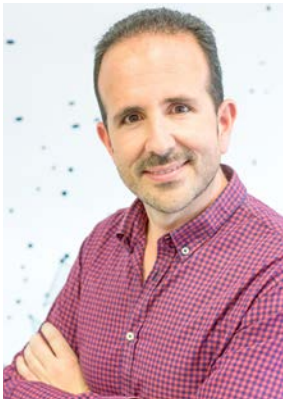
Current Position: Project Manager. Zhilabs. A Samsung Company. Madrid. Spain
Ph.D. Date: 7 November 2019

Dr. Guillermo BIELSA

Current Position: Aerial Communications Engineer, Indra Sistemas, Madrid, Spain
Ph.D. Date: 26 July 2019

Dr. Hany ASSASA

Current Position: Senior System Engineer. Pharrowtech. Leuven. Belgium
Ph.D. Date: 23 July 2019



Dr. Roberto CALVO-PALOMINO

Current Position: Associate Professor. Department of Signal Theory and Communications, Telematics and Computing. Universidad Rey Juan Carlos. Madrid. Spain
Ph.D. Date: 10 July 2019

Dr. Foivos MICHELINAKIS

Current Position: Research Scientist. Simula Metropolitan Center for Digital Engineering (SimulaMet). Oslo. Norway
Ph.D. Date: 19 September 2018

Dr. Aymen FAKHREDDINE

Current Position: Principal Investigator, University of Klagenfurt, Austria & Senior researcher, TII, UAE
Ph.D. Date: 14 June 2018

Dr. Roderick FANOU

Current Position: Systems Engineer. Cloudflare, Inc. Austin, Texas, USA
Ph.D. Date: 14 December 2017

Dr. Christian VITALE

Current Position: Research Associate. KIOS Research and Innovation Centre of Excellence (KIOS CoE). Nicosia. Cyprus
Ph.D. Date: 9 June 2017

Dr. José A. RUIPÉREZ-VALIENTE

Current Position: Associate Professor. Department of Information and Communications Engineering. Universidad de Murcia. Murcia. Spain
Ph.D. Date: 31 May 2017

Dr. Evgenia CHRISTOFOROU

Current Position: Research Associate (Fairness and Ethics in AI - Human Interaction Group) at the CYENS-Centre of Excellence, Nicosia, Cyprus
Ph.D. Date: 25 May 2017

Dr. Nicola BUI

Current Position: Senior Research Engineer. Bastille. Boston. Massachusetts. USA
Ph.D. Date: 12 May 2017

Dr. Angelos CHATZIPAPAS

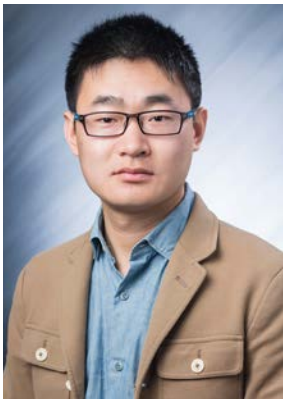
Current Position: Engineering Lead. Lloyds Banking Group. London. United Kingdom
Ph.D. Date: 25 November 2016

Dr. Elli ZAVOU

Current Position: Service Delivery Manager and Data Governance Expert. StratioBD. Madrid. Spain
Ph.D. Date: 30 September 2016

Dr. Syed Anwar UL HASAN

Current Position: Postdoctoral Researcher. ETH Zurich. Switzerland
Ph.D. Date: 20 June 2016



Dr. Qing WANG

Current Position: Assistant Professor. Delft University of Technology - TU Delft. Delft. The Netherlands
Ph.D. Date: 19 May 2016

Dr. Juan Camilo CARDONA

Current Position: Senior Software Engineer. NTT GIN
Ph.D. Date: 6 May 2016

Dr. Pablo SALVADOR

Current Position: Agile Delivery Leader. Paradigma Digital. Madrid. Spain
Ph.D. Date: 8 April 2016

Dr. Gek Hong SIM

Current Position: Post-doc Researcher. TU Darmstadt. Germany
Ph.D. Date: 30 March 2016

Dr. M. Isabel SANCHEZ

Current Position: Postdoctoral Fellow. Simula Research Laboratory. Oslo. Norway
Ph.D. Date: 8 March 2016

Dr. Arash ASADI

Current Position: Assistant Professor at TU Delft. NetherlandsPh.D. Date: 8 March 2016

Dr. Vincenzo SCIANCALEPORE

Current Position: Principal Research Scientist. NEC Laboratories Europe. Heidelberg. Germany
Ph.D. Date: 27 November 2015

Dr. Thomas NITSCHE

Current Position: Wissenschaftlicher Mitarbeiter/Research Fellow. Fraunhofer Institute for Embedded Systems and Communication Technologies ESK. Munich. Germany
Ph.D. Date: 25 September 2015

Dr. Ignacio CASTRO

Current Position: Lecturer. Queen Mary University of London. UK
Ph.D. Date: 20 July 2015

Dr. Fabio GIUST

Current Position: Security Product Manager. Hewlett Packard Enterprise. Vicenza, Italy
Ph.D. Date: 5 March 2015

Dr. Jordi ARJONA AROCA

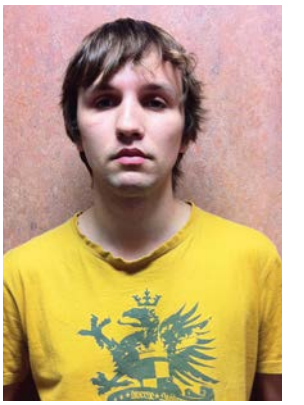
Current Position: Research line coordinator. Instituto Tecnológico de Informática (ITI). Valencia. Spain
Ph.D. Date: 13 February 2015

Dr. Andra LUTU

Current Position: Senior Researcher. Telefonica Research and Development. Madrid. Spain
Ph.D. Date: 11 November 2014

Dr. Agustín SANTOS

Current Position: Deputy Assistant Director. Ministry of Finance, Spanish Public Administration. Madrid. Spain
Ph.D. Date: 3 June 2013



Dr. Michal KRYCZKA

Current Position: Manager. Accenture. Warsaw. Poland
Ph.D. Date: 7 February 2013

Dr. Marco GRAMAGLIA

Current Position: Visiting Professor. Universidad Carlos III de Madrid. Madrid. Spain
Ph.D. Date: 26 September 2012

Dr. Alex BIKFALVI

Current Position: Software Engineer. Adevinta. Barcelona. Spain
Ph.D. Date: 18 July 2012

Dr. Paul PATRAS

Current Position: Reader and Chancellor's Fellow. School of Informatics. University of Edinburgh. United Kingdom
Ph.D. Date: 18 March 2011

research team structure

network design&intelligence

Research Professors
- Dr. Arturo Azcorra
- Dr. Albert Banchs
- Dr. Antonio Fernández Anta
- Dr. Marco Fiore
- Dr. Claudio Fiandrino
- Dr. Sergey Gorinksy
- Dr. Jaya Prakash Varma Champati

Senior Researchers
- Dr. Jose Aguilar

Pre-Doc & Post-Doc Researchers
- Dr. Antonio Bazco-Nogueras
- Dr. Adarsh Prasad Behera
- Dr. Livia Elena Chatzieleftheriou
- Dr. Nadezda Chukhno
- Dr. Michele Gucciardo
- Dr. Blas Kolic
- Dr. Diego Madariaga
- Sergi Alcalá-Marín
- Aristide Tanyi Jong Akem
- Nikolaos Apostolakis
- Iñaki Bravo
- Beyza Bütün
- David de Andrés
- Ángela Díaz-Bricio
- Sergio Díaz Aranda
- Abhishek Duttagupta
- Andrea Fresa
- Arivarasan Karmegam
- Blanca López
- Leonardo Lo Schiavo
- Orlando E. Martínez-Durive
- Amir Mehrjoo
- Sachit Mishra
- Reza Namvar
- Leonardo Peroni
- Máximo Pirri
- Vittorio Prodomo
- Antonio Russo
- Islomjon Shukhratov
- Lucía Uguina
- Junlang Wang

wireless communication&sensing

Research Professors
- Dr. Joerg Widmer
- Dr. Domenico Giustiniano
- Dr. Marco Ajmone-Marsan
- Dr. Vincenzo Mancuso
- Dr. Katia Obraczka

Senior Researchers
- Dr. Jesús Omar Lacruz

Pre-Doc & Post-Doc Researchers
- Dr. Andrea Bedin
- Dr. Marco Canil
- Dr. Edson Dos Santos
- Dr. Dayrene Frómeta
- Dr. Nina Grosheva
- Dr. Farzam Nosrati
- Dr. Juan Marcos Ramirez
- Dr. Timothy Otim
- Dr. Giuseppe Santaromita
- Dr. Syed Waqas Haider Shah
- Ghina Al Atat
- Sai Pavan Deram
- Stavros Eleftherakis
- Rita Ingabire
- Yago Lizarribar
- Sachit Mishra
- Serly Moghadas Golian
- Bei Ouyang
- Francesco Pigato
- Rafael Ruiz
- Pablo Saucedo de Miguel
- Salil Sharma
- Javier Talavante

network measurements, cybersecurity&privacy

Research Professors
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- Dr. Nikolaos Laoutaris
- Dr. Guillermo Suárez-Tangil
- Dr. Narseo Vallina-Rodríguez

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- Vahid Ghafouri
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- Alexandr Goultiaev Tolstokorov
- Behafarid Hemmatpour
- Devriş Işler
- Aninda Lahiri
- Naicheng Li
- Louis Miermont
- Mariella Mischinger
- Alfonso Rodríguez
- Nipuna Weerasekara

our current team

Comunidad de Madrid

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