

2026 IEEE
INTERNATIONAL SYMPOSIUM ON
MNC
Measurement in Networking and Communications
July 13-16, 2026 - Naples, Italy

2026 IEEE International Symposium on Measurement in Networking and Communications (MNC)

SYMPOSIUM PROGRAM

SPONSORS AND ORGANIZERS

IEEE INSTRUMENTATION & MEASUREMENT SOCIETY®

IEEE

Please visit our website for more information!

mnc2026.ieee-ims.org

Table of Contents

Welcome Message 3
Organizers 4
Symposium Sponsors 5
Keynote Speakers 7
Hands-on-Lab 10
Tutorials 11
Technical Program 13
Author Index 22

Welcome Message



On behalf of the Organizing Committee and the Steering Committee of the IEEE International Symposium on Measurements in Networking and Communications (MNC 2026), we are delighted to welcome you to Naples, one of the oldest and most vibrant cities in the Mediterranean.

With the 2026 edition, we proudly introduce a new name: the IEEE International Symposium on Measurements in Networking and Communications. This change reflects our commitment to a broader, integrated view of measurement science across both networking and communications. Building on the success of seven previous editions, MNC 2026 remains a leading forum for researchers, practitioners, and innovators from academia, industry, government, and standardization bodies.



Networks are crucial in today's digital age. They represent the backbone of many services, from connectivity and data sharing to remote access, remote work, and collaboration. In this framework, measurements are essential to networking, as they provide valuable insights into the performance, efficiency, and overall health of a network, and are indispensable for maintaining a reliable, secure, and high-performing infrastructure.

On the other hand, networking is fundamental to measurement: it enables the collection of data from network devices and endpoints, and it allows the monitoring and analysis of measurements in real time or over extended periods. With the growth of remote work and distributed systems, networking enables the remote collection of measurements from geographically dispersed locations. Networking and measurement also intersect in the realm of security: by monitoring traffic, analyzing logs, and measuring security metrics, organizations can detect and prevent incidents, ensuring the integrity and confidentiality of data.

Considering all these aspects, MNC 2026 represents a privileged forum for fostering discussion on the evolving and reciprocal role of measurements in networking and communications, embracing both emerging technologies and foundational research. The Symposium will feature keynote talks, technical and special sessions, tutorials, panels, and industry presentations, spanning measurement in networking, measurement in communications, networking for measurement, cybersecurity, standardization, and interoperability, as well as special focus topics on 6G and beyond, green networking, trustworthy AI, and new frontiers such as quantum networking and digital twins.

We are glad to report that the conference received a high number of paper submissions. We extend our gratitude to the authors for their unwavering commitment to meeting the rigorous standards required for publication in MNC. Accepted papers will appear in the Symposium Proceedings and will be submitted to IEEE Xplore®, and are eligible to be submitted after a technical extension to the MNC Special Section that will be published in IEEE Transactions on Instrumentation and Measurement and in the IEEE Open Journal of Instrumentation and Measurement.

The keynote program proposed at MNC 2026 is also outstanding, including Prof. Mauro Conti (University of Padua, Italy) on “Me, Myself and AI: Defensive, Offensive, and Adversarial AI”, Dr. Michele Ludovico (FiberCop, Italy) on “Exploiting Measurements in Network Digital Twins”, and Dr. Richard Candell (National Institute of Standards and Technology, USA) on “Metrology, Performance Assessment, and Sensing Frameworks for Next-Generation Industrial Networks”. We sincerely thank our distinguished speakers for their invaluable contributions to the Symposium. Their expertise, dedication, and willingness to share their knowledge greatly enrich the conference, fostering insightful discussions and inspiring new ideas that advance the fields of instrumentation, measurement, networking, and communications.

We extend our sincere gratitude to our technical sponsors, IEEE and the IEEE Instrumentation and Measurement Society, and to our platinum patron NHM; gold patrons: GAM Engineering, Iliad Italia SpA, Keysight, Microrad, SPICI, Rohde & Schwarz, SIAconsulting, Tecnosoft; silver patrons: Namex, Teledyne LeCroy, VIAVI; bronze patrons: Dewesoft, DIETI, Distek, SMS Engineering; and exhibitor Selint.

MNC 2026 also has a very exciting and interesting social event program. On Monday evening, a reception will be organized at the *Darwin-Dohrn Museum* on the Naples seafront to welcome all attendees; on Tuesday evening, we will visit the *Bourbon Tunnel* and walk through the last 500 years of Naples’ history. The Gala Dinner will take place on Wednesday evening at *Le Arcate* restaurant, in one of the most suggestive and central locations of the city of Naples.

This symposium would not have been possible without the generous and voluntary contributions of the Organizing Committee, often during unconventional hours. We warmly thank all the members of the Committee for their invaluable support.

Finally, and most importantly, we recognize the immense effort of the Technical Program Chairs, Gianni Cerro (University of Molise, Italy), Shervin Shirmohammadi (University of Ottawa, Canada), and Federico Tramarin (University of Padua, Italy).

We look forward to your participation, where you will have the chance to reconnect with colleagues, stay abreast of the latest developments in your field, and establish new connections that may lead to valuable collaborations. We are confident that you will have an enjoyable experience in Naples and that the symposium will be a memorable and rewarding opportunity for you.

Sincerely,
IEEE MNC 2026 General Co-Chairs

Gianfranco Miele
University of Cassino and Southern Lazio, Italy

Nicola Pasquino
University of Naples Federico II, Italy

MNC 2026 Organizers

GENERAL CHAIRS
Gianfranco Miele, University of Cassino and Southern Lazio, Italy
Nicola Pasquino, University of Naples Federico II, Italy

TECHNICAL PROGRAM CHAIRS
Gianni Cerro, University of Molise, Italy
Shervin Shirmohammadi, University of Ottawa, Canada
Federico Tramarin, University of Padova, Italy

SPECIAL SESSION CHAIRS
Marco Carratù, University of Salerno, Italy
Marco Di Felice, University of Bologna, Italy
Nikola Djuric, University of Novi Sad, Serbia
Stefania Zinno, University of Naples Federico II, Italy

TUTORIAL CHAIRS
Alberto Morato, Research Council of Italy, Italy
Vincenzo Paciello, University of Salerno, Italy
Emiliano Sisinni, University of Brescia, Italy

PUBLICITY CHAIRS
Bruno Andò, University of Catania, Italy
Pere Barlet-Ros, Universitat Politècnica de Catalunya, Spain
Nunzio Cennamo, University of Campania "Luigi Vanvitelli", Italy
Huang-Chen Lee, National Chung-Cheng University, Taiwan
Darko Suka, University of East Sarajevo, Bosnia and Herzegovina

LOCAL ARRANGEMENTS COMMITTEE
Ludovica Cerullo, University of Naples Federico II, Italy
Marika Cirocco, University of Naples Federico II, Italy
Osvaldo Danisi, University of Naples Federico II, Italy
Matteo D'Iorio, University of Naples Federico II, Italy
Alessandro Minella, University of Naples Federico II, Italy
Assia Solmonte, University of Naples Federico II, Italy
Nunzia Solmonte, University of Naples Federico II, Italy
Matthia Noe' Vitale, University of Naples Federico II, Italy

Symposium Sponsors

This Symposium is promoted by TC-37 of IMS

Symposium Sponsors

IEEE INSTRUMENTATION & MEASUREMENT SOCIETY®

IEEE

Platinum Patron

NHM

Gold Patron

SIA consulting

MICRORAD
Percipere Aestimare et Inquirere

iliad

ROHDE&SCHWARZ
Make ideas real

KEYSIGHT

Spicy
Società per l'Innovazione la Cooperazione e l'Internazionalizzazione

GAM ENGINEERING

Tecnosoft

Silver Patrons

TELEDYNE LECROY

VIAVI

NAMEX
ROMA INTERNET EXCHANGE POINT

Bronze Patrons

SMS engineering

DIETI. UNIVERSITA' DEGLI STUDI DI NAPOLI FEDERICO II
DIPARTIMENTO DI INGEGNERIA ELETTRICA E DELLE TECNOLOGIE DELL'INFORMAZIONE

DEWESoft® measurement innovation

Distek

Exhibitor

Selint

Local Support

COMITATO ELETTROTECNICO ITALIANO

UNCEM

5G Academy
NOKIA TIM

AFCEA
AFCEA NAPLES CHAPTER

ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

ARPAC
Agenzia Regionale Protezione Ambientale CAMPANIA

dE

associazione italiana gme gruppo misure elettriche ed elettroniche

INGEGNERI ORDINE NAPOLI

CONSIGLIO NAZIONALE DEGLI INGEGNERI

C3i
COMITATO ITALIANO INGEGNERIA INFORMAZIONE

Keynote Speakers



Tuesday, July 14th | 11:00 - 11:45
Me, Myself and AI: Defensive, Offensive, and Adversarial AI
Mauro Conti, *University of Padua, Italy*

Abstract: Artificial Intelligence (AI) has fundamentally transformed Information and Communication Technologies, managing and having even indirect access to an increasing amount of our confidential data, while introducing a paradigm shift in Cybersecurity. AI is no longer just a tool to enhance defense mechanisms; it has become a dual-use technology that defines both the shield and the sword, requiring a deep understanding of how AI can protect systems, how adversaries weaponize it, and, last but not least… how AI solutions themselves can be exploited.

In this talk, we take a journey through representative research results the SPRIZ group published in the domains of Defensive, Offensive and Adversarial AI, spanning from DIMVA 2014 up to more recent breakthroughs in USENIX Security 2022, ACM CCS 2023 and WWW 2024. In particular, we address Defensive AI in domains such as sensor-enhanced keystroke authentication, and malicious traffic identification in IoT. We explore Offensive AI by analyzing how adversaries exploit gaming data, network traffic, acoustic VoIP eavesdropping, and battery status to infer sensitive information like ATM PINs, or how user attributes can be mined from public Spotify playlists. Finally, we investigate the Security of AI systems and Adversarial AI, demonstrating how text-based MLaaS and hate speech detection fall against evasion attacks, and how hidden prompt-injections can mislead Large Language Models used in scientific peer-reviewing.

Biography: Mauro Conti is Full Professor at the University of Padua, Italy. He is also affiliated with University of Washington, Seattle, and is a Wallenberg WASP Guest Professor at Örebro University, Sweden. He obtained his Ph.D. from Sapienza University of Rome, Italy, in 2009.

After his Ph.D., he was a Post-Doc Researcher at Vrije Universiteit Amsterdam, The Netherlands. In 2011 he joined as Assistant Professor at the University of Padua, where he became Associate Professor in 2015, and Full Professor in 2018. He has been Visiting Researcher at GMU, UCLA, UCI, TU Darmstadt, UF, FIU, and Affiliate Professor at TU Delft.

He has been awarded with a Marie Curie Fellowship (2012) by the European Commission, with a Fellowship by the German DAAD (2013), and with a WASP Fellowship by the Knut and Alice Wallenberg Foundation (2025). His research is also funded by companies, including Cisco, Intel, and Huawei. His main research interest is in the area of Security and Privacy. In this area, he published more than 600 papers in topmost international peer-reviewed journals and conferences. He is area Editor-in-Chief for IEEE Communications Surveys & Tutorials, and has been Editor-in-Chief for IEEE Transactions on Information Forensics and Security (2022-24) and Associate Editor for several journals, including IEEE Communications Surveys & Tutorials, IEEE Transactions on Dependable and Secure Computing, IEEE Transactions on Information Forensics and Security, and IEEE Transactions on Network and Service Management. He was Program Chair for TRUST 2015, ICISS 2016, WiSec 2017, ACNS 2020, CANS 2021, CSS 2021, WiMob 2023 and ESORICS 2023, ICICS 2026 and General Chair for SecureComm 2012, SACMAT 2013, NSS 2021, ACNS 2022, RAID 2024, NDSS 2026 and 2027. He is Fellow of the IEEE, Fellow of the AAIA, Distinguished Member of the ACM, and Fellow of the Young Academy of Europe. In 2022, he was named Knight of the Order of Merit of the Italian Republic, by the President of the Republic.



Wednesday, July 15th | 11:00 - 11:45
Exploiting Measurements in Network Digital Twins
Michele Ludovico, *FiberCop*

Abstract: Digital Twins are increasingly recognized as a key paradigm for modeling, monitoring, and optimizing complex systems, including communication networks. Their relevance is further amplified by the growing adoption of artificial intelligence, which enables advanced data-driven insights and automation. The keynote will analyze the role of Digital Twins in network operators' operations. The crucial role of measurements in ensuring accurate and reliable digital representations will also be discussed. Finally, a set of representative use cases is presented to illustrate how measurement data can support analysis, prediction, and decision-making in this context.

Biography: Michele Ludovico holds a degree in Electronic Engineering from the University of Pisa. He began his career within the Telecom Italia Group, where he initially worked on the design of microwave systems for satellite communications.

Since 2001, he has been involved in the development of tools and methodologies for the design and optimization of radio access networks. Since 2024, he has been working at FiberCop, where he is currently responsible for Innovation Programs, overseeing digital innovation initiatives, standardization activities, collaborations with universities and research institutions, and intellectual property management. He has also conducted training and consulting activities both in Italy and abroad and is a co-inventor of several patents in the field of wireless design and radio resource management.



Wednesday, July 15th | 17:00 - 17:45

Metrology, Performance Assessment, and Sensing Frameworks for Next-Generation Industrial Networks

Richard Candell, *U.S. National Institute of Standards and Technology (NIST)*

Abstract: The transition toward highly automated industrial environments requires rigorous measurement frameworks to validate the performance of coexisting wired and wireless communication systems. As industrial operations increasingly rely on deterministic and ultra-reliable connectivity, establishing precise metrology is critical to ensuring safety, interoperability, and operational resilience.

This presentation reviews recent research and standardization efforts led by NIST to characterize, evaluate, and model advanced networking technologies for factory automation. The discussion begins with verification methodologies for Time-Sensitive Networking (TSN) applied to industrial mobile robotics. This work focuses on evaluating key performance indicators (KPIs) such as bounded latency, jitter, and packet delivery reliability within hardware-in-the-loop robotic control systems. Moving to wireless domains, insights from the NIST Industrial Private 5G Testbed will be presented, detailing empirical performance evaluations of 5G low-latency communications. This research characterizes wireless link behavior, protocol resilience, and signal propagation within complex, highly reflective industrial radio environments. Central to validating these wireless networks is the newly published IEEE 3388-2025 standard (Standard for the Performance Assessment of Industrial Wireless Systems), for which Dr. Candell serves as the working group chair. The presentation will outline the standard's reference test architecture and its functional model for radio frequency impairments, known as "aggressors" (such as multipath propagation and radio frequency interference). This framework allows for repeatable performance testing and objective system evaluation before factory deployment. Finally, the address will explore emerging NIST capabilities for Integrated Sensing and Communication (ISAC) in industrial applications. ISAC focuses on the dual use of radio frequency waveforms for concurrent data transmission and spatial sensing to improve factory floor localization, obstacle detection, and situational awareness.

Biography: Dr. Richard Candell is a Principal Investigator at the National Institute of Standards and Technology (NIST), where he leads the Industrial Wireless Systems research laboratory. With over 25 years of experience in the research, design, and evaluation of advanced wireless systems, his current work focuses on the intersection of Integrated Sensing and Communications (ISAC), industrial wireless performance testing, and wireless time-sensitive networking (WTSN). His research directly supports robotics, smart manufacturing, and mission-critical systems where wireless is the primary mode of communication. An IEEE Senior Member, Dr. Candell holds key leadership roles as the Chair of the IEEE P3388 Wireless Performance Assessment and Measurement Working Group and the NIST Industrial Wireless Systems Technical Interest Group. He holds multiple patents in spread-spectrum communications and earned his Ph.D. in Computer Science from the University of Burgundy, France.

Hands-on-Lab

Development of Intelligent Sensors with Embedded AI and IEEE 1451 Interoperability
Instructors:
António Espírito-Santo, *University of Beira Interior, Portugal*
Helbert da Rocha, *University of Beira Interior, Portugal*

Abstract: The growing integration of artificial intelligence (AI) into measurement devices has accelerated the development of intelligent sensors capable of performing complex tasks directly at the system edge. These devices often operate under strict constraints, such as limited computational capacity, reduced memory availability, and demanding energy requirements, which makes designing efficient solutions a significant technical challenge.

Beyond local processing capabilities, interoperability has become a critical factor for the adoption of intelligent sensors in industrial, laboratory, and research environments. The use of standardized infrastructures, such as those provided by the IEEE 1451 family of standards, enables heterogeneous sensors to communicate uniformly, supporting advanced semantic interoperability through ontologies and data dictionaries.

This Hands-on Lab is structured into two complementary phases. In the first phase, participants will develop an intelligent sensor capable of executing AI models locally, exploring optimization techniques suitable for resource-constrained devices. In the second phase, the sensor will be integrated into an IEEE 1451 infrastructure, demonstrating how standardization enables semantic interoperability and integration into larger systems.

The ultimate goal is to provide a complete, practical experience: from building an intelligent sensor to integrating it into an interoperable, semantically enriched ecosystem.

Technical Issues Addressed and Their Significance:

This tutorial addresses emerging challenges at the intersection of embedded artificial intelligence, intelligent sensing, and standardized interoperability. As artificial intelligence (AI) increasingly migrates from the cloud to the edge, sensors are expected not only to acquire data but also to process, interpret, and communicate it autonomously. Achieving this shift requires addressing several technical constraints that remain central to current research and industrial deployment.

A first challenge concerns the execution of AI models on devices with severe resource limitations. Intelligent sensors typically operate with reduced computational power, limited memory, and strict energy budgets. Designing and deploying machine-learning models that remain functional under these constraints demands specialized optimization techniques, lightweight architectures, and careful hardware/software co-design. These issues are particularly relevant today, as edge-AI adoption accelerates across domains such as industrial monitoring, environmental sensing, and smart infrastructures.

A second challenge relates to interoperability. As sensing systems grow in scale and heterogeneity, the ability of devices to integrate seamlessly into larger infrastructures becomes essential. The IEEE 1451 family of standards provides a structured framework for metadata representation, communication, and enabling device self-description. However, effectively leveraging this framework, especially when integrating AI-enabled sensors, requires a clear understanding of Transducer Electronics Data Sheet (TEDS) structures, communication models, and semantic extensions. The tutorial addresses how standardized metadata, ontologies, and dictionaries can support semantic interoperability, enabling systems to interpret sensor data consistently and automatically.

The timeliness of this tutorial stems from the convergence of three trends: the rapid expansion of edge AI, the growing demand for interoperable sensing ecosystems, and the increasing relevance of IEEE 1451 in both academic and industrial contexts. By guiding participants through the development of an AI-enabled sensor and its integration into a standardized infrastructure, the tutorial provides practical insights into technologies that are becoming foundational for next-generation cyber-physical systems.

20 Min- Opening and Technical Foundations

- Introduction of the goals and expected outcomes of the lab, and present the technical challenges
- Provide a high-level overview of the IEEE 1451 architecture (TEDS, NCAP, STIM)
- Hands-on Preparation

80 Min- Developing an Intelligent Sensor with Local AI

- Characteristics of resource-constrained devices
- Lightweight AI models suitable for embedded execution
- Optimization techniques
- Deployment workflow for embedded inference
- Hands-on Activities
- Load and inspect a pre-trained lightweight model
- Apply optimization techniques to reduce size and computational load
- Deploy the optimized model to the sensor hardware
- Run inference locally and evaluate performance (latency, memory usage, energy impact)

80 Min- IEEE 1451 Integration and Semantic Interoperability

- IEEE 1451 architecture in practice
- TEDS (Transducer Electronic Data Sheets) and their role
- Metadata standardization
- Semantic interoperability using ontologies and dictionaries
- How standardized descriptions enable machine interpretable sensor data
- Hands on Activities
- Create and configure TEDS for the intelligent sensor
- Connect the sensor to an IEEE 1451 Network Capable Application Processor (NCAP) Publish sensor data and metadata in a standardized format
- Use semantic tools (ontologies, dictionaries) to interpret the sensor's capabilities and outputs
- Demonstrate how semantic queries can automatically understand the sensor's meaning and context

Tutorials

Network-Aware Distributed Learning for Smart Mobility: Federation, Peer-to-Peer and Beyond
Joannes Sam Mertens J, *DIEEI, University of Catania, Italy*

Abstract: The rapid evolution of intelligent transportation systems is driving a paradigm shift toward data-driven, cooperative and autonomous mobility where vehicles and infrastructure continuously learn from distributed data sources. In this context, distributed machine learning has emerged as a key enabler for smart and safe mobility, allowing learning to take place directly within vehicular networks while addressing stringent constraints on latency, bandwidth, scalability and privacy.

This tutorial provides a comprehensive overview of efficient distributed learning paradigms tailored to vehicular environments, with a particular focus on communication-aware and context-aware learning protocols. Specifically, the tutorial introduces state of-the-art distributed learning approaches for vehicular networks, including vehicle-to-vehicle (V2V) gossip-based learning and vehicle-to infrastructure (V2I) federated learning schemes. It discusses how communication efficiency can be improved through selective and partial model exchange, such as layer-wise sharing strategies and neural network partitioning that separates vehicle specific user behaviour from road- and environment-specific patterns. The tutorial further explores how wireless channel conditions, model similarity among neighbouring nodes and network dynamics can be jointly exploited to enable adaptive gossiping strategies for model dissemination.

Practical applications are illustrated through representative vehicular models, including CNN autoencoders for driving behaviour anomaly detection and safety-critical use cases. Overall, the tutorial equips researchers and students with the insights needed to design scalable, efficient and reliable distributed learning solutions for next-generation intelligent transportation systems and connected mobility scenarios.

Length of the tutorial: One-time slot (1h 30 min)

Description:
Road safety and intelligent transportation systems increasingly rely on artificial intelligence to support cooperative perception, driving behaviour analysis and safety-critical decision-making. These applications impose stringent requirements on vehicular networks in terms of latency, reliability, scalability and efficient use of wireless resources. As vehicles continuously generate large volumes of data, centralized cloud-based learning solutions become inefficient and impractical. Distributed learning paradigms such as federated learning, split learning, and gossip-based learning offer a promising alternative by enabling collaborative intelligence directly over V2V and V2I communication links while preserving data privacy and reducing backhaul load. However, vehicular networks are characterized by intermittent connectivity, rapidly varying channel conditions and limited spectrum availability, which make conventional full-model exchange strategies inefficient.

This tutorial addresses these challenges by presenting communication efficient and network-aware distributed learning protocols that explicitly account for wireless constraints and network dynamics. Gossip-based learning, partial model exchange and context-aware adaptation mechanisms are discussed as key enablers for scalable and robust distributed AI in vehicular environments, making the topic both highly relevant to current research and deployment trends. The tutorial also addresses how communication efficiency and node fairness can be systematically measured and improved based on contribution, and participation balance among vehicles.

Outline of the Tutorial Content:
- Introduction to Distributed AI for Vehicular Communications: Fundamentals of distributed, federated, split and gossip-based learning from a communication-centric perspective emphasizing latency bandwidth reliability and scalability.
- Model Gossiping vs. Federated Learning in Vehicular Networks: Comparative analysis of V2V gossip-based learning and V2I federated learning, highlighting trade-offs between convergence, communication cost, and robustness.
- Partial Model Exchanges: Communication-efficient strategies including layer-wise sharing, sparse updates and selective parameter dissemination.
- Neural Network Partitioning: Partitioning deep neural networks into vehicle-specific and environment-specific layers for cooperative training.
- Context-Aware Gossiping and Channel-Aware Learning: Integration of wireless context, channel state information, model accuracy and model similarity into adaptive gossiping strategies.
- Application-Oriented Case Studies for Smart and Safe Mobility: CNN autoencoder-based anomaly detection, driving behaviour profiling, vehicle speed forecasting and other safety-critical applications.
- Research Challenges and Emerging Directions: Open issues, dataset availability, learning-aware networking, and autonomous agentic learning mechanisms in vehicular systems.

Planned Format of the Tutorial:
The tutorial will primarily follow a lecture-based format, supported by visual illustrations of the protocols, and practical examples. Selected code snippets will be presented to demonstrate communication-efficient model exchange mechanisms.

Electromagnetic Field Measurements in the 5G Era (Part 1 & Part 2)
Sara Adda, *Agenzia Regionale per la Protezione Ambientale (ARPA) Piemonte, Italy*
Nicola Pasquino, *University of Naples Federico II, Italy*
Settimio Pavoncello, *Agenzia Regionale per la Protezione Ambientale (ARPA) Lazio, Italy*

Abstract: The recent deployment of 5G technology, the fifth generation of mobile communications, together with active massive MIMO (mMIMO) antennas, has significantly improved telecommunications network performance in terms of data rate, efficiency, and latency. These advances enable a wide range of low-latency services, such as autonomous driving and telemedicine.

They are expected to drive a technological revolution across multiple sectors in the near future.
5G and 4G TDD systems represent the first mobile communication technologies based on active mMIMO antennas, which allow service quality enhancement through adaptive and highly directive beamforming toward users, improving the signal-to-noise ratio and reducing error probability.
A critical side effect of this technological evolution concerns electromagnetic field (EMF) environmental measurements. Unlike previous generations, the strongest radiated power is associated with traffic channels rather than control channels, due to the use of highly directive beams. Consequently, traditional measurement approaches based on control channels may lead to significant underestimation of the maximum electric field levels.

This tutorial presents the state of the art of EMF environmental measurement methodologies for modern mobile communication systems employing active mMIMO antennas. The validity of the proposed approaches will be demonstrated through a live measurement session using state-of-the-art selective measurement instrumentation.

Length of the tutorial: Two-time slots (3 h)

A description of the technical issues that the tutorial will address, emphasizing its significance and timeliness:
The technical issues addressed in this tutorial include identifying appropriate reference signals and channels for EMF measurements, extrapolating measured values to maximum power conditions, and designing measurement procedures capable of capturing worst-case exposure scenarios through controlled traffic generation and beam activation.

The significance and timeliness of this tutorial stem from the rapid and widespread deployment of 5G networks and the increasing demand for accurate, reproducible, and standardized EMF measurement methodologies by regulatory authorities, network operators, and measurement professionals. Addressing these challenges is essential to ensure the protection of public health and the correct interpretation of exposure levels in modern mobile communication environments.

An outline of the tutorial content:
The tutorial is structured to provide both a solid conceptual background and practical insight into electromagnetic field (EMF) measurement techniques for modern mobile communication systems. Particular emphasis is placed on measurement challenges introduced by active massive MIMO (mMIMO) antennas and on the practical implementation of methodologies defined in the IEC 62232 technical standard. Participants will have the opportunity to observe and directly use state-of-the-art signal analysis instruments from leading manufacturers, gaining hands-on experience with selective measurement techniques applied to real mobile signals.

The tutorial content is organized as follows:

- Overview of EMF measurements in mobile communication systems
- Regulatory framework and reference methodologies defined by IEC 62232
- Signal analysis instrumentation for EMF measurements
- Measurement approaches for 4G and 5G systems using active mMIMO antennas
- Key differences and operational challenges compared to legacy systems
- Zero-span and vector measurement techniques for mobile signals
- Perspectives based on advanced signal analysis, including I/Q signal capture
- Live demonstration and practical measurement session
- Planned format of the tutorial: lecture and hands-on

Technical Program: Monday, July 13, 2026

Registration
Mon Jul 13, 11:00 · Conference Center Foyer

Light Lunch
Mon Jul 13, 13:00 · Lunch & Coffee Break Room

Opening Ceremony
Mon Jul 13, 14:00 · Aula Magna (Auditorium) 1st FL

ORAL SESSION 1: Special Session "Networking for Measurement: selective optical sensor systems combined with communication systems"
Mon Jul 13, 14:30 · Aula Magna (Auditorium) 1st FL
Chair(s): Francesco Arcadio (University of Campania Luigi Vanvitelli); Giuseppe Quero (Università del Molise); Rosalba Pitruzzella (University of Campania Luigi Vanvitelli)

Bio/Chemical Measurements via Plasmonic Phenomena in cup-shaped optical waveguides combined with receptors
Chiara Marzano (University of Campania Luigi Vanvitelli)

Towards multi-analyte biosensing measurements in optical fibers through Brillouin Optical Frequency Domain Analysis
Cosimo Trono (Istituto di Fisica Applicata Nello Carrara); Raffaele Vallifuoco (University of Campania Luigi Vanvitelli); Agnese Coscetta (University of Campania "Luigi Vanvitelli"); Sara Tombelli (Istituto di Fisica Applicata Nello Carrara); Luigi Zeni (University of Campania Luigi Vanvitelli); Nunzio Cennamo (University of Campania Luigi Vanvitelli); Aldo Minardo (Unicampania)

Flow Dynamics and Probe Positioning Effects in Microfluidic Optical Fiber Meta-Tip Biosensors
Patrizio Vaiano (University of Sannio); Sarassunta Ucci (University of Sannio); Gaia Berruti (University of Sannio); Angela Cusano (Centro Regionale Information Communication Technology); Sara Spaziani (University of Sannio); Francesco Di Menna (University of Sannio); Maria Principe (University of Sannio); Gustavo Marini (University of Sannio); Nicola Fontana (University of Sannio); Marco Consales (University of Sannio); Andrea Cusano (University of Sannio)

Low-cost equipment in biomedical measurement systems to detect substances of interest at ultra-low concentration levels
Rosalba Pitruzzella (University of Campania Luigi Vanvitelli); Francesco Arcadio (University of Campania Luigi Vanvitelli); Federica Passeggio (University of Campania Luigi Vanvitelli); Alessandro Filisetti (Elettronica S.p.A.); Pietro Bia (Elettronica Group); Antonio Manna (Elettronica SpA); Luca Pasquale Renzullo (University of Campania Luigi Vanvitelli); Laura Pasquardini (Indivenire Srl); Luigi Zeni (University of Campania Luigi Vanvitelli); Nunzio Cennamo (University of Campania Luigi Vanvitelli)

Technical Speech by Keysight Technologies
Mon Jul 13, 15:30 · Aula Magna (Auditorium) 1st FL

Enabling the 6G Vision: Data, AI, and Digital Twins
Filip Ivanovic (Keysight Technologies)

Technical Speech by NAMEX
Mon Jul 13, 15:45 · Aula Magna (Auditorium) 1st FL
Chair(s): Gianni Cerro (Università degli Studi del Molise - Dipartimento di Medicina e Scienze della Salute "V. Tiberio")

Peering market at a glance
Flavio Luciani (Namex)

Coffee Break
Mon Jul 13, 16:00 · Lunch & Coffee Break Room

Tutorial: Network-Aware Distributed Learning for Smart Mobility: Federation, Peer-to-Peer and Beyond
Mon Jul 13, 16:30 · Sala A (Room A) Ground FL
Speaker(s): Joannes Sam Mertens J (University of Catania)

Welcome Reception
Mon Jul 13, 18:30 · Museo Darwin-Dohrn (DaDoM)

Technical Program: Tuesday, July 14, 2026

Registration
Tue Jul 14, 8:30 · Conference Center Foyer

ORAL SESSION 2: Special Session "AI-Native and Data-Driven Management for Next-Generation Networks"
Tue Jul 14, 9:00 · Aula Magna (Auditorium) 1st FL
Chair(s): Stefania Zinno (University of Naples Federico II); Giovanni Stanco (University of Napoli Federico II)

Are We Shooting Flies with Cannons? Trade-off Analysis for AI-based 5G Intrusion Detection
Federica Uccello (Linköping University); Simin Nadjm-Tehrani (Linköping University)

Conditional Generative Network Performance Modeling with Uncertainty Estimation
Dimitrios Syrrafos (Universidad Politécnica de Cataluna); Albert Cabellos-Aparicio (Universitat Politècnica de Catalunya); Miquel Ferriol-Galmés (Universitat Politècnica de Catalunya); Pere Barlet-Ros (Universitat Politècnica de Catalunya)

Use-Case-Guided Text-to-SQL for Network Measurement via Natural Language Querying
Hussein Akbarzadeh (University of Ottawa); Dr. Shervin Shirmohammadi (University of Ottawa); Chris Barber (Ciena)

Investigating Machine Learning Training Strategies for 5G Latency Prediction Across Paths and Temporal Context
Stefania Zinno (University of Naples Federico II); Giovanni Stanco (University of Napoli Federico II); Giuseppe Caso (Karlstad University); Nicola Pasquino (University of Naples Federico II); Alessio Botta (University of Napoli Federico II); Anna Brunstrom (Karlstad University); Giorgio Ventre (University of Naples Federico II)

Forecasting Individual NetFlows using a Predictive Masked Graph Autoencoder
Georgios Anyfantis (Universitat Politècnica de Catalunya); Pere Barlet-Ros (Universitat Politècnica de Catalunya)

Technical Speech by Viavi
Tue Jul 14, 10:15 · Aula Magna (Auditorium) 1st FL

Measuring the 5G NR Radio Environment: When Instruments Aren't Enough - and When They Are
Paul Harris (VIAVI Solutions)

Coffee Break
Tue Jul 14, 10:30 · Lunch & Coffee Break Room

Keynote
Tue Jul 14, 11:00 · Aula Magna (Auditorium) 1st FL
Chair(s): Domenico Capriglione (University of Cassino and Southern Lazio)

Me, Myself and AI: Defensive, Offensive, and Adversarial AI
Mauro Conti (University of Padua)

Poster Session
Tue Jul 14, 11:45 · Poster Room
Chair(s): Gianfranco Miele (University-of-Cassino-and-Southern-Lazio); Federico Tramarin (University of Padova, Italy)

A Low-Complexity Joint TX/RX IQ Imbalance Calibration Method Using Circularity Statistics
Jiajun Zhu (The Hong Kong Polytechnic University); Hao Chai (Zhuhai Jieli Technology Co. Ltd.); Francis Lau (The Hong Kong Polytechnic University)

Investigating the Impact of Various Underlying Hardware Factors on Virtualised Network Deployments - Implementations and Conclusions from 6G-SANDBOX
Filip Ivanovic (Keysight Technologies); Lukas Fasken (Keysight Technologies); The Dao (Keysight Technologies); Bjoern Riemer (Fraunhofer FOKUS); Vasilis Pitsilis (NCSRD)

Automated Passive Interoperability Testing for Cellular V2X
Davide Pesavento (NIST); Eugene Song (NIST); Thomas Roth (National Institute of Standards and Technology)

Experimental Sensitivity of mmW Automotive Radar for Vegetation Targets

Samiullah Yousaf (Università degli Studi di Napoli Parthenope); Emanuele Setale (University of Naples Parthenope); Antonio Sorrentino (Università di Cagliari); Andrea Buono (Università degli Studi di Napoli Parthenope); Alessandro Fanti (University of Cagliari); Maurizio Migliaccio (Universita' Napoli Parthenope)

Exploratory Statistical Framework for RF-EMF Exposure Analysis: A Case Study on Time-Series Monitoring Data

Nunzia Solmonte (University of Naples Federico II); Nikola Djuric (University of Novi Sad); Nicola Pasquino (University of Naples Federico II)

Device-Free Worker Health Monitoring through Wi-Fi: Experimental Analysis on the NTU-Fi HAR Dataset

Sara Poce (University of Molise); Chiara Carissimo (University-of-Molise); Giulia Varriano (University of Molise); Gianni Cerro (Università degli Studi del Molise - Dipartimento di Medicina e Scienze della Salute "V. Tiberio"); Antonella Santone (Department of Medicine and Health Sciences); Francesco Mercaldo (Department of Medicine and Health Sciences)

Integrating IEEE 1451 Smart Transducers into IoT Environments using Node-RED Library

Helbert da Rocha (University-of-Beira-Interior); Eugene Song (NIST); António Espírito-Santo (University of Beira Interior); Riccardo Brama (Dive Industries SRL)

Real-world Validation of AC Magnetic Localization System for Underground Targets

Chiara Carissimo (University-of-Molise); Cecilia Provenzale (University of Cassino and Southern Lazio); Filippo Milano (University-of-Cassino-and-Southern-Lazio); Domenico Capriglione (University of Cassino and Southern Lazio); Francesco Santoni (University-of-Perugia); Antonio Moschitta (University-of-Perugia); Valerio Brunacci (Czech Technical University in Prague)

A Linux Kernel Anomaly Detection Based on a Multi-Source eBPF Observability Pipeline and Unsupervised Autoencoders

Daniel Mabanza Mukristu (université de Kinshasa); Dave Tshimbalanga Kazumba (University of Kinshasa); Vital Angelo Kuti Lusala (Université de Kinshasa); PIERRE SEDI NZAKUNA (University of Salerno); Maria Palladino (University of Salerno); Vincenzo Paciello (University of Salerno)

Quantitative Tapping Analysis in People with Alzheimer's Disease: towards a Digital Twin for Personalized Smart Health

Alessia Marinaro (University of Molise); Chiara Carissimo (University-of-Molise); Gianni Cerro (Università degli Studi del Molise - Dipartimento di Medicina e Scienze della Salute "V. Tiberio"); Cecilia Provenzale (University of Cassino and Southern Lazio); Gianfranco Miele (University-of-Cassino-and-Southern-Lazio); Annalisa D'Ermo (University of Cassino and Southern Lazio); Tommaso Di Libero (University of Cassino and Southern Lazio)

Experimental Evaluation of LoRaWAN in Metallic Enclosures for Industrial IoT Applications

Giacomo Peruzzi (University-of-Padova); Alberto Morato (National Research Council of Italy (CNR-IEIIT)); Alessandro Pozzebon (University of Padova); Federico Tramarin (University of Padova, Italy); Nicola Trivellin (Dipartimento di Ingegneria Industriale); Matteo Bertocco (University-of-Padova)

A Predictive Digital Twin for Online Decision Support in BLE Mesh Networks

Leonardo Ciabattini (University of Bologna); Angelo Trotta (University of Bologna); Luciano Bononi (University of Bologna); Marco Di Felice (University of Bologna)

Edge-to-Fog Deployment of Vision Anomaly Detection for Industrial Automation

Irida Shallari (Mid Sweden University); Seyed Jalaleddin Mousavirad (Mid Sweden University); Mattias O'Nils (Mid-Sweden-University)

Toward Portable Measurement Systems for Nanoplastics monitoring via L-Shaped Gold Nanogratings Biochips

Annabella la Grasta (Politecnico di Bari); Francesco Arcadio (University of Campania Luigi Vanvitelli); Rosalba Pitruzzella (University of Campania Luigi Vanvitelli); Teresa Natale (Politecnico di Bari); Nunzio Cennamo (University of Campania Luigi Vanvitelli); Luigi Zeni (University of Campania Luigi Vanvitelli); Francesco Dell'Olio (Polytechnic University of Bari)

Lunch
Tue Jul 14, 13:00 · Lunch & Coffee Break Room

ORAL SESSION 3: Special Session "Advanced Wireless Solutions for Reliable and Secure Industrial IoT Systems"
Tue Jul 14, 14:00 · Aula Magna (Auditorium) 1st FL
Chair(s): Alberto Morato (National Research Council of Italy (CNR-IEIIT)); Federico Tramarin (University of Padova, Italy)

Enabling IEEE 1451 Smart Transducer Interface over LoRaWAN

Helbert da Rocha (University-of-Beira-Interior); Emiliano Sisinni (University-of-Brescia); Paolo Ferrari (University-of-Brescia); Jose Salvado (University-of-Beira-Interior); António Espírito-Santo (University of Beira Interior)

Bayesian Optimization of PTP Servo Parameters for Time Synchronization in Wired TSN Networks

Alberto Morato (National Research Council of Italy (CNR-IEIIT)); Federico Tramarin (University of Padova, Italy); Giada Giorgi (University-of-Padova); Filippo Semenza (University of Padova)

AI-Driven Valorization of a Large Repository of Raw Industrial Network Recordings Using NL2SQL

Massimiliano Gaffurini (University of Brescia); Enrico Brunelli (University of Brescia); Dennis Brandão (University of Brescia); Paulo Cardieri (UNICAMP); Alessandro Depari (University-of-Brescia); Paolo Ferrari (University-of-Brescia); Mikael Gidlund (Mid Sweden University); Diana González (Pontifícia Universidade Católica-Campinas); Emiliano Sisinni (University-of-Brescia)

Network Load Effects on IEC 61850 over 5G: Implications for Synchrophasor-Based Monitoring and Control

Alberto Morato (National Research Council of Italy (CNR-IEIIT)); Federico Tramarin (University of Padova, Italy); Guglielmo Frigo (Swiss Federal Institute of Metrology METAS)

Comparative Analysis of Measurement Methods for TSN Switches Evaluation in Ethernet Forwarding

Muhammad Afzal (University of Cassino and Southern Lazio); Domenico Capriglione (University of Cassino and Southern Lazio); Gianni Cerro (Università degli Studi del Molise - Dipartimento di Medicina e Scienze della Salute "V. Tiberio"); Luigi Ferrigno (University-of-Cassino); Gianfranco Miele (University-of-Cassino-and-Southern-Lazio)

5G RedCap Wearable Devices in Large-Area Construction Sites: A Feasibility Study

Riccardo Bagno (University of Padua); Giada Giorgi (University-of-Padova); Alberto Morato (National Research Council of Italy (CNR-IEIIT)); Claudio Narduzzi (Universita' di Padova); Federico Tramarin (University of Padova, Italy)

Hands-on-Lab - Part 1
Tue Jul 14, 15:30 · Sala A (Room A) Ground FL
Speaker(s): António Espírito-Santo (University of Beira Interior); Helbert da Rocha (University-of-Beira-Interior)

Coffee Break
Tue Jul 14, 15:50 · Lunch & Coffee Break Room

Hands-on-Lab - Part 2&3
Tue Jul 14, 16:20 · Sala A (Room A) Ground FL
Speaker(s): António Espírito-Santo (University of Beira Interior); Helbert da Rocha (University-of-Beira-Interior)

ORAL SESSION 4: Quantum-Enabled Next-Generation Communications, Sensor Technologies and Machine Learning
Tue Jul 14, 16:20 · Aula Magna (Auditorium) 1st FL
Chair(s): Mauro D'Arco (University-of-Naples-Federico-II); Marco Carratù (University of Salerno)

Measurement-Driven Diagnostics and Uncertainty Evaluation of NISQ Hardware: A Metrological Framework for NMR Quantum Nodes

Marco Carratù (University of Salerno); Giuseppe Di Leo (University of Salerno); Vincenzo Gallo (University of Salerno); Valter Laino (University of Salerno); Consolatina Liguori (University of Salerno); Vincenzo Paciello (University of Salerno); Antonio Pietrosanto (University of Salerno)

Challenges in Seamless QKD Integration within Classical Communication Infrastructures

Fabrizio Lo Regio (University of Naples Federico II); Matteo D'Iorio (University of Naples, Federico II); Mauro D'Arco (University-of-Naples-Federico-II); Leopoldo Angrisani (University of Napoli Federico II - DIETI)

Superconducting detectors enhancement of quantum communication: practical cases

RIccardo Maria Ienco (Qunatech); Sannino Alessia (UNINA, Photon Technology Italy SRL); Giorgia Tortora (Photon Technology Italy); Pasquale Ercolano (Unina); Ciro Bruscino (Unina); Martina Peluso (UNINA); Syed M.J Bukhari (Unina); Fabio Auriemma (CNR-Institute for SuPerconductors, INnovative materials and devices); Mikkel Ejrnaes (CNR-SPIN); Loredana Parlato (UNINA); Giovanni Piero Pepe (University of Naples Federico II)

An Heterogeneous Multi-Sensor Platform for Structural Health Monitoring

Matteo Zauli (CIRI ICT - University of Bologna); Ivano Barrasso (DEI, ARCES University of Bologna); Luca De Marchi (DEI - University of Bologna); Federica Zonzini (DEI - University of Bologna)

XLM-Stack: Stacked Ensemble Learning for Encrypted Traffic Anomaly Detection

Jinyun Ye (Nanjing Normal University); Xinyu Huang (Nanjing Normal University); Nian Xia (Nanjing Normal University); Pang-Wei Tsai (National Cheng Kung University); Yang Lu (NNU); Ming Zeng (Laval University); Chu-Sing Yang (National Cheng Kung University)

Visit to Galleria Borbonica (Bourbon Tunnel)
Tue Jul 14, 18:30 · Bourbon Tunnel

Technical Program: Wednesday, July 15, 2026

Registration
Wed Jul 15, 8:30 · Conference Center Foyer

ORAL SESSION 5: Special Session "Interoperability, Measurement, and Standardization for Smart Transducers in Intelligent Systems"
Wed Jul 15, 9:00 · Aula Magna (Auditorium) 1st FL
Chair(s): Eugene Song (NIST); António Espírito-Santo (University of Beira Interior)

IEEE 1451.0 and 1451.1.6-based Smart Transducer Digital Twin Testbed for IoT Real-Time Monitoring and Control of Smart Homes
Eugene Song (NIST); Tyler Wong (University of Maryland); Thomas Roth (National Institute of Standards and Technology)

Didactic Markovian Sensor Signal Learning Model Implemented on an ESP32 Microcontroller
Gustavo Monte (Universidad Tecnologica Nacional); Pablo Garcia Bruna (UTN FRN); Ruben Bufanio (UTN FRN); Ariel Agnello (UTN FRN); Norberto Scarone (UTN FRN); Cesar Echeverria (UTN FRN)

Measurement Framework for Quantifying Braking Comfort in Automated Vehicles
Wenqi Guo (NIST); Zeid Kootbally (NIST); Ninad Harishchandrakar (NIST); Thomas Roth (National Institute of Standards and Technology); Sanchit Kedia (Pyka Inc.)

Securing IEEE 1451 via RISC-V TIMs Using Authenticated Encryption with Associated Data
Marcus Vinícius Ferreira da Silva (Universidade da Beira Interior); Helbert da Rocha (University-of-Beira-Interior); Jose Salvado (University-of-Beira-Interior); António Espírito-Santo (University of Beira Interior)

Applying Lessons from Explainable Models to Non-Explainable Models for Prediction of Wireless Network Performance
Sabrina Pochaba (Salzburg Research); Christian Maier (Salzburg Research); Sahan Dabarera (Salzburg Research); Matthias Herlich (Salzburg Research); Peter Dorfinger (Salzburg Research Forschungsgesellschaft m. b. H.)

Feasibility analysis of DoS attacks identification based on low-cost hardware-enabled electromagnetic side-channel measurements
Muhammad Afzal (University of Cassino and Southern Lazio); Benedetta Masone (University of Cassino and Southern Lazio); Domenico Capriglione (University of Cassino and Southern Lazio); Gianni Cerro (Università degli Studi del Molise - Dipartimento di Medicina e Scienze della Salute "V. Tiberio"); Luigi Ferrigno (University-of-Cassino); Gianfranco Miele (University-of-Cassino-and-Southern-Lazio); Antonio Nardone (University-of-Cassino-and-Southern-Lazio); Luca Tari (Università degli studi di Cassino e del Lazio Meridionale)

Tutorial: Electromagnetic Field Measurements in the 5G Era, Part 1
Wed Jul 15, 9:00 · Sala A (Room A) Ground FL
Speaker(s): Nicola Pasquino (University of Naples Federico II); Settimio Pavoncello (ARPA Lazio)

Coffee Break
Wed Jul 15, 10:30 · Lunch & Coffee Break Room

Keynote
Wed Jul 15, 11:00 · Aula Magna (Auditorium) 1st FL
Chair(s): Nicola Pasquino (University of Naples Federico II)

Exploiting Measurements in Network Digital Twins
Michele Ludovico (FiberCop)

ORAL SESSION 6: Special Session "Measurement, Networking and Communications Technologies for Smart Health Monitoring"
Wed Jul 15, 11:45 · Aula Magna (Auditorium) 1st FL
Chair(s): Giulia Varriano (University of Molise); Chiara Carissimo (University-of-Molise)

An IMU-based automatic measurement system for detecting postural changes during sedentary work activities
Annalisa D'Ermo (University of Cassino and Southern Lazio); Giada D'Alessandro (University of Cassino and Southern Lazio); Chiara Carissimo (University-of-Molise); Gianni Cerro (Università degli Studi del Molise - Dipartimento di Medicina e Scienze della Salute "V. Tiberio"); Tommaso Di Libero (University of Cassino and Southern Lazio); Angelo Rodio (University of Cassino and Southern Lazio)

Real-World Deployment and Energy Consumption of Federated Learning in V2N Scenarios

Selman Sezgin (Orange SA); Kahina Mokrani (Orange Labs); Julien Jacques (Université de Lyon 2); Sylvain Allio (Orange)

A Novel EEG Dataset for Joint Motor Imagery and Mental Fatigue Analysis in BCI applications

Rahma Riahi (University of Sousse); Eya Aloui (University of Sousse); Cecilia Provenzale (University of Cassino and Southern Lazio); Alessandro Bria (University of Cassino and Southern Latium); Mehdi Hamila (University of Sousse); Belgacem Hamdi (High Institute of Applied Sciences and Technology); Sami Chatti (University of Sousse); Antonio Maffucci (University of Cassino and Southern Lazio); Chiara Carissimo (University-of-Molise); Gianni Cerro (Università degli Studi del Molise - Dipartimento di Medicina e Scienze della Salute "V. Tiberio"); Gianfranco Miele (University-of-Cassino-and-Southern-Lazio)

From IMU Sensing to In-Network Intelligence: A Distributed Edge AI Telerehabilitation Framework

Milena Mazza (University of Bologna); Alfonso Esposito (University of Bologna); Leonardo Ciabattini (University of Bologna); Ivan Zyrianoff (University of Bologna); Marco Di Felice (University of Bologna)

Performance Evaluation of Wake-up Radio Technology in a Real-Time Wireless Testbed

Ahmed Kashkool (Technische Universitat Ilmenau); Ariel Aguirre (Ilmenau University of Technology); Jochen Seitz (Technische Universitaet Ilmenau); Ali Haider (Technische Universitat Ilmenau); Abdul Wahab Hanif (Technische Universität Ilmenau); Muhammad Noor Ul Hassan (Technische Universitat Ilmenau)

Tutorial: Electromagnetic Field Measurements in the 5G Era, Part 2
Wed Jul 15, 11:45 · Sala A (Room A) Ground FL
Speaker(s): Nicola Pasquino (University of Naples Federico II); Settimio Pavoncello (ARPA Lazio)

Technical Speech by ROHDE & SCHWARZ
Wed Jul 15, 13:00 · Aula Magna (Auditorium) 1st FL

Analysis of RF signals : Field measurements of 5GNR digital modulation

Roberto Cosentino (ROHDE & SCHWARZ)

Lunch
Wed Jul 15, 13:15 · Lunch & Coffee Break Room

ORAL SESSION 7: Special Session "Human Exposure to Electromagnetic Fields in Modern Communication Networks - part 1"
Wed Jul 15, 14:15 · Aula Magna (Auditorium) 1st FL
Chair(s): Nicola Pasquino (University of Naples Federico II); Nikola Djuric (University of Novi Sad)

An EIRP-Based Approach to EMF Exposure Compliance of Multi-Band Base Stations

Riccardo Suman (Vodafone Italy); Stefano D'Elia (Vodafone); Nunzia Solmonte (University of Naples Federico II); Nicola Pasquino (University of Naples Federico II)

Mutual Support of Temporal and Spatial RF-EMF Measurements in the EMF RATEL System

Dragan Kljajic (University of Novi Sad); Nikola Djuric (University of Novi Sad); Vidak Otasevic (Regulatory Authority for Electronic Communications and Postal Services); Snezana Djuric (Institute BioSens, University of Novi Sad); Nunzia Solmonte (University of Naples Federico II); Darko Suka (University of East Sarajevo)

5G NR Long Term Measurement of the Exposure Generated by MaMIMO Antennas

Alberto Galati (Fibercop); Maurizio Crozzoli (Telecom Italia); Nikolaos Petroulakis (FORTH); John Bolte (The Hague University of Applied Sciences); Erdal Korkmaz (The Hague University of Applied Sciences); Andrea Schiavoni (Fibercop)

Reconstruction of Missing Data in Urban RF-EMF Exposure Time Series

Nunzia Solmonte (University of Naples Federico II); Assia Solmonte (University of Naples Federico II); Nikola Djuric (University of Novi Sad); Nicola Pasquino (University of Naples Federico II)

Technical Speech by WIND TRE
Wed Jul 15, 15:15 · Aula Magna (Auditorium) 1st FL

5G Solutions for Enterprises and Public Administration.

Luca Scorrano (B2B & Wholesale Technology Services)

IEEE IMS TC-37 Meeting
Wed Jul 15, 15:30 · Aula Magna (Auditorium) 1st FL

Coffee Break
Wed Jul 15, 16:15 · Lunch & Coffee Break Room

Technical Speech by TELEDYNE LECROY
Wed Jul 15, 16:45 · Aula Magna (Auditorium) 1st FL

PCIe in Modern Networking: Measurement Challenges and the Role of Oscilloscopes
Giulio Fabbro (Teledyne LeCroy)

Keynote
Wed Jul 15, 17:00 · Aula Magna (Auditorium) 1st FL
Chair(s): Federico Tramarin (University of Padova, Italy)

Metrology, Performance Assessment, and Sensing Frameworks for Next-Generation Industrial Networks
Richard Candell (NIST)

Gala Dinner
Wed Jul 15, 19:30 · Le Arcate

Technical Program: Thursday, July 16, 2026

Registration
Thu Jul 16, 8:30 · Conference Center Foyer

ORAL SESSION 8: Special Session "Human Exposure to Electromagnetic Fields in Modern Communication Networks - part 2"
Thu Jul 16, 9:00 · Aula Magna (Auditorium) 1st FL
Chair(s): Nunzia Solmonte (University of Naples Federico II)

Ordinary Kriging as a Tool for Spatial Modeling of RF-EMF Exposure in the Environment
Jorge Guillén-Pina (Universidad de Alcalá de Henares); Nikola Djuric (University of Novi Sad); Ricardo Chocano (Universidad de Alcalá de Henares); Dragan Kljajic (University of Novi Sad); Snezana Djuric (Institute BioSens, University of Novi Sad); Pablo-Luis Lopez-Espi (University of Alcala)

Two Birds, One Stone: FR3 as 6G Golden Band? Analysis from Measurement-Calibrated Ray Tracing
Marco Danger (Communication Networks Institute, TU Dortmund University, Germany); Stefan Böcker (Communication Networks Institute, TU Dortmund University, Germany); Christian Wietfeld (Virginia Tech University)

5G-PassiveMPE: a Cost-Effective Extrapolation Procedure for 5G Signals Using Zero-Span Measurements
Daniele Franci (ISPRA); Settimio Pavoncello (ARPA Lazio); Giuseppe Marsico (ISPRA); Martina Callea (Tor Vergata University of Rome); Hina Tabassum (York University); Luca Chiaraviglio (University of Rome Tor Vergata)

Comparison of Methodologies for 5G Signal Extrapolation: experiences in real sites, from IEC 62232 Standard Formula to Zero-Span Measurements
Barbara Notari (Arpae Environmental Protection and Energy Agency); Matteo Tiberti (Arpae Environmental Protection and Energy Agency); Massimo Tedeschini (Arpae Environmental Protection and Energy Agency); Martino Cremona (Arpae Environmental Protection and Energy Agency); Emanuele De Sena (Arpae Environmental Protection and Energy Agency); Roberto Tinarelli (Arpae Environmental Protection and Energy Agency); Irene Taddei (Arpae Environmental Protection and Energy Agency); Elena Fusillo (Arpae Environmental Protection and Energy Agency); Daniele Bontempelli (ARPAE Sezione Bologna); Simone Colantonio (Arpae Environmental Protection and Energy Agency); Sabrina Chiovaro (Arpae Environmental Protection and Energy Agency)

Assessment of Electromagnetic Fields in Indoor Environments: A Pilot Study in Three Bulgarian Cities
Nikolay Atanasov (South-West University Neofit Rilski); Blagovest Atanasov (South-West University Neofit Rilski); Gabriela Atanasova (South-West University Neofit Rilski)

Bridging Scalar and Vectorial RF EMF Assessment in 5G Massive MIMO Networks Using Spatial-Temporal Power Reduction Factors
Simona Valbonesi (Fondazione Ugo Bordoni); Riccardo Suman (Vodafone Italy); Stefano D'Elia (Vodafone); Andrea Garzia (Fondazione Ugo Bordoni); Paolo Grazioso (Fondazione Ugo Bordoni)

Coffee Break
Thu Jul 16, 10:30 · Lunch & Coffee Break Room

Closing & Awards Ceremony
Thu Jul 16, 11:00 · Aula Magna (Auditorium) 1st FL

Light Lunch
Thu Jul 16, 12:00 · Lunch & Coffee Break Room

Author Index

A

Afzal, Muhammad 17, 18
Agnello, Ariel 18
Aguirre, Ariel 19
Akbarzadeh, Hussein 15
Alessia, Sannino 17
Allio, Sylvain 19
Aloui, Eya 19
Angrisani, Leopoldo 17
Anyfantis, Georgios 15
Arcadio, Francesco 13, 16
Atanasov, Blagovest 21
Atanasov, Nikolay 21
Atanasova, Gabriela 21
Auriemma, Fabio 17

B

Bagno, Riccardo 17
Barber, Chris 15
Barlet-Ros, Pere 15, 15
Barrasso, Ivano 17
Berruti, Gaia 13
Bertocco, Matteo 16
Bia, Pietro 13
Böcker, Stefan 21
Bolte, John 19
Bononi, Luciano 16
Bontempelli, Daniele 21
Botta, Alessio 15
Brama, Riccardo 16
Brandão, Dennis 17
Bria, Alessandro 19
Brunacci, Valerio 16
Brunelli, Enrico 17
Brunstrom, Anna 15
Bruscino, Ciro 17
Bufanio, Ruben 18
Bukhari, Syed M.J 17
Buono, Andrea 16

C

Cabellos-Aparicio, Albert 15
Callea, Martina 21
Capriglione, Domenico 17, 18, 16
Cardieri, Paulo 17
Carissimo, Chiara 18, 19, 16, 16, 16
Carratù, Marco 17
Caso, Giuseppe 15
Cennamo, Nunzio 13, 13, 16
Cerro, Gianni 17, 18, 19, 18, 16, 16
Chai, Hao 15
Chatti, Sami 19
Chiaraviglio, Luca 21
Chiovaro, Sabrina 21
Chocano, Ricardo 21
Ciabattini, Leonardo 19, 16
Colantonio, Simone 21
Consales, Marco 13
Coscetta, Agnese 13
Cremona, Martino 21
Crozzoli, Maurizio 19
Cusano, Andrea 13
Cusano, Angela 13

D

D'Alessandro, Giada 18
D'Arco, Mauro 17
D'Elia, Stefano 19, 21
D'Ermo, Annalisa 18, 16
D'Iorio, Matteo 17
da Rocha, Helbert 16, 18, 16
Dabarera, Sahan 18
Danger, Marco 21
Dao, The 15
De Marchi, Luca 17
De Sena, Emanuele 21
Dell'Olio, Francesco 16
Depari, Alessandro 17
Di Felice, Marco 19, 16
Di Leo, Giuseppe 17
Di Libero, Tommaso 18, 16
Di Menna, Francesco 13
Djuric, Nikola 19, 19, 21, 16
Djuric, Snezana 19, 21
Dorfinger, Peter 18

E

Echeverria, Cesar 18
Ejrnaes, Mikkel 17
Ercolano, Pasquale 17
Espírito-Santo, António 16, 18, 16
Esposito, Alfonso 19

F

Fanti, Alessandro 16
Fasken, Lukas 15
Ferrari, Paolo 16, 17
Ferrigno, Luigi 17, 18
Ferriol-Galmés, Miquel 15
Filisetti, Alessandro 13
Fontana, Nicola 13
Franci, Daniele 21
Frigo, Guglielmo 17
Fusillo, Elena 21

G

Gaffurini, Massimiliano 17
Galati, Alberto 19
Gallo, Vincenzo 17
Garcia Bruna, Pablo 18
Garzia, Andrea 21
Gidlund, Mikael 17
Giorgi, Giada 16, 17
González, Diana 17
Grazioso, Paolo 21
Guillén-Pina, Jorge 21
Guo, Wenqi 18

H

Haider, Ali 19
Hamdi, Belgacem 19
Hamila, Mehdi 19
Hanif, Abdul Wahab 19
Harishchandrakar, Ninad 18
Herlich, Matthias 18
Huang, Xinyu 17

I

Ienco, RIccardo Maria 17
Ivanovic, Filip 15

J

Jacques, Julien 19

K

Kashkool, Ahmed 19
Kedia, Sanchit 18
Kljajic, Dragan 19, 21
Kootbally, Zeid 18
Korkmaz, Erdal 19
Kuti Lusala, Vital Angelo 16

L

la Grasta, Annabella 16
Laino, Valter 17
Lau, Francis 15
Liguori, Consolatina 17
Lo Regio, Fabrizio 17
Lopez-Espi, Pablo-Luis 21
Lu, Yang 17

M

Maffucci, Antonio 19
Maier, Christian 18
Manna, Antonio 13
Marinaro, Alessia 16
Marini, Gustavo 13
Marsico, Giuseppe 21
Masone, Benedetta 18
Mazza, Milena 19
Mercaldo, Francesco 16
Miele, Gianfranco 17, 19, 18, 16
Migliaccio, Maurizio 16
Milano, Filippo 16
Minardo, Aldo 13
Mokrani, Kahina 19
Monte, Gustavo 18
Morato, Alberto 16, 17, 17, 16
Moschitta, Antonio 16
Mousavirad, Seyed Jalaleddin 16
Mukristu, Daniel Mabanza 16

N

Nadjm-Tehrani, Simin 15
Nardone, Antonio 18
Narduzzi, Claudio 17
Natale, Teresa 16
Noor Ul Hassan, Muhammad 19
Notari, Barbara 21

O

O'Nils, Mattias 16
Otasevic, Vidak 19

P

Paciello, Vincenzo 17, 16
Palladino, Maria 16
Parlato, Loredana 17
Pasquardini, Laura 13
Pasquino, Nicola 15, 19, 19, 16
Passeggio, Federica 13
Pavoncello, Settimio 21
Peluso, Martina 17
Pepe, Giovanni Piero 17
Peruzzi, Giacomo 16
Pesavento, Davide 15
Petroulakis, Nikolaos 19
Pietrosanto, Antonio 17
Pitruzzella, Rosalba 13, 16
Pitsilis, Vasilis 15
Poce, Sara 16
Pochaba, Sabrina 18
Pozzebon, Alessandro 16
Principe, Maria 13
Provenzale, Cecilia 19, 16, 16

R

Renzullo, Luca Pasquale 13
Riahi, Rahma 19
Riemer, Bjoern 15
Rodio, Angelo 18
Roth, Thomas 18, 18, 15

S

Salvado, Jose 16, 18
Santone, Antonella 16
Santoni, Francesco 16
Scarone, Norberto 18
Schiavoni, Andrea 19
SEDI NZAKUNA, PIERRE 16
Seitz, Jochen 19
Semenza, Filippo 16
Setale, Emanuele 16
Sezgin, Selman 19
Shallari, Irida 16
Shirmohammadi, Shervin 15
Silva, Marcus Vinícius Ferreira da 18
Sisinni, Emiliano 16, 17
Solmonte, Assia 19
Solmonte, Nunzia 19, 19, 19, 16
Song, Eugene 18, 15, 16
Sorrentino, Antonio 16
Spaziani, Sara 13
Stanco, Giovanni 15
Suka, Darko 19
Suman, Riccardo 19, 21
Syrrafos, Dimitrios 15

T

Tabassum, Hina 21
Taddei, Irene 21
Tari, Luca 18
Tedeschini, Massimo 21
Tiberti, Matteo 21
Tinarelli, Roberto 21
Tombelli, Sara 13
Tortora, Giorgia 17
Tramarin, Federico 16, 17, 17, 16
Trivellin, Nicola 16
Trono, Cosimo 13
Trotta, Angelo 16
Tsai, Pang-Wei 17
Tshimbalanga Kazumba, Dave 16

U

Uccello, Federica 15
Ucci, Sarassunta 13

V

Vaiano, Patrizio 13
Valbonesi, Simona 21
Vallifuoco, Raffaele 13
Varriano, Giulia 16
Ventre, Giorgio 15

W

Wietfeld, Christian 21
Wong, Tyler 18

X

Xia, Nian 17

Y

Yang, Chu-Sing 17
Ye, Jinyun 17
Yousaf, Samiullah 16

Z

Zauli, Matteo 17
Zeng, Ming 17
Zeni, Luigi 13, 16
Zeni, Luigi 13
Zhu, Jiajun 15
Zinno, Stefania 15
Zonzini, Federica 17
Zyrianoff, Ivan 19