Italian National Committee

2025 Italian URSI Annual Meeting

The annual meeting of the Italian URSI Committee will be held on **June 25-26, 2025,** jointly with the Electromagnetic Theory Symposium (EMTS 2025, https://www.emts2025.it/)

Venue: The meeting is jointly organized with EMTS 2025 in Aule Belmeloro, a campus of the University of Bologna located in via Beniamino Andreatta 8, Bologna, Italy.
Date: Wednesday 25 – Thursday 26, June 2025
Organizers: Carlo Carobbi (University of Florence), Giuliano Manara (University of Pisa)

PROGRAMME

The URSI Italian National Meeting is intended to disseminate and promote the activities of the International Union of Radio Science, one of the oldest and largest scientific Unions supporting education and research in all Radio Science fields (www.ursi.org). The meeting offers an URSI special session with tutorials exemplifying the activities of three URSI Scientific Commissions, a session organized by the Italian Chapter of Women in Radio Science (WIRS), and the presentations of the three finalist papers of the Best Paper Young Scientist Award delivered by the URSI Italian National Committee and named after Prof. Roberto Sorrentino.

Wednesday, June 25

National and International URSI Activities
Session Chair: Giuliano Manara, Secretary URSI Italy

10:00-10:15
Carlo Carobbi – President URSI Italy
The International Union of Radio Science (URSI) in Italy

10:15-11:00
Peter Van Daele, Secretary General, URSI
The 100 years history and recent activities of the International Union of Radio Science (URSI)

11:00 – 11:30 Coffee break

Pathways and Perspectives: Women Navigating RadioScience (URSI WIRS Italy Chapter)
Session Chair: Alessandra Costanzo, Co-Chair Chapter URSI WIRS Italy

11:30-11:40
Paola Russo
Activities of the chapter WIRS-Italy

11:40-12:00
Francesca Vipiana
The Women in Engineering Perspectives through the IEEE Antennas and Propagation Magazine Column

12:00-12:30
Alice Buffi
Expanding Horizon of RFID Localization: From Logistics to Safety

12:30-13:00
Michela Longhi
The Woman Behind the Wave: Exploring Metasurfaces Through a Gendered Lens

13:00
Alessandra Costanzo
Closing remarks

the programme of Wednesday, June 25 continues on the next page

"Roberto Sorrentino" Award Session
Session Chair: Giuliano Manara, Secretary URSI Italy

15:30-16:30
Presentations of the three finalist papers (15 minutes plus 5 minutes questions each)

20:30
Social Dinner and Joint URSI-EMTS Award Ceremony

Thursday, June 26

URSI Special Session
Session Chair: Carlo Carobbi, President URSI Italy

9:00-9:40
Claudio Cesaroni
Commissions G
AI-powered Ionospheric Forecasting

9:40-10:20
Gianfranco Brunetti
Commission J
LOFAR and the gigantic leap forward in low-frequency radio astronomy

10:20-11:00
Ari Sihvola
Commissions B
Paths from early origins of electricity to modern radio science

11:00 Coffee break

end of the programme

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SUMMARIES OF THE URSI WIRS SESSION PRESENTATIONS

The Women in Engineering Perspectives through the IEEE Antennas and Propagation Magazine Column

Francesca Vipiana
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Abstract: The Women in Engineering (WiE) column of the IEEE Antennas and Propagation Magazine started in December 2018 when I wrote my first contribution inviting colleagues to be part of the column. Then, up to the end 2024, 36 contributions have been received from researchers and scientists from all around the world, and, from 2025, Prof. Claire Migliaccio has been the WiE column appointed Associate Editor to go on with this adventure. The main aims of the column are to share experiences and achievements, to inspire young researchers to pursue a career in antennas and propagation, and to give visibility to women engineers and scientists. In this presentation, I will give an overview of all the analyses and messages published in these years in the column highlighting the women in engineering perspectives.

Expanding Horizon of RFID Localization: From Logistics to Safety

Alice Buffi
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Abstract: Real-time location awareness has become an integral part of everyday life in modern society. Whether it's planning a trip and choosing the best route, monitoring physical activity, or guiding others to our location, knowing where we are and where we are going is essential. As a result, localization has become a fundamental component of countless services and systems.
Several technologies support localization, each with its own characteristics and advantages that make it better suited for specific scenarios. Among these, RFID technology operating in the UHF band stands out as an increasingly attractive solution, especially when using battery-free (passive) tags. Thanks to their low complexity, affordability, and ease of deployment and maintenance, UHF RFID systems have become a standard in logistics and inventory management, from warehouse operations to retail. However, the potential of RFID-based localization extends well beyond these traditional uses. Today, it is being successfully applied in diverse fields such as precision agriculture and safety systems, proving its versatility and growing relevance across multiple domains.
The talk will explore the adoption of RFID-based localization to measure positions of workers, obstacles and vehicles in both industrial and agricultural environments thus enhancing safety at workplace. The core architecture of the systems will be introduced, highlighting its capabilities, especially when integrated with sensor fusion approaches, as well as its current limitations for accurate measurements. Finally, the discussion will move to future perspectives, aiming to uncover emerging applications of this technology across a wide range of sectors.

The Woman Behind the Wave: Exploring Metasurfaces Through a Gendered Lens

Michela Longhi
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Abstract: This seminar describes a professional journey through the field of electromagnetism, with a particular focus on advanced research in metasurfaces and wave manipulation at subwavelength scales. Drawing on a multidisciplinary background that spans RFID systems, antenna design for drones, biomedical applications, and reconfigurable electromagnetic devices, the talk outlines the scientific challenges and innovations encountered throughout a dynamic research path. Through the perspective of a young female researcher, it also addresses the experience of balancing a demanding scientific career, often involving mobility and collaboration across Europe, with the responsibilities of motherhood. This journey, marked by both sacrifice and determination, is sustained by a deep passion for discovery and technological progress. By combining technical insights with personal reflections, the seminar aims to foster a meaningful dialogue on gender, identity, and perseverance within the scientific community. It is a story of waves, electromagnetic and personal, and the strength required to surf them.

SUMMARIES OF THE URSI SPECIAL SESSION PRESENTATIONS

AI-powered Ionospheric Forecasting

Claudio Cesaroni
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Abstract: In recent years, machine learning (ML) and deep learning (DL) techniques have become widely adopted for ionospheric forecasting, particularly for predicting Total Electron Content (TEC) variations. These approaches have demonstrated significant potential in enhancing the accuracy and timeliness of TEC forecasts, which are critical for applications such as satellite navigation and space weather monitoring. While the use of ML/DL for TEC forecasting is now well-established, forecasting the occurrence of Large Scale Travelling Ionospheric Disturbances (LSTIDs) remains a novel and challenging task. In this talk, we present a pioneering approach developed at INGV for the first time within the framework of the European project T-FORS, aimed at forecasting LSTID occurrences over Europe using ML/DL techniques. We discuss the unique challenges involved in identifying and predicting LSTIDs, the methodology adopted, and the interpretability of the results obtained so far. This presentation highlights both the maturity of ML/DL in TEC forecasting and the innovative steps being taken to extend these tools to the less explored domain of LSTID prediction, contributing to the broader goal of improving ionospheric monitoring and space weather resilience across Europe.

LOFAR and the gigantic leap forward in low-frequency radio astronomy

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Abstract: In recent years, low-frequency radio astronomy has undergone a gigantic leap forward.
This has been possible thanks to the combination of innovative technologies and strong increase in data transport and computational capabilities that have enabled the construction of gigantic interferometers such as the LOw Frequency ARray (LOFAR).
LOFAR is an interferometer observing in the frequency range 10-200 MHz and consisting of tens of thousands of antennas distributed across 10 European countries. Thanks to its unprecedented sensitivity and angular resolution, which are orders of magnitude better than those of previous radio telescopes operating at low frequencies, LOFAR is opening a new window for the observation of the Universe and in these years has led to ground-breaking discoveries in several areas of astrophysics and cosmology.
LOFAR is part of a roadmap of low-frequency radio astronomy in Italy that extends over 70 years, started with the construction of the Northern Cross in the 1960s in Medicina (30 km from Bologna) and that will lead to the LOFAR 2.0 and the Square Kilometer Array (SKA) in the future. In this talk I will report on this roadmap and the ongoing revolution produced by LOFAR data and technology.

Paths from early origins of electricity to modern radio science

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Abstract: The International Union of Radio Science — URSI — is active and now living its second century. Radio science is the study of electromagnetic waves and fields, their interaction with structures and materials, and all the potential applications that are generated thereby. Radio science has its basis in physics of electricity and magnetism, phenomena that have excited the imagination of humans for millennia. The official history of this field starts in Ancient Greece, with amber and lodestone, natural materials carrying mysterious forces of electricity and magnetism. The talk will present key innovations and advancements in understanding electricity, magnetism, and electromagnetism over the centuries. The true unification of all the electromagnetic and optical phenomena was achieved by James Clerk Maxwell in 1860's. After 25 years, Hertz experimentally proved the existence of radio waves. This made the road open towards wireless radio communications, and equally towards all the geophysical and astronomical applications of radio science which are covered by the activities of our scientific union URSI.