



Italian National
Committee



2023 Italian URSI Annual Meeting

The annual Meeting of the Italian URSI Committee will be held in Genova on **November 17, 2023** jointly with the 2023 IEEE Conference on Antenna Measurements and Applications (<https://2023ieeecama.org/>).

Venue: The conference venue is the “NH Collection Genova Marina Hotel”, Molo Ponte Calvi, 5, 16124 Genova – Italy (<https://www.nh-hotels.com/en/hotel/nh-collection-genova-marina>).

Date: Friday 17, November 2023

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 Radio Science Union, 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, and the presentations of the three finalist papers of the 2023 Best Paper Young Scientist Award delivered by the URSI Italian National Committee and named after Prof. Roberto Sorrentino.

Friday, November 17

“Roberto Sorrentino” Award Session

Session Chair: Carlo Carobbi, President URSI Italy

11:10-12:30

Presentations of the three finalist papers (20 minutes plus 5 minutes questions each)

11:10-11:15

Carlo Carobbi – President URSI Italy

Introduction to the “Roberto Sorrentino” award session

11:15-11:40

Francesco Lestini, Gaetano Marrocco, and Cecilia Occhiuzzi

“RFID-Based Reconfigurable Intelligent Surfaces: towards Wireless and Ultra-Low-Power Reconfigurability”

11:40-12:05

Simone Negri, Giordano Spadacini, Flavia Grassi, and Sergio A. Pignari

“Inductively Coupled In-Circuit Measurement of Multiport Admittance Parameters”

12:05-12:30

Sandra Rodini, Simone Genovesi, Giuliano Manara and Filippo Costa

“Wireless Pressure Sensing through Passive Chipless mm-Wave tags”

National and International URSI Activities

Session Chair: Giuliano Manara, Secretary URSI Italy

12:30-12:45

Carlo Carobbi – President URSI Italy

“The International Union of Radio Science (URSI) in Italy”

12:45-13:00

Micaela Liberti – Chair URSI WIRS Italian Chapter

“The URSI Women in Radio Science (WIRS) initiative and the URSI WIRS Italian Chapter”

13:00 – 14:00 Lunch break

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

14:00-14:30

Peter Van Daele, Secretary General, URSI

"The 100 years history and recent activities of the International Union of Radio Science (URSI)"

14:30-15:00

Andrea Randazzo and Alessandro Fedeli

Commission B: Fields and waves, Electromagnetic theory and applications

"Microwave imaging techniques and applications (In memory of Matteo Pastorino)"

15:00-15:30

Erika Pittella

Commission A: Electromagnetic Metrology, Electromagnetic measurements and standards

"Dielectric characterization of materials at microwave frequencies"

15:30-16:00

Giovanni Nico, Manilo Monaco, Pier Francesco Biagi, Anita Ermini, and Aleksandra Nina

Commission G: Ionospheric Radio and Propagation

"Detection of anomalies in time series of VLF signals"

16:00-16:20

Coffee break

end of the programme

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SUMMARIES OF THE URSI SPECIAL SESSION PRESENTATIONS

Microwave imaging techniques and applications (In memory of Matteo Pastorino)

Andrea Randazzo and Alessandro Fedeli
Università di Genova

Abstract: Microwave imaging is a class of nondestructive and noninvasive techniques aimed at inspecting targets starting from measurements of the electromagnetic field they scatter when illuminated by an incident radiation at microwave frequencies. The objective is usually the retrieval of some of the geometrical/physical properties (e.g., the distributions of the dielectric properties) of the targets under test. However, the underlying inverse-scattering problem poses significant theoretical, numerical, and practical issues, which make the development of these techniques quite difficult and challenging. Consequently, engineers and scientists devoted significant efforts in the design of new and innovative solutions, in terms of both effective measurement systems and data processing algorithms. In this presentation, some recent techniques and their application in relevant applicative fields will be discussed. In particular, inversion approaches in non-standard spaces as well as recent AI-based paradigms will be considered. Some specific examples in the civil and biomedical fields will be provided.

Dielectric characterization of materials at microwave frequencies

Erika Pittella
Università di Roma 'La Sapienza'

Abstract: This presentation provides an overview of systems used to characterize and monitor materials at microwave frequencies. The first topic discussed is Cultural Heritage Monitoring, which compares various methods and probes to noninvasively determine the relationship between water content in stone materials and their reflection properties at microwave frequencies. The second topic is Health Monitoring in Concrete Structures, exploring the use of a network of split-ring resonators to identify cracks in concrete and their location with a single measurement. Lastly, Composites Materials Characterization at microwave frequencies is investigated, including polyamide 6 graphene nanoplatelet composites and 3D printed PLA and PLA/CNT composites.

Detection of anomalies in time series of VLF signals

Giovanni Nico¹, Manilo Monaco², Pier Francesco Biagi³, Anita Ermini⁴, and Aleksandra Nina⁵

¹Institute of Applied Mathematics, Italy's National Research Council, Bari, Italy

²Italian Space Agency, Matera, Italy

³Department of Physics, University of Bari, Bari, Italy

⁴Department of Industrial Engineering, University of Tor Vergata, Rome, Italy

⁵Institute of Physics Belgrade, University of Belgrade, Belgrade, Serbia

Abstract: This presentation provides an overview of the techniques for the detection of anomalies in the trend of VLF signals and their potential use to reveal radio precursors of earthquakes. Wavelet and time series analysis techniques are applied to VLF (10-60 kHz) signals acquired by the receivers of the INFREP European radio network installed since 2009. A few case studies are presented referred to recent earthquakes occurred in the Mediterranean region.