



Union Radio-Scientifique Internationale (URSI)

Activities' Report – Year 2024

Prof. Carlo Carobbi

1. Introduction

The URSI (www.ursi.org) mission statement is as follows: “Radio science encompasses the knowledge and study of all aspects of electromagnetic fields and waves. The International Union of Radio Science (Union Radio-Scientifique Internationale), a non-governmental and non-profit organization under the International Council for Science, is responsible for stimulating and coordinating, on an international basis, studies, research, applications, scientific exchange, and communication in the fields of radio science.” Included within the objectives are the following:

- To encourage and promote international activity in radio science and its applications, for the benefit of humanity;
- To encourage the adoption of common methods of measurement, and the intercomparison and standardization of the measuring instruments used in scientific work;
- To stimulate and co-ordinate studies of:
 - o the scientific aspects of telecommunications using electromagnetic waves, guided and unguided;
 - o the generation, emission, radiation, propagation, reception, and detection of fields and waves, and the processing of the signals embedded in them.
- To represent radio science to the general public, and to public and private organizations.

The first General Assembly of URSI was held in July 1922 in Brussels. At that time, only four National Committees had been formed officially: Belgium, France, United Kingdom and the USA. However, the following new Committees adhered to the Union during the same year: Australia, Spain, Italy, Japan and the Netherlands. The Italian URSI Committee operates under the umbrella of the National Research Council (CNR) which pays the fee for Italian participation in URSI.

The range of scientific activities covered by URSI is reflected by the scope of its scientific commissions, namely

- Commission A: Electromagnetic Metrology
- Commission B: Fields and waves
- Commission C: Radiocommunication systems and signal processing
- Commission D: Electronics and photonics
- Commission E: Electromagnetic environment and interference
- Commission F: Wave propagation and remote sensing
- Commission G: Ionospheric radio and propagation
- Commission H: Waves in plasmas
- Commission J: Radio astronomy
- Commission K: Electromagnetics in biology and medicine

The CNR-URSI Committee has ten mirror commissions fully reflecting the scopes of the international URSI scientific commissions. Officers and their substitutes of the CNR-URSI scientific commissions can be found [here](#).

URSI organizes three flagship international conferences where all the scientific commissions are involved:

- The “General Assembly and Scientific Symposium of the International Union of Radio Science” (URSI GASS)
- The “Atlantic Radio Science Conference” (URSI AT-RASC)
- The “Asia-Pacific Radio Science Conference” (URSI AP-RASC)

The three flagship conferences take place on a three-year basis.

2. Main activities carried on by URSI during 2024 relevant for Italy and for CNR

In 2024 URSI organized the URSI Atlantic Radio-Science Conference (AT-RASC) in Gran Canaria (Spain, May 19-24). As is shown in Fig. 1, Italian participation was very strong with the highest number of participants.

As in the past URSI flagship conferences, a meeting of the Italian delegates attending URSI AT-RASC 2024 was organized, for the purpose of informing delegates about the activities of URSI in Italy (in particular, the annual meeting and the “Sorrentino” award for young scientists) and for presenting the CNR-URSI Committee, its history and structure.

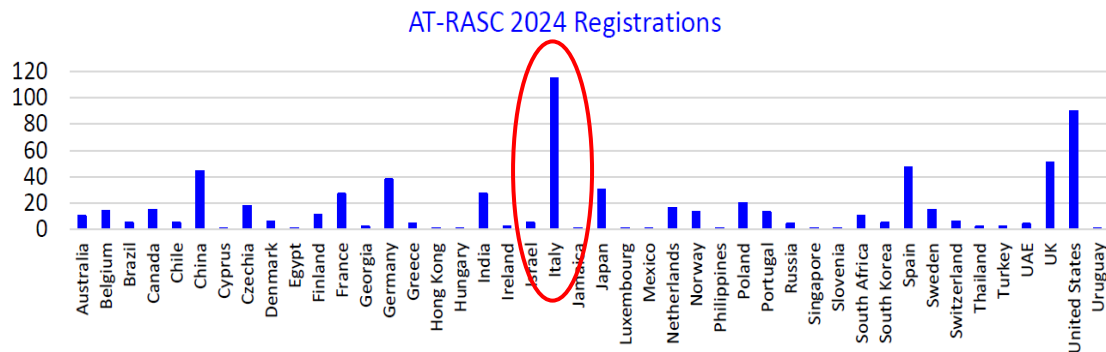


Figure 1: A histogram plot showing the number of attendees per country at URSI AT-RASC 2024. Italy is the top attendance country.

During the meeting of Italian radioscientists was also recalled that the 2025 edition of the URSI Electromagnetic Theory Symposium will be organized with the support of the CNR-URSI Committee at the Alma Mater University of Bologna in June 2025.

3. Activities carried on by the Italian Delegate Prof. Carlo Carobbi within the Union during 2023 and impact on the Italian scientific community

In September 2024 I joined the “Simposio Nacional anual de URSI-España” (4-6 September, Cuenca, Spain) in order to present the URSI activities carried out by URSI in Italy. I attended the “Simposio Nacional” together with the representative of the Italian Chapter of Women in Radio-Science (WIRS) Prof. Paola Russo (Università Politecnica delle Marche, Ancona). Prof. Russo presented the WIRS activities in Italy. Attendance to the URSI Spain meeting is in line with my participation to the URSI Germany meeting in 2019 (with Prof. Manara) and in 2022, in order to strengthen relationships with URSI European National Committees. See a picture of a moment of the event in Spain after my presentation of URSI Italy activities.



Figure 2: From left, Cristina García Miró Chair of the Capítulo Español de WIRS, Paola Russo, Secretary of the WIRS Italian Chapter, Michel Lazo, Chair of the URSI Spain National Committee, and Carlo Carobbi, Chair of the URSI Italy National Committee.

In collaboration with Prof. Manara and Prof. Michel (past ECR of URSI Commission B, University of Pisa), I co-organized the annual meeting of the Italian URSI Committee, which was held on 1-2 October 2024 in

Viareggio, Lucca (Italy). The event was co-located with the National Meeting on Electromagnetism (Riunione Nazionale di Elettromagnetismo - RiNEm 2024) organized by the Italian Society of Electromagnetism (Società Italiana di Elettromagnetismo - SIEm). RiNEm provides an excellent contact point for Italian researchers working on Applied Electromagnetics and represents an opportunity for the exchange of professional experiences among young researchers from Universities, Research Centers and industries. The Italian National URSI Committee Meeting was attended by more than thirty researchers working in universities and research institutes.

The meeting offered a vibrant program with outstanding Invited Speakers. Initially, Prof Carlo Carobbi (President of the URSI Italian National Committee) introduced the program of the meeting. Soon after, Prof Micaela Liberti (Chair of the Italian WIRS Chapter) illustrated the activities of the Italian WIRS Chapter and introduced the plenary session entitled “New challenges for radio sciences in Antarctica: AGATA” which was presented by Dr. Lucilla Alfonsi (National Institute of Geophysics and Vulcanology – INGV Rome). See a picture of a nice moment of this interesting and fascinating presentation in Fig. 3.



Figure 3: Lucilla Alfonsi (INGV) is presenting AGATA project during the URSI Italian National Committee meeting.

During the URSI Special Session chaired by Prof. Carlo Carobbi, three tutorials were presented as multidisciplinary contributions from some URSI Scientific Commissions: The first tutorial was a contribution from Commission C (Radiocommunication Systems and Signal Processing), but of interest also for Commission F and J. The tutorial entitled “One Parabola for Three Commissions: C, F and J” was presented by Prof. Filippo Giannetti (University of Pisa, Italy). The second tutorial was a contribution from Commission G (Ionospheric Radio and Propagation). The title of the presentation was “Detection of anomalies in time series of VLF signals”. It was given by Dr. Giovanni Nico (Institute for Applied Mathematics, IAC-CNR, Bari, Italy). The third tutorial was a contribution from Commission E (Electromagnetic Environment and Interference), but of interest also for Commissions B and C. Prof. Franco Moglie (Polytechnic University of Marche, Ancona, Italy) presented a talk entitled “Reverberation Chambers as Complex Environments for Wireless System Optimization”.

The final of the Italian URSI National Committee 2024 Young Scientist Best Paper Award was chaired by Prof. Giuliano Manara (Secretary of the URSI Italian National Committee and RiNEm 2024 General Chair). In this context, the three finalists presented their papers. In particular, the 2024 Italian URSI Committee Young Scientist Best Paper Award was assigned to Dr. Micol Colella (University of Rome La Sapienza), for the paper “A novel observable in TMS numerical dosimetry: the Effective Electric Field”. Dr. Micol Colella received the URSI Sorrentino Award 2024 (from left to right: Prof. Alessandro Toscano – SIEm President, Prof. Carlo Carobbi, Dr. Micol Colella, Prof Giuliano Manara, see Fig. 4). Honorary mentions were given to the other two finalists: Dr. Giulio Maria Bianco (University of Rome Tor Vergata), for the paper “Smart Packaging with Microfluidic-Antenna System for Monitoring Meat Degradation,” and Dr. Luca Tosi (University of Trento), for the paper “Thinned Array Antenna Design for Interference Suppression Through Quantum Optimization Method.” The URSI award and the honorary mentions were announced at the Italian URSI National Meeting 2024 and RiNEm 2024 gala dinner.



Figure 4: Dr. Micol Colella is awarded the 2025 edition of the “Roberto Sorrentino” prize.

During the RiNem 2024, a round table was organized to present the activities of international professional societies in which SIEm members reached important positions: IEEE Antennas & Propagation Society (AP-S), IEEE Microwave Theory and Techniques (MTT), International Society for Optics and Photonics (APTICA), IEEE Geoscience and Remote Sensing Society (GRSS), IEEE Oceanic Engineering Society (OES), Virtual Institute for Artificial Electromagnetic Materials and Metamaterials (METAMORPHOSE VI AISBL). In this framework, Prof. Giuliano Manara presented the international activities of URSI.

4. Evaluation of the participation in terms of benefits and membership cost

During URSI GASS 2023 the following Italian radio scientists were elected to URSI apical positions for the triennium 2023-2026:

1. Giuliano Manara, Vice-President URSI
2. Carlo Carobbi, Chair Commission E
3. Francesca Apollonio, Chair Commission K
4. Giovanna Signorile, Early Career Representative 1 Commission A
5. Valentina Palazzi, Early Career Representative 1 Commission D
6. Giacomo Paolini, Early Career Representative 2 Commission D
7. Riccardo Trincherio, Early Career Representative 1 Commission E
8. Dario Sabbagh, Early Career Representative 1 Commission G

In the next triennium (2026-2029), vice-chairs will be promoted to chairs and early career representatives 2 to early career representative 1. Moreover, chairs will be promoted to the grade of URSI fellows.

5. Evaluation of Italians’ attendance and how to improve interest and involvement

The participation of Italian radio scientists in international events has always been strong but, at the same time, it should be noted that in the past Italian radio-scientists did not reach a proportional number of apical positions within URSI. Thanks to the organization of URSI GASS 2021 in Rome, the involvement of young and senior Italian radio scientists has significantly increased.

Moreover, actions have been undertaken to promote URSI in Italy through information about the advantages deriving from individual membership. The mailing list of URSI affiliated and sympathizers under the responsibility of CNR is providing a significant benefit in this respect and it is regularly used to spread important messages concerning URSI activities in Italy.

6. Italian experts with important roles within the Union or within related Commissions and Programs (if known)

Please, refer to the list reported in clause 4.

7. Union with CNR Commission, short summary about the 2024 CNR Commission activities

The CNR-URSI Committee met online on January 11, June 18 and December 10, 2024. The minutes of these meetings are available on the website of the CNR-URSI Committee <http://www.ursi.cnr.it>. The annual 2024 meeting of the CNR-URSI Committee was held in Viareggio, jointly with the “Riunione Nazionale di Elettromagnetismo”, organized by SIEm. See section 3 of this report for details.

8. Conclusions

The CNR-URSI Committee is one of the most active URSI Member Committees in promoting scientific activities within URSI, both at international and national levels.

Firenze, 25th May 2025

Prof. Carlo Carobbi



(in cooperation with Prof. Giuliano Manara)