

# IEEE International Symposium on Antennas & Propagation & USNC-URSI Radio Science Meeting

## JULY 23-28, 2023 • Portland



You are cordially invited to the 2023 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting – AP-S/URSI 2023, from July 23–28, 2023, at the Oregon Convention Center and Hyatt Regency, in Portland, Oregon, USA, the City of Roses. This conference is cosponsored by the IEEE Antennas and Propagation Society (AP-S) and the US National Committee (USNC) for the International Union of Radio Science (URSI). It is intended to provide an international forum for the exchange of information on state-of-the-art research on antennas, propagation, electromagnetic engineering, and radio science. The symposium and meeting will include a wide range of technical sessions, invited talks, special sessions, student paper and design competitions, short courses, tutorials, exhibits, professional meetings, tours, and networking events. All events will be held in person, however there will be an option to join some business meetings remotely.

The paper submission deadline is January 13, 2023. Conference website: <https://2023.apsursi.org>

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<https://2023.apsursi.org>

## Paper Submission

Authors are invited to submit abstracts and papers for review and possible presentation on topics of interest to AP-S and USNC-URSI:

- AP-S submissions must be in standard IEEE two-column format and must be two pages in length.
- USNC-URSI submissions may be in either a one-page, one-column format with a minimum length of 250 words, or in the IEEE two-page, two-column format with a length of two pages.

Suggested topics and general information are listed on the conference website. Please note the following:

- In all cases, only accepted and presented submissions that are in the IEEE two-page two-column format and substantially fill the two pages will be submitted for possible inclusion in IEEE Xplore if the author chooses submission to Xplore.
- All accepted and presented submissions will appear in the proceedings distributed at the conference.
- The presenting author will be required to register for the conference by the due date (to be announced) in order for their paper to be included in the conference.
- Detailed instructions, including formats and templates, are available on the conference website.
- Every effort will be made to complete the review process by March 15, so attendees have sufficient time to obtain visas as needed.

## AP-S Student Paper Competition

Eligible entries in the Student Paper Competition must have only one student author, and that student must be the first author. Each additional coauthor must submit a signed letter indicating that his/her contribution is primarily advisory, to be uploaded at the time of paper submission. All Student Paper Competition entries will be evaluated using a double-blind review process, in addition to the normal review process used for all submissions to the conference. Detailed instructions are available on the conference website. For additional information, contact Magda El-Shenawee ([magda@uark.edu](mailto:magda@uark.edu)) and Ahmed Hassan ([hassanam@umkc.edu](mailto:hassanam@umkc.edu)).

## AP-S Student Design Contest

All students are encouraged to form teams and participate in Student Design Contest. Each team should consist of two to five students, with at least 50% being undergraduate students. Detailed instructions can be found on the conference website. For additional information, contact Ting-Yen Shih ([tshih@uidaho.edu](mailto:tshih@uidaho.edu)) and Glauco Fontgalland ([fontgalland@dee.ufcg.edu.br](mailto:fontgalland@dee.ufcg.edu.br)).

## Short Courses/Workshops/Tutorials

Several short courses, workshops, and tutorials on topics of special and current interest will be solicited by the technical program committee and organized for the conference. In addition, colleagues who wish to organize a short course, workshop or tutorial should contact Ata Zadehghol ([azadehghol@uidaho.edu](mailto:azadehghol@uidaho.edu)) and George Trichopoulos ([gtrichop@asu.edu](mailto:gtrichop@asu.edu)) by December 1, 2022.

## Sponsorships

We have many outstanding opportunities for sponsorships of the conference and its various aspects. Interested parties should contact Fikadu Dagefu ([dfikadu@gmail.com](mailto:dfikadu@gmail.com)) and Luis Gomez ([ljgomez@purdue.edu](mailto:ljgomez@purdue.edu)).

## Exhibits

Industrial, academic, government, software, and book exhibits will be open during most of conference days. Exhibitor registration and additional information can be found on the conference website. Interested parties may contact Fikadu Dagefu ([dfikadu@gmail.com](mailto:dfikadu@gmail.com)) and Luis Gomez ([ljgomez@purdue.edu](mailto:ljgomez@purdue.edu)).

## Special Sessions

Requests to organize special sessions for the conference should be submitted to Dan Sievenpiper ([dsievenpiper@eng.ucsd.edu](mailto:dsievenpiper@eng.ucsd.edu)) no later than October 15, 2022. Each proposal should include the title of the special session, a brief description of the topic, an indication of whether the proposed session is for AP-S, USNC-URSI, or is joint, and justification for its designation as a special session. Details of submission are posted on the conference website. Special sessions will be selected and finalized by Nov. 15, 2022. At that time, additional instructions will be provided to the organizers of the special sessions chosen for inclusion in the conference. The associated papers or abstracts will be due January 13, 2023.

## Social Program

The social program for the AP-S/URSI 2023 Portland Conference includes a Welcome Reception, Students' and Young Professionals' Reception, Awards Celebratory Dinner, and Closing Reception, all with live entertainment and fun activities, as well as Diversity and Inclusion Events and a rich Accompanying Persons/Families Program. We will help attendees obtain Childcare Services as needed. We are also working on organizing the following AP-S/URSI 2023 private tours: Multnomah Falls in the Columbia River Gorge National Scenic Area; the International Rose Test Garden; Bonneville Power Administration Laboratories Tour; Spirit River Cruises; Oregon Museum of Science and Industry; etc.

# Conference Venue

The conference will be held at the Oregon Convention Center and the Hyatt Regency Hotel, both of which are located across a quiet street from one another. These sites are located in downtown Portland, which is nine miles from the Portland International Airport. The MAX mass transit light rail system stops 446 times a day at the Convention Center. For just \$2.50 USD, attendees can ride the light rail from the airport to the Convention Center. Before or after the conference, attendees may want to consider visiting nearby points of interest, such as the Columbia River Gorge and Multnomah Falls (35 minutes away from the Convention Center), Washington Park (12 minutes away and includes the Hoyt Arboretum, Portland Japanese Garden, Children's Museum, World Forestry Center, and Oregon Zoo), Oregon Museum of Science and Industry (6 minutes away), Mt. St. Helens National Volcanic Monument (1 hour 15 minutes away), Cannon Beach (1.5 hours away), various wineries (5 minutes – 1 hour away), etc.



## AP-S Topics

### Antennas

1. Antenna theory
2. Antenna feeds and matching circuits
3. Mutual coupling in antenna arrays
4. Dielectric resonator antennas
5. Microstrip antennas, arrays, and circuits
6. Slotted and guided wave antennas
7. Phased-array antennas
8. Reflector and reflectarray antennas
9. Electrically small antennas
10. Broadband/ultra-wideband antennas
11. Multi-band antennas
12. Adaptive, active, and smart antennas
13. Reconfigurable antennas and arrays

### Electromagnetics & Materials

14. Electromagnetic theory
15. Electromagnetic material properties and measurements
16. Frequency-selective surfaces

17. Electromagnetic bandgap materials
18. Metamaterials and metasurfaces
19. Nano-electromagnetics
20. Electromagnetic education

### Computational & Numerical Techniques

21. Computational electromagnetics
22. High-frequency and asymptotic methods
23. Integral-equation methods
24. FDTD methods
25. FEM methods
26. Hybrid methods
27. Techniques for transient simulations
28. Optimization methods in EM designs
29. Parallel and special-processor-based numerical methods

### Propagation & Scattering

30. Indoor, urban, terrestrial, and ionospheric propagation

31. Propagation and scattering in random or complex media
32. Scattering, diffraction, and RCS
33. Inverse scattering and imaging
34. Remote sensing

### Antenna Applications & Emerging Technologies

35. Biomedical applications
36. MIMO implementations and applications
37. Mobile and PCS antennas
38. RFID antennas and systems
39. Ultra-wideband systems
40. Vehicular antennas and electromagnetics
41. Software-defined/cognitive radio
42. On-chip antennas
43. Wireless power transmission and harvesting
44. 3D printed antennas and structures
45. Millimeter-wave and sub-mm-wave antennas
46. Terahertz, infrared, and optical antennas



## Commission A Electromagnetic Metrology

USNC CHAIR: Christopher Anderson  
[canderso@usna.edu](mailto:canderso@usna.edu)

- A.1. Microwave to sub-millimeter measurements/standards
- A.2. Quantum metrology and fundamental concepts
- A.3. Time and frequency
- A.4. Time-domain metrology, EM-field metrology
- A.5. EMC and EM metrology
- A.6. Noise
- A.7. Materials
- A.8. Bioeffects and medical applications
- A.9. Antennas
- A.10. Impulse radar
- A.11. Interconnect and packaging
- A.12. Test facilities
- A.13. THz metrology
- A.14. High-Frequency and millimeter wireless metrology

## Commission B Fields & Waves

USNC CHAIR: Branislav Notaros  
[notaros@colostate.edu](mailto:notaros@colostate.edu)

- B.1. Antenna arrays
- B.2. Antenna theory, design, & measurements
  - B.2.1. Active antennas
  - B.2.2. Active and passive antenna matching
  - B.2.3. Antenna and propagation measurement techniques
  - B.2.4. Small antennas
  - B.2.5. Other antenna topics
- B.3. Complex, novel, or specialized media
  - B.3.1. Electromagnetic-bandgap (EBG) structures
  - B.3.2. Biological media
  - B.3.3. Geophysical media
  - B.3.4. Metamaterials
- B.4. Educational methods and tools
- B.5. Electromagnetic interaction and coupling
- B.6. Frequency-selective surfaces and filters
- B.7. Guided waves and wave-guiding structures
- B.8. High-frequency techniques
- B.9. Imaging, inverse scattering, and remote sensing
- B.10. Microstrip antennas and printed devices
- B.11. Millimeter-wave and terahertz antennas
- B.12. MIMO antennas and systems
- B.13. Nanoscale electromagnetics
- B.14. Nonlinear electromagnetics
- B.15. Numerical methods
  - B.15.1. Fast methods
  - B.15.2. Finite-difference methods
  - B.15.3. Frequency-domain methods
  - B.15.4. Hybrid methods
  - B.15.5. Integral-equation methods
  - B.15.6. Time-domain methods
- B.16. Optimization techniques
- B.17. Propagation phenomena and effects
- B.18. Rough surfaces and random media
- B.19. RFID
- B.20. Scattering and diffraction
- B.21. Theoretical electromagnetics
- B.22. Transient fields, effects, and systems
- B.23. Ultra-wideband electromagnetics
- B.24. Wireless communications
- B.25. Wireless sensors and sensing networks

- B.26. Cognitive radio
  - B.26.1. Reconfigurable antennas
  - B.26.2. Simultaneous transmit and receive systems
  - B.26.3. Spectrum enhancement techniques

## Commission C Radio Communication and Signal Processing Systems

USNC CHAIR: Greg Huff  
[ghuff@psu.edu](mailto:ghuff@psu.edu)

- C.1. Cognitive radio, software-defined wireless systems, and waveform diversity
- C.2. Computational imaging and inverse methods
- C.3. Information theory, coding, modulation, and detection
- C.4. MIMO and MISO systems
- C.5. Radar systems, target detection, localization, and tracking
- C.6. Radio communication systems
  - C.6.1. Internet of Things
  - C.6.2. 5G
  - C.6.3. Electromagnetic spectral harmony
- C.7. Sensor networks, and sensor array processing and calibration
- C.8. Signal and image processing
- C.9. Spectrum and medium utilization
  - C.9.1. Electromagnetic modeling of systems and environments
- C.10. Synthetic aperture and space-time processing
- C.11. Ground-penetrating radar (GPR)
- C.12. Distributed, multi-modality, electromagnetic, autonomous systems

## Commission D Electronics and Photonics

USNC CHAIR: Jonathan Chisum  
[jchisum@nd.edu](mailto:jchisum@nd.edu)

- D.1. Electronic devices, circuits, and applications
- D.2. Photonic devices, circuits, and applications
- D.3. Physics, materials, CAD, technology and reliability of electronic and photonic devices, in radio science and telecommunications
- D.4. Wide bandgap materials
- D.5. THz electronics
- D.6. Reconfigurable RF

## Commission E Electromagnetic Environment and Interference

USNC CHAIR: Robert Gardner  
[robert.gardner@etri.gatech.edu](mailto:robert.gardner@etri.gatech.edu)

- E.1. Electromagnetic environment
  - E.1.1. Electromagnetic noise of natural origin
  - E.1.2. Manmade noise
- E.2. Electromagnetic compatibility measurement technologies
- E.3. Electromagnetic compatibility standards
- E.4. Legal aspects of electromagnetic compatibility
- E.5. Electromagnetic radiation hazards

- E.6. Electromagnetic compatibility education
- E.7. Computational electromagnetics in electromagnetic compatibility
  - E.7.1. Computer Modeling
  - E.7.2. Model Validation
  - E.7.3. Statistical Analysis
- E.8. Effects of natural and intentional emissions on system performance
  - E.8.1. Crosstalk
  - E.8.2. Effects of transients
  - E.8.3. System analysis
  - E.8.4. Signal integrity
  - E.8.5. Electromagnetic compatibility in communication systems
  - E.8.6. Statistical analysis
- E.9. High-power electromagnetics
  - E.9.1. Electrostatic discharge
  - E.9.2. Electromagnetic pulse and lightning
  - E.9.3. Transients
  - E.9.4. Power transmission
- E.10. Spectrum compatibility issues, usage and management

## Commission F Wave Propagation and Remote Sensing

USNC CHAIR: Thomas Hanley  
[thomas.hanley@jhuapl.edu](mailto:thomas.hanley@jhuapl.edu)

- F.1. Point-to-point propagation effects
  - F.1.1. Measurements
  - F.1.2. Propagation models
  - F.1.3. Multipath/mitigation
  - F.1.4. Land or water paths
  - F.1.5. Scattering/diffraction
  - F.1.6. Indoor/outdoor links
  - F.1.7. Mobile/fixed paths
  - F.1.8. Horizontal/slant paths
  - F.1.9. Surface/atmosphere interactions
  - F.1.10. Numerical weather prediction
  - F.1.11. Dispersion/delay
  - F.1.12. Natural/manmade structures
- F.2. Microwave remote sensing of the Earth
  - F.2.1. Atmospheric sensing
  - F.2.2. Ocean and ice sensing
  - F.2.3. Field campaigns
  - F.2.4. Interferometry and SAR
  - F.2.5. Subsurface sensing
  - F.2.6. Scattering/diffraction
  - F.2.7. Radiation and emission
  - F.2.8. Propagation effects
  - F.2.9. Urban environments
  - F.2.10. Soil moisture & terrain
- F.3. Propagation and remote sensing in complex and random media

## Commission K Electromagnetics in Biology and Medicine

USNC CHAIR: Asimina Kiourti  
[kiourti.i@osu.edu](mailto:kiourti.i@osu.edu)

- K.1. Body-area networks
- K.2. Dosimetry and exposure assessment
- K.3. Electromagnetic and mixed-mode imaging and diagnostics
- K.4. Therapeutic and rehabilitative applications
- K.5. Implantable and ingestible devices
- K.6. Human-body interactions with antennas and other electromagnetic devices