



# 2025 CALL FOR PAPERS

## IEEE AP-S INTERNATIONAL SYMPOSIUM/NORTH AMERICAN RADIO SCIENCE MEETING OTTAWA, CANADA 13-18 JULY 2025

### Welcome

Dear Friends and Colleagues,

On behalf of the conference organizing committee, it is our great pleasure to invite you to join us in the beautiful city of Ottawa, Canada from July 13 to 18, 2025, for the 2025 IEEE International Symposium on Antennas and Propagation and North American Radio Science Meeting at the Rogers Centre Ottawa. From antenna design and analysis to electromagnetic theory, wireless communication systems to remote sensing, and beyond, we will explore the pioneering research and applications that are shaping the future of this important field.

The Symposium is co-sponsored by the IEEE Antennas and Propagation Society (IEEE AP-S), the Canadian National Committee (CNC), and the US National Committee (USNC) of the International Union of Radio Science (URSI). The Symposium will feature a diverse range of keynote speeches, technical sessions, and interactive workshops covering various topics related to antennas and propagation. The Symposium will also include both a trade show featuring top vendors and suppliers in our field, and plenary sessions that will be open to the local technical community.

Ottawa is our nation's capital and has been at the heart of Canadian contributions in radar and wireless communications for nearly a century. We hope our conference will help us 'remember the future' that these and other pioneers created and which serves as the foundation for current efforts to advance antennas and propagation for the benefit of humanity.

We look forward to personally welcoming you to Ottawa in 2025 and making your conference experience both pleasant and unforgettable. We also hope that you will take full advantage of the cultural, social, and recreational activities that our National Capital Region offers.

Sincerely,

**David G. Michelson**  
*Conference Chair*

**Yahia Antar, George Eleftheriades, Ahmed Kishk, Ke Wu**  
*Conference Co-chairs*

### Submission Deadlines

**28 OCTOBER 2024**  
PROPOSALS FOR SPECIAL SESSIONS

**2 DECEMBER 2024**  
PROPOSALS FOR SHORT COURSES/  
WORKSHOPS/TUTORIALS

**20 JANUARY 2025**  
PAPERS AND ABSTRACTS

### Steering and Organizing Committees

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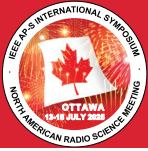
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Erdem Topsakal  
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**Visa & International Chair**  
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**Social Programs & Hospitality**  
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# 2025 CALL FOR PAPERS

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## Paper Submission

Authors are invited to submit contributions for review and possible presentation at the symposium on topics of interest to IEEE AP-S and URSI. Suggested topics and general information are listed below and on the symposium website.

Contact [tpc@2025.apsursi.org](mailto:tpc@2025.apsursi.org) for more information.

Authors should be aware of the **NEW** submission formats and registration limits:

**URSI submissions may be in either:**

- the URSI one-page, one-column format with a minimum length of 250 words, or
- the IEEE two-column format with a length of 2 pages.

**AP-S submissions must be in:**

- the IEEE two-column format and (**NEW this year**) must be 3 to 4 pages in length

**Papers per registration limitations (NEW this year):**

- two (2) papers per full registration
- one (1) paper per student registration

In all cases, only accepted and presented submissions, including both one-page abstracts and two-column IEEE-formatted papers 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.

**Important Notes:**

- The presenting author will be required to register for the conference and upload their paper by the due date (to be announced) in order for their paper to be included in the conference. Detailed instructions, including formats and templates, will be available on the conference website.
- Every effort will be made to complete the review process by 15 March 2025, so attendees have enough time to apply for visas, if required. IEEE AP-S/URSI 2025 has registered with the Special Events Unit of Immigration, Refugees, and Citizenship Canada in order to streamline visa processing.

## AP-S Topics

### ANTENNA FUNDAMENTALS

1. Antenna theory
2. Antenna measurements
3. Antenna feeds and matching circuits
4. Wire antennas
5. Slot antennas
6. Dielectric resonator antennas
7. Microstrip antennas
8. Traveling and guided-wave antennas
9. Electrically small antennas

### ANTENNA ENHANCEMENTS

10. Array antennas
11. Mutual coupling in antennas
12. Reflector and reflectarray antennas
13. Multi-band antennas
14. Broadband/ultra-wideband antennas & systems
15. Millimeter-wave antennas
16. Metasurface and metamaterial antennas
17. MIMO implementations and applications
18. Reconfigurable and adaptive antennas and arrays

### ELECTROMAGNETICS: THEORY, MATERIALS, AND EDUCATION

19. Electromagnetic theory
20. Electromagnetic material properties and measurements
21. Frequency-selective surfaces
22. Electromagnetic bandgap materials
23. Metamaterials and metasurfaces
24. Nano-electromagnetics
25. High power electromagnetics
26. Random and nonlinear electromagnetics
27. Electromagnetics education
28. Historical aspects of antennas & EM

### COMPUTATIONAL AND ANALYTICAL TECHNIQUES

29. Computational electromagnetics
30. High-frequency and asymptotic methods
31. Integral-equation methods
32. FDTD methods
33. FEM methods
34. Hybrid methods
35. Techniques for transient simulations
36. Techniques for layered and inhomogeneous media
37. Optimization methods in EM designs
38. Parallel and special-processor-based numerical methods

### PROPAGATION AND SCATTERING

39. Indoor, urban, terrestrial, and ionospheric propagation
40. Propagation models
41. Channel modeling
42. Propagation and scattering in random or complex media
43. Scattering, diffraction, and RCS
44. Inverse scattering and imaging
45. Remote sensing

### ANTENNA APPLICATIONS AND EMERGING TECHNOLOGIES

46. Biomedical applications
47. Mobile antennas
48. Automotive antennas & electromagnetics
49. Satellite antennas
50. Antennas on platforms and in specialized environments
51. On-chip antennas
52. 3D printed antennas and structures
53. RFID antennas and systems
54. Wireless power transmission and harvesting
55. THz and optical antennas
56. Software-defined/cognitive radio
57. AI in electromagnetic field applications

## URSI Topics

### COMMISSION A: ELECTROMAGNETIC METROLOGY

- 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

#### Antennas

- B.1. Antenna theory, design, and measurements
- B.2. Antenna arrays and systems
- B.3. Microstrip and printed antennas, circuits, and devices
- B.4. Antenna feeds and reflector and reflectarray antennas

#### Propagation, Scattering, Sensing

- B.5. Electromagnetic propagation, scattering, and interaction
- B.6. Guided-wave structures and systems
- B.7. Imaging, inverse scattering, and remote sensing
- B.8. Wireless sensors, networks, and communication

#### Numerical Methods

- B.9. Integral-equation methods
- B.10. Finite-element, finite-difference, and hybrid methods
- B.11. Computational electromagnetics, analysis, and optimization



## Theory, Materials, Education

- B.12. Electromagnetic theory
- B.13. Metamaterials and complex media
- B.14. Electromagnetics education

## Devices, Systems, Applications

- B.15. RF and microwave devices, structures, and systems
- B.16. THz and optical antennas, devices, and systems
- B.17. Biomedical applications of fields and waves

## COMMISSION C: RADIO COMMUNICATION AND SIGNAL PROCESSING SYSTEMS

- 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

- 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. Wireless power

- D.5. Wearable antennas
- D.6. THz electronics and antennas
- D.7. Integrated antenna systems for MMW and THz
- D.8. Active antennas
- D.9. Reconfigurable RF
- D.10. IoT and RFID antennas, circuits, and systems
- D.11. Metamaterials and plasmonics

## COMMISSION E: ELECTROMAGNETIC ENVIRONMENT AND INTERFERENCE

- 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

- 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

- 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

## Additional Contacts

### AP-S Student Paper Competition

Eligible entries in the Student Paper Competition (SPC) must only have one student author and the student must be the first author. The student's primary academic advisor must respond to an email that will be sent to them after the paper is submitted indicating that coauthor's contributions are primarily advisory. Detailed instructions are available on the conference website. For additional information, **contact Amanda Malone and Mohamed Emara at [spc@2025.apsursi.org](mailto:spc@2025.apsursi.org)**.

### AP-S Student Design Contest

All students are encouraged to form teams and participate in the Student Design Contest. Each team should consist of two to five students, with at least 50% being undergraduate students. Detailed instructions may be found on the conference website. For additional information, **contact Glauco Fontgalland, Shih-Yuan Chen, and George Shaker at [designcontest@2025.apsursi.org](mailto:designcontest@2025.apsursi.org)**.

### Short Courses/Workshops/Tutorials

Proposals for short courses, workshops, and tutorials on topics of special and current interest should be submitted via the conference website. The deadline for submission is 2 December 2024. For additional information **contact Tayeb Denidni and Ahmed Kishk at [swt@2025.apsursi.org](mailto:swt@2025.apsursi.org)**.

### Sponsorships/Exhibits

We have many outstanding opportunities for sponsorships of the conference and its various aspects. Industrial, academic, government, software, and book exhibits will be open during the majority of the conference days. Interested parties should **contact Lars J. Foged, Rod Waterhouse, Charlotte Blair, Jiang Zhu at [exhibition@2025.apsursi.org](mailto:exhibition@2025.apsursi.org)**.

### Special Sessions

Proposals for special sessions should be submitted via the conference website. The deadline for submission is 28 October 2024. Special sessions are meant to complement the regular sessions with their focus and content. They may be focused on new research and technology directions, or they can be celebratory (e.g. memorial, anniversary), or dedicated to historical milestones/reviews. For additional information **contact Koichi Ito and Elham Baladi at [communitysessions@2025.apsursi.org](mailto:communitysessions@2025.apsursi.org)**.

### Social Program

The 2025 AP-S/URSI conference in Ottawa will include a rich Accompanying Persons/Families Program and private tours may be available. We will also help attendees obtain Childcare Services as needed. For additional information, **contact Shelly Uslenghi, Judy Long, Joanne Wilton, and Olivera Notaros at [SocialProgram@2025.apsursi.org](mailto:SocialProgram@2025.apsursi.org)**.



[2025.apsursi.org](https://2025.apsursi.org)

## VENUE

### **ROGERS** Centre Ottawa

Situated on the site of the former Congress Centre, the Rogers Centre Ottawa revitalizes Ottawa's downtown core. The striking redevelopment in 2011 tripled its capacity, attracting national and international planners and establishing it as one of Canada's premier convention centers.

Admire Ottawa's modern gem with its impressive design and prime location. The Rogers Centre Ottawa adjoins the CF Rideau Centre and the Westin Ottawa, providing a seamless experience for guests. Overlooking the historic Rideau Canal, it's also close to key attractions like the National Arts Centre and ByWard Market.

In the summer, Ottawa comes alive with a range of activities that highlight its natural beauty. The Rideau Canal becomes a hub for outdoor enthusiasts with opportunities for kayaking, paddle-boarding, and leisurely boat cruises. Surrounding pathways are ideal for biking and strolling.

The city's parks and green spaces offer perfect spots for relaxation and recreation. Major's Hill Park is popular for picnics with views of Parliament Hill, while Gatineau Park features hiking trails, scenic lookouts, and refreshing swimming spots.

Ottawa's vibrant summer scene is further enhanced by outdoor cafes and restaurants, where you can enjoy local cuisine and pleasant weather. Warm temperatures and extended daylight hours make it an ideal time to explore the city's cultural and natural attractions, ensuring a memorable summer experience in Canada's capital.

