

The IMS2022 Technical Program Takes a Systems View

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Hello and welcome to the 2022 IEEE Microwave Theory and Techniques Society (MTT-S) International Microwave Symposium (IMS)! We are excited to serve as the Technical Program Committee chairs for IMS2022, each having attended IMS over the past 23 (Kate) and 36 (Dylan) years. We have tried to make the technical program as interesting and up to date as possible for you and everyone else who attends.

At the time this column was written, we had recently finished distributing the more than 590 submissions we received to the 35 technical subcommittees comprising the IMS2022 Technical Program Review Committee (TPRC). The subcommittees had

begun their work, and the reviews were already in process. The excitement in the TPRC was palpable, the quality of the submissions was excellent, and everyone on the TPRC was readying what we all hoped would be

the largest in-person technical meeting in the microwave field since the pandemic began.

The pie charts in Figure 1 point to strong international participation, with a majority of submissions from outside

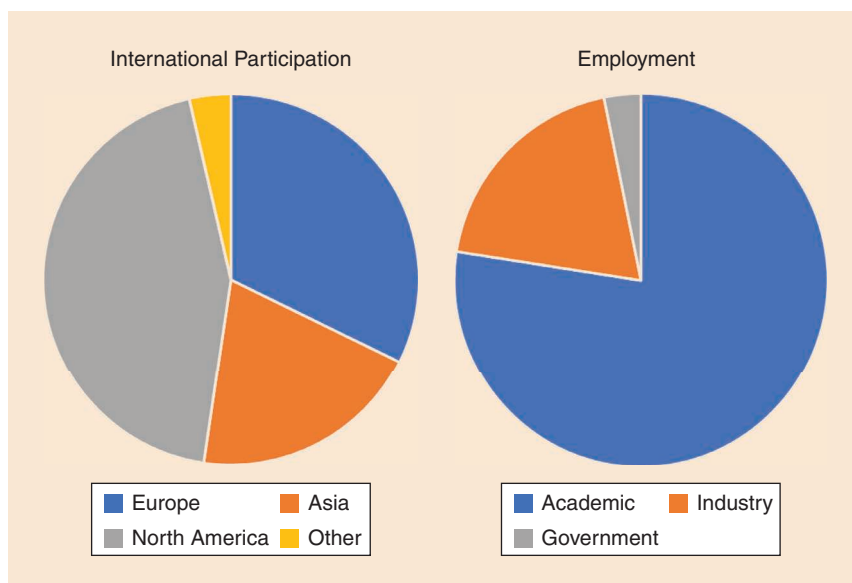


Figure 1. Sources of IMS2022 submissions.

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North America, and good industry participation. Denver's IMS2022 promises to be very broad indeed! On the technical side, Table 1 shows the number of submissions in each technical area. The topic of millimeter wave (mm-wave) and terahertz components and systems is clearly very hot this year, with so many submissions that it was

necessary to form two technical subcommittees to review all of the papers.

We have also been organizing the new IMS2022 Systems Forum, which will overlay the IMS technical program and emphasize systems-level microwave engineering. As we are all aware, advances in integration and CAD tools have been putting an increased

emphasis on systems design, and microwave engineers have been increasingly pushed to the forefront of these efforts.

This trend has deeply impacted the MTT-S, from its recent application for a name change to "IEEE Microwave Theory and Technology Society" and renaming its letters as *Microwave and Wireless Technology*

TABLE 1. Submissions to the IMS2022 TPRC subcommittees.

TPRC Subcommittee	Submission Count
01. Field Analysis and Guided Waves	6
02. Numerical Techniques and CAD Algorithms	17
03. Instrumentation and Measurement Techniques	27
04. MHz-to-THz Device Modeling	8
05. Nonlinear Circuit and System Analysis, Simulation, and Design	6
06. MHz-to-THz Interaction of Materials and Tissues	10
07. Transmission Line Structures	13
08. Passive Circuit Elements	29
09. Planar Passive Filters and Multiplexers	21
10. Nonplanar Passive Filters and Multiplexers	16
11. Active, Tunable, and Integrated Filters	18
12. Microwave Acoustic, Ferrite, Ferroelectric, Phase-Change, and MEMS Components	31
13. Packaging, MCMs, and 3D Manufacturing Techniques	24
14. Semiconductor Devices and Process Characterization	13
15. Low-Noise Amplifiers, Variable-Gain Amplifiers, and Receivers	20
16. Signal Generation, Modulators, Frequency Conversion, and Signal Shaping ICs	18
17. Mixed-Signal and Wireline ICs	6
18. High-Power MHz, RF, and Microwave Amplifiers	15
19. Compound Semiconductor Power Amplifiers	17
20. Silicon Power Amplifiers	5
21. Linearization and Transmitter Techniques for Power Amplifiers	17
22. Integrated Transceivers, Beamformers, Imaging, and Phased-Array Chips and Modules	14
23a. Millimeter-Wave and Terahertz Integrated Circuits and Systems	19
23b. Millimeter-Wave and Terahertz Integrated Circuits and Systems	17
24. Microwave Photonics and Nanotechnology	11
25. HF/VHF/UHF Technologies and Applications	12
26. Phased Arrays, MIMO, and Beamformers	25
27. Radar and Imaging Systems	35
28. Wireless System Characterization and Architectures for 5G and Beyond	12
29. Sensing and RFID Systems	21
30. Wireless Power Transmission	20
31. MHz-to-THz Instrumentation for Biological Measurements and Health-Care Applications	11
32. AI/ML for RF and mm-Wave	16
33. Innovative Systems and Applications	20
34. MHz-to-THz Physical Layer Security	7
35. Quantum Devices, Systems, and Applications	15

AI: artificial intelligence; HF: high frequency; IC: integrated circuit; MCM: multichip module; MEMS: microelectromechanical systems; MHz: megahertz; MIMO: multiple-input/multiple-output; ML: machine learning; THz: terahertz; UHF: ultrahigh frequency; VHF: very high frequency;

Highlights from the IMS2022 Systems Forum

Activity	Tuesday June 21	Tuesday June 21	Wednesday June 22	Thursday June 23
	Conn. Future Summit	Quantum Systems Day	Radar & Aerospace Day	Phased Arrays & OTA Day
AM1: 08:00- 09:40	Keynote: Smart Cities and Our Connected Future Session 1: The Connected Future	Keynote: Engineering Quantum Systems of Superconducting Qubits Tu1E Focus Session: Microwave Technologies for Quantum - System Integration	Keynote: Recent Radar Advances and Their Impact We1F Focus Session: Radar from Space to Ground (and Below) - The synergy between commercial, government, and metrology applications	Keynote: Calibrating RF/Microwave Front Ends in Multichannel Receiver and Transmitter Systems TH1F Focus Session w/ARFTG: Efficient Characterization and Test of Phased Array
AM2: 10:10- 11:50	Session 2: Spectrum, Standards and Innovation Fireside Chat: Non-Terrestrial Networks: Cellular in space	Tu2E: Cryogenic Microwave Circuits for Control of Quantum Systems	We2F: Advanced Concepts for 77 GHz Radar	Th2F: Antenna Systems for 5G and SATCOM Applications
Lunch 12:00- 13:30	Panel Session w/RFIC: Race to the Next G — Ride the mmWave or Wave Goodbye!	Panel Session: This is the Right Way to Architect the Microwave Control for a Quantum Computer!	Panel Session: Small Satellites and Constellations: Who Will be the Winners of the New Race to Space?	Panel Session w/ARFTG: Modern Phased Arrays and OTA Testing: A Design or a Measurement Challenge?
PM1: 13:30- 15:10	Session 3: Next-Generation Technologies	Tu3E Focus Session: Cryogenic Measurement and Characterization for Quantum Information Systems	We3F Focus Session: Cognitive Radar	Th3F Focus Session: Advances in Integrated Transceivers for beamforming and RADAR Applications
PM2: 15:40- 17:00	Session 4: 6G Challenges Panel Session: “Will flexibility and digital bottlenecks break 6G?” Connected Future Summit Reception (17:00-17:45)	Quantum Reception at the Interactive Forum: Plenary Poster, Quantum Posters, Hardware demos	We4F: Advanced Radar Imaging and Signal Processing Radar Reception w/Interactive Forum: Plenary Poster, Radar Posters, Hardware demos	Phased Arrays and OTA Reception at the Interactive Forum: Plenary Poster, Phased Array Posters
				IMS2022 Closing Session

Figure 2. An overview of the IMS2022 Systems Forum. *ARFTG:* Automatic Radio Frequency Techniques Group; *OTA:* over-the-air; *RFIC:* IEEE Radio Frequency Integrated Circuits Symposium.

Letters to the addition of a systems journal-within-a-journal in our *IEEE Transactions on Microwave Theory and Techniques*. We now have 10 MTT-S technical committees explicitly focused on systems-level technology and applications in HF-VHF-UHF; terahertz technology; microwave photonics; wireless communications; microwave/mm-wave radar, sensing, and arrays; wireless power transfer and energy conversion; RF identification; wireless sensors and the Internet of Things; connected and autonomous systems; biological effects and medical applications; and microwave aerospace systems. Even

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how IMS has been changing to accommodate this increased focus on systems and the importance of collaboration between the MTT-S and other IEEE Societies. The IMS summits, which began in 2017 in Honolulu, focus on the progression of commercial wireless communication systems and infrastructure

the IMS TPRC subcommittees now better cover systems topics of increasing interest to MTT-S members.

The IEEE 5G Summit, now the Connected Future Summit, was jointly developed with the IEEE Communications Society. These summits are an early example of

and have been very popular since their inception. This year, we will include the Summit in the IMS2022 Systems Forum.

The new IMS2022 Systems Forum will feature various themes, including the Connected Future Summit and quantum systems on Tuesday; radar and aerospace on Wednesday; and phased arrays and over-the-air (OTA) applications on Thursday. Figure 2 shows the preliminary schedule.

The teams of volunteers on the TPRC, the Systems Forum, and all of the other IMS technical activities have been superlative. We have been overwhelmed with their energy and initiative for activities new and old. It seems that everyone is looking forward to meeting in Denver. Hope to see you there!



Errata

In the March 2022 issue of *IEEE Microwave Magazine* [1], one of the articles introducing the two new MTT-S Honorary Life Members incor-

rectly identified individuals in two of the figures [1]. The figures and correct captions are below. *IEEE Microwave Magazine* regrets these errors.

Reference

- [1] J. Modelski, "Richard V. Snyder: MTT-S honorary life member [Awards]," *IEEE Microw. Mag.*, vol. 23, no. 3, pp. 20–23, Mar. 2022, doi: 10.1109/MMM.2021.3131948.



Figure 2. Ray Camisa, Kiyo Tomiyasu, Dick Snyder, and Fred Schindler at IMS2003.



Figure 3. Dick Snyder, Fred Schindler, and a friend (in the middle) at IMS2003.

