


# Introduction to the Fall 2023 Issue

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(Editorial)

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**ABSTRACT** Our fall issue of IEEE JOURNAL OF MICROWAVES opens with great news: we are now being indexed on Clarivate's Web of Science! We will also have our papers appearing on Elsevier's Scopus database as early as November. In July, we were joined by a new assistant editor, Jackie Steele who, in addition to the normal editorial functions, is helping to promote our authors and our journal. Jackie has already set up a JMW forum on LinkedIn<sup>TM</sup> and started a monthly newsletter. In this issue you will find 16 new research papers covering topics as diverse as optimal power beaming transmitter arrays to a new ultra-wideband cryogenic isolator, plus the more usual components, filters, radar, and communications articles. We also share the third iteration of our continuing series of articles from Topic Editor Allison Marsh, on *Women in Microwaves*. Our subject is University of Minnesota Professor Rhonda Franklin. Our usage numbers now top 420,000 and our latest IEEEExplore citation count sits at 8.79 per article published. Also in this issue – our full list of 2023 reviewers. Based on feedback from our July special series article *Making Waves: Microwaves in Climate Change*, we have started planning for a full special issue on this topic to be released in late 2024. A Call for Papers can be found at the end of this issue's table of contents.

**INDEX TERMS** Fall issue, opening editorial, Web of Science, 2023 reviewers, special issue call.

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## I. JMW NEWS

We open our fall issue of IEEE JOURNAL OF MICROWAVES, VOL. 3, NO. 4, with great news: we received an official notice in mid-August that we are now being indexed on Clarivate's Web of Science – “the world's most trusted publisher-independent global citation database” [1]! We have been waiting for this news since we applied for Clarivate's very rigorous and lengthy evaluation process last summer. By mid-October, all our published papers should be indexed. Until we receive our impact factor, JMW will be part of the *Emerging Sources Citation Index* under the Core Collection on the drop-down menu under the DOCUMENTS panel on the Web of Science Search page. We should also be showing up on Elsevier's Scopus indexing service [2] in mid- November.

In response to feedback from our *Making Waves* article, “Microwaves in Climate Change,” [3] we are putting together a full special issue on this topic for release in late 2024. The Call for Papers can be found at the end of our fall issue Table of Contents and you can keep track of progress, contributing authors, and article topics, through our journal home pages.

We hope this special issue will encourage even more submissions in this growing application area, which includes microwave techniques and instrumentation as a major element.

Starting in July, we brought onto our team a new assistant editor, Jackie Steele, who has a strong background in technical media and a special interest in science. Jackie is working to help promote our authors and the visibility of our journal as we move closer to our formal evaluation and ranking process at Clarivate – expected sometime within the next year. She has already set up an active JMW forum on LinkedIn<sup>TM</sup> and started a monthly newsletter. As authors, you may hear from her if your paper is selected for special mention, or just to help out with any particular review processing or production problems you might be having. Jackie is also working closely with our editorial team to provide direct feedback and improvements in our author-editor processes. Please feel free to communicate directly with Jackie if you have any issues you wish to bring up, you want to offer us some advice or criticism, or if you have suggestions for improvements. In order to assist with our process enhancements, we are planning to

send out a series of author and reader surveys towards the end of this year. Positive comments regarding your experiences in working with us on JMW are also welcomed!

Summarizing our most recent article statistics, our usage numbers now top 420,000 and our latest IEEEExplore citation count sits at 8.79 cites per article published, compared to 7.5 in June. We are hoping to continue this upward trend well into 2024!

As we leave 2023, we hope to bring our authors and readers an even more personalized experience in these days of increasing AI and very limited contact with individuals who care and interact directly. Do not hesitate to contact this EiC personally, or any of our Topic Editors, whenever you have something you wish to communicate. We strive to achieve both a quick and personal response.

## II. JMW FALL ISSUE CONTENT

Moving to our fall issue content, we bring you 17 new articles this month. We lead off the issue with an invited article from Ping Lu (Sichuan University), Mahmoud Wagih (University of Glasgow), George Goussetis (Heriot-Watt University), Naoki Shinohara (Kyoto University), and Chaoyun Song (King's College London), which surveys synthesized beamforming techniques for enhancing wireless power transmission. This comprehensive review describes both existing and new synthesis techniques, shows what has been achieved, and illuminates the challenges that lie ahead. With over 150 references it is a great starting point for those who are interested in this popular field.

Our second article comes to us from our editorial board historian, Allison Marsh. It is the third in Professor Marsh's special series on *Women in Microwaves*. In this article Allison interviewed Linda Katehi's (a pioneering microwave engineer in her own right) former student, Rhonda Franklin, now a professor at University of Minnesota and a recent N. Walter Cox award winner. Professor Franklin's story is an inspiring one, and not to be missed.

We begin our regular papers this issue with an article from prolific contributor to JMW and noted radar expert, Martin Vossiek and colleagues at Friedrich-Alexander University Erlangen-Nuremberg (FAU), in collaboration with Gerhard Hamberger and Matthias Beer from Rohde & Schwarz GmbH, Munich. The article, "A Simple and Versatile Concept to Improve Dynamic Range and Enable Target Angle Adaptability in Radar Target Simulators," presents a new technique for improving both the dynamic range and resolution of radar target simulators as well as allowing multiple angle interrogation using a single back end. Improvements of up to 30 dB in dynamic range are demonstrated. The technique has applications in the development of self-driving automobiles.

Our next two papers involve amplifiers. "A Broadband Asymmetrical Doherty Power Amplifier with Optimized Continuous Mode Harmonic Impedances," from Alex Pitt, Gautam Jindal, and Tommaso Cappello, at University of Bristol, and Kevin Morris from University of Leeds, presents a design procedure for realizing a wide-band Doherty power amplifier

(2.1–3.2 GHz) with state-of-the-art performance and record drain efficiency at high output power back-off levels.

In the second article on amplifiers, corresponding author Nicholas C. Miller and a large team composed of some of the best gallium nitride researchers and associated foundries in the United States survey state-of-the-art high electron mobility low-noise transistor performance. The article, "A Survey of GaN HEMT Technologies for Millimeter-Wave Low Noise Applications" catalogs the noise and gain performance results that have been realized in the 8–110 GHz frequency range. The article provides a ready source for benchmarking these highly desirable devices as they continue to be developed and utilized.

The next article covers an unusual commercial application. Michigan State's John Papapolymerou and student Adamantia Chletsou teamed up with Ford Motor Company's Eric Newsom to design and analyze an antenna that sits not on the roof, but in the taillight of an SUV. The compact helical antenna operates as a monopole with an omnidirectional beam and a gain of 2.5 dBi at 5.9 GHz. Its location on the rear of the vehicle, however, would necessitate a second antenna in the front headlight, to cover the full 360 degrees of a more typical roof top unit.

Our own Francisco Mesa (University of Seville) teams up with KTH's Oscar Quevedo-Teruel and students Shiyi Yang and Oskar Zetterstrom, to bring us a article on analyzing metasurfaces with hexagonal lattice substructure. They look at higher order symmetries and the relationship of periodicity to dispersion. As a test of the analysis, a Ka-band Luneburg lens with graded index is designed and simulated. The lens shows excellent beam steering performance (out to 50 degrees) over more than 10% bandwidth. The analysis can be extended to 3D periodic structures.

Continuing with our analytic papers, Marco Pirola and Giovanni Ghione from Politecnico di Torino investigate amplifiers based on conditionally stable active devices (rather than the usual unconditionally stable two ports). They derive a lower bound to the allowed input and output mismatch to achieve stability. They then use reactive matching sections to achieve several successful low noise amplifier designs composed of unconditionally stable active stages. The article is: "On the Lower Bound to the Input and Output Mismatch of Conditionally Stable Linear Two-Ports."

Microfluidics are shown to make useful reconfigurable beam steering antenna systems in "Mm-Wave Beam Steering Antenna Arrays Using Microfluidically Reconfigurable Beamforming Networks." The article comes from University of South Florida's Gokhan Mumcu and student, Jonas Mendoza. It describes a technique for introducing a capacitive load (metal fingers) over a transmission line via an overlaying microfluidic channel that moves the capacitive elements laterally over the conductors with a piezoelectric actuator. The concept is realized through a 28 GHz 4-beam patch antenna array, which uses the capacitive loading to change the phase to each antenna. The resulting beam steering spans from  $-20$  to  $+30$  degrees.

In another beam steering application, Farhan Ghaffar (Lakehead University, Canada), Hammad Cheema, and student Shahishah Ali (National University of Science and Technology, Islamabad, Pakistan), describe and analyze a beam-steered leaky-wave antenna based on crossed slots. The antennas are integrated onto a field programmable varactor tuned substrate that can electronically vary its dielectric constant and hence applied phase to the antennas, with applied voltage. The authors demonstrate a single frequency transmitter with 72 degrees of continuous vertical beam steering at 12 GHz.

Our own JMW Topic Editor, Nelson Fonseca, and colleagues Jiro Hirokawa, Takashi Tomura, and student Shngjia Wu, of Tokyo Institute of Technology discuss optimum phase settings for a one dimensional four beam switching-matrix-based antenna array. The analysis is demonstrated through realized designs operating at 20–24 GHz. The article is “Optimal Adjacent Output Phase Difference Assignments in One-Dimensional Parallel Switching Matrices with Four Beams.”

The next few papers in this issue describe new filter concepts. In “Dual-band Dielectric Resonator Filters Employing TE<sub>01 $\delta$</sub>  Mode and Degenerate HEH<sub>11</sub> Modes,” Yun Liu (Nanjing University of Aeronautics and Astronautics), Cristiano Tomassoni (University of Perugia), and Shuai Jiang (Nanjing Electronic Equipment Institute) demonstrate a high Q dielectric-resonator-style filter with two passbands at 2.4 and 2.6 GHz and a quality factor over 12,000.

Wenhao Li and Yun Liu at Nanjing University of Aeronautics and Astronautics, and Shanhui Pei at China Electronics Technology Corporation in Hefei, contributed a article demonstrating another dual frequency cavity-based bandpass filter, this time with a tunable center frequency. The concept is demonstrated with passbands at 0.845 GHz and 1.79 GHz, and has insertion losses below 0.4 dB.

In a “Lightweight, High-Q and High Temperature Stability Microwave Cavity Resonators Using Carbon-Fiber Reinforced Silicon-Carbide Ceramic Composite,” Lu Qian, Talal Skaik, and Yi Wang from University of Birmingham, and colleagues from Engineered Ceramic Materials GmbH, Moosinning, Germany, and the European Space Agency in Noordwijk, demonstrate resonator-based filters using carbon-reinforced silicon carbide. This new HB-Cesic ceramic composite material has low density, high thermal conductivity, and a very low thermal expansion coefficient. The authors demonstrate a Q of over 10,000 at 11.4 GHz for a spherical resonator based on the TM<sub>101</sub> mode. The HB-Cesic material has very high thermal stability, as required in a space application.

Finally we include, “Additively Manufactured and Monolithically-Integrated Triple-mode Post-loaded Cavity-Resonator-Based Bandpass Filters,” from Kunchen Zhao, at University of Colorado and Dimitra Psychogiou, at University of Cork, Ireland. This very interesting paper describes a 3D printing technique for post-loaded microwave cavity filters that combines three modes within the volume of a single resonator. It has the advantage of simply realizing

transmission zeros in the out-of-band response and has much reduced size and weight compared with conventional split-block designs. Three and six pole filters in the 3 GHz range are demonstrated, and exhibit in-band insertion loss less than 0.37 dB and quality factors above 780.

Our next article for this issue is titled “A Wideband RF Power Divider with Ultra-Wide Harmonics Suppression.” It comes from corresponding authors Yehia Massoud and Muhammad Zubair at KAUST, Muhammad Mehmood at University of the Punjab, Lahore and additional colleagues in Pakistan. The article describes a wideband power divider with greater than 50% bandwidth centered at 1.6 GHz. It is notable for its harmonic suppression, which extends out past 24 times the design frequency, and its low insertion loss of only 3.03 dB.

In our last submission this year, we received a really nice component paper from Lingzhen Zeng, C. Edward Tong, and Scott Paine, at Harvard Smithsonian Astrophysical Observatory, Cambridge, Massachusetts. The article describes a new cryogenic ferrite isolator design with unprecedented performance. Operating at 4K, it covers 4 GHz to 22 GHz with an insertion loss under 1 dB, greater than 17 dB isolation, and a return loss of less than –15 dB. The isolator is being targeted for low noise radio astronomy receiver applications and for quantum computers. The article is titled, “A Low-Insertion Loss Cryogenic Edge-Mode Isolator With 18 GHz Bandwidth.”

Looking forward to our January 2024 issue, which will kick off our fourth year of production, we already have a well populated queue with almost two-dozen manuscripts currently in review. We hope you will come back to our website at the beginning of the new year to see what we have to offer! Please don’t forget to consider a contribution to our special “*Microwaves in Climate Change*” issue by contacting our EiC with your proposed topic.

### III. OUR EDITORIAL TEAM

Most of our twenty-four Topic Editors have been serving since April 2020, and they continue to contribute their time and expertise keeping the journal both relevant and of high quality. All of these notable individuals were chosen from the Chairs, Vice-Chairs, and key participants of the twenty-six active technical committees within the Microwave Theory and Technology Society.<sup>1</sup> In addition to technical expertise and academic, governmental, and industrial backgrounds, we also have significant publications experience and leadership skills on our Editorial Board, which includes three former and three current IEEE journal Editors-in-Chief, a former MTT-S Ad-Com President, and twelve current and former IEEE journal Associate Editors. Many have Associate Editor experience on

<sup>1</sup>The current 26 MTT technical committees are listed on the IEEE JOURNAL OF MICROWAVES web page: <https://mtt.org/publications/journal-of-microwaves/>, under: Editorial Board (at the very bottom of the page), and they are detailed on the MTT Society web pages under Technical Coordination Committees (<https://mtt.org/technical-committees-list/>).



multiple journals. Our efforts are also aided by a senior administrative editor, Kara McArthur, our new and enthusiastic assistant editor, Jackie Steele, and an experienced production editor, Joanna Gojlik. Photos and short bios of our team can be found at the end of this editorial.

## ACKNOWLEDGMENT

This issue, the EiC would like to acknowledge the already prolific ideas and contributions that Jackie Steele, our new assistant editor, has brought to the journal. Jackie has not only established a media presence for JMW, but is actively working on a newsletter, daily LinkedIn posts, enhanced editorial support, Topic Editor interviews, and a continuous stream of excellent suggestions to help us succeed. We value her support and her contributions to JMW.

We want to say farewell and thank you to our departing assistant editor of two years, Sharri Shaw. Sharri is moving on to support a much more established publication – *IEEE Power Systems Magazine*, the editor of which is anxious to have a person of Sharri's experience and knowledge. We wish Sharri success on her new journal and a grateful thank you for all her work on JMW! Also, we would like to say farewell and thank you to Professor David Ricketts, who is leaving our Editorial Board after this issue. David has been contributing to JMW for almost two years, and has been essential in helping screen our many filter papers, as well as other topical contributions covering MTTs Technical Committee 9: microwave and millimeter-wave solid state circuits.

## REFERENCES

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## EDITORIAL BOARD

### EDITOR-IN-CHIEF



**PETER H. SIEGEL** (Life Fellow, IEEE) received the B.A. degree in astronomy from Colgate University, Hamilton, NY, USA, in 1976, the M.S. degree in physics and the Ph.D. degree in electrical engineering from Columbia University, New York City, NY, USA, in 1978 and 1983, respectively. He has held appointments as a Research Fellow and Engineering Staff with the NASA Goddard Institute for Space Studies, New York City, from 1975 to 1983; Staff Scientist with the National Radio Astronomy Observatory, Central Development Labs,

Charlottesville, VA, USA, from 1984 to 1986; Technical Group Supervisor and Senior Research Scientist with the Jet Propulsion Laboratory (JPL), National Aeronautics and Space Administration (NASA), Pasadena, CA, USA, from 1987 to 2014; and a Faculty Associate of electrical engineering and Senior Scientist of biology with the California Institute of Technology (Caltech), Pasadena, CA, USA, from 2002 to 2014. At JPL, he founded and led for 25 years, the Submillimeter Wave Advanced Technology Team, a group of more than 20 scientists and engineers developing THz technology for NASA's near and long-term space missions. This included delivering key components for

four major satellite missions and leading more than 75 smaller research and development programs for NASA and the U.S. Department of Defense. At Caltech, he was involved in new biological and medical applications of THz, especially low-power effects on neurons and most recently millimeter-wave monitoring of blood chemistry. He was an IEEE Distinguished Lecturer and the Vice-Chair and Chair of the IEEE MTTs THz Technology Committee. He is currently an elected Member of the MTTs AdCom. He has more than 300 articles on THz components and technology and has given more than 250 invited talks on this subject throughout his career of 45 years in THz. His current appointments include the CEO of THz Global, a small research and development company specializing in RF bio-applications, a Senior Scientist Emeritus of biology and electrical engineering with Caltech, and Senior Research Scientist Emeritus and Principal Engineer with the NASA Jet Propulsion Laboratory. Dr. Siegel was the recipient of 75 NASA technology awards, ten NASA team awards, the NASA Space Act Award, three individual JPL awards for technical excellence, four JPL team awards, and IEEE MTTs Applications Award in 2018. He is honored to continue the responsibilities in 2022, as the Founding Editor-in-Chief of IEEE JOURNAL OF MICROWAVES, which he hopes will invigorate the microwave field. Among many other functions, he was the Founding Editor-in-Chief for IEEE TRANSACTIONS ON TERAHERTZ SCIENCE AND TECHNOLOGY, from 2010 to 2015, and the Founder in 2009, Chair through 2011, and has been an elected General Secretary since 2012, of the International Society of Infrared, Millimeter, and Terahertz Waves (IRMMW-THz), the world's largest non-profit society devoted to THz science and technology. He is also an appointed Editorial Board Member of IEEE ACCESS through 2025.

## TOPIC EDITORS (ALPHABETICALLY)

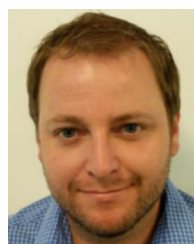
### TC-3 & TC-24 TOPIC EDITOR: MICROWAVE MEASUREMENTS & MICROWAVE/MM-WAVE RADAR, SENSING, AND ARRAY SYSTEMS



**SHERIF S. AHMED** (Senior Member, IEEE) received the M.Sc. degree in microwave engineering from the Technical University of Munich, Munich, Germany, in 2007, and the Ph.D. (Dr. Ing.) degree from The University of Erlangen-Nürnberg, Erlangen, Germany, in 2013. He is currently an Adjunct Professor with Stanford University, Stanford, CA, USA, and assembles more than 15 years of professional industry experience in various R&D roles. He has coauthored more than 25 research papers, more than 20 patents, and a book *Advanced Microwave Imaging Methods*. His R&D focus extends to microwave

and mmWave imaging, stand-off THz sensing, multistatic radars, advanced signal-processing techniques, terahertz technology, and last but not least, automotive radar design and characterization. Over the past decade, he pioneered the body scanner technology with the first fully electronic multistatic millimeter wave imaging systems, which are being deployed worldwide today at airport checkpoints. In the recent years, he has been advancing the qualifications of automotive radars, towards autonomous driving capabilities. Dr. Ahmed was the recipient of the University Academic Award of the Technical University of Munich in 2007, Innovation Award of Rohde & Schwarz (R&S) in 2009 and 2018, and IEEE MTT Microwave Prize Award of 2013. Moreover, he is the Chair of the IEEE N42.59 Standard for Measuring the Imaging Performance of Active mmWave Systems for Security Screening of Humans.

### TC-11 TOPIC EDITOR: MICROWAVE LOW-NOISE TECHNIQUES



**JOSEPH BARDIN** (Senior Member, IEEE) received the Ph.D. degree in electrical engineering from the California Institute of Technology, Pasadena, CA, USA, in 2009. In 2010, he joined the Department of Electrical and Computer Engineering, University of Massachusetts, Amherst, MA, USA, where he is currently a Full Professor. His research group currently focuses on low temperature integrated circuits with applications in radio astronomy and the quantum information sciences. In 2017, he joined the Google Quantum

AI Team as a Visiting Faculty Researcher and, in addition to his university appointment, he is currently a Staff Research Scientist with this team. Dr. Bardin was the recipient of the 2011 DARPA Young Faculty Award, 2014

NSF CAREER Award, 2015 Office of Naval Research YIP Award, 2016 UMass Amherst College of Engineering Barbara H. and Joseph I. Goldstein Outstanding Junior Faculty Award, 2016 UMass Amherst Award for Outstanding Accomplishments in Research and Creative Activity, and 2020 IEEE MTT-S Outstanding Young Engineer Award.

#### TC-20 TOPIC EDITOR: HF-VHF-UHF TECHNOLOGIES AND APPLICATIONS



**ROBERT H. CAVERLY** (Life Fellow, IEEE) received the Ph.D. degree in electrical engineering from Johns Hopkins University, Baltimore, MD, USA, in 1983. Since 1997, he has been a Faculty Member with the Department of Electrical and Computer Engineering, Villanova University, Villanova, PA, USA, where he is currently a Full Professor. Previously, he was a Professor for more than 14 years with the University of Massachusetts Dartmouth, Dartmouth, MA, USA. He has authored or coauthored more than 100 journal and

conference papers and is the author of two books, *Microwave and RF Semiconductor Control Device Modeling and CMOS RFIC Design Principles* from Artech House. His research interests include the characterization of semiconductor devices, such as PIN diodes and FETs in the microwave and RF control environment. Dr. Caverly is currently the Editor-in-Chief of IEEE MICROWAVE MAGAZINE and a Member of the MTT-S AdCom. He was the General Chair of the 2020 IEEE Radio and Wireless Week.

#### TC-28 TOPIC EDITOR: BIOLOGICAL EFFECTS AND MEDICAL APPLICATIONS



**J.-C. CHIAO** (Fellow, IEEE) received the B.S. degree from the Department of Electrical Engineering, National Taiwan University, Taipei, Taiwan, in 1988, and the M.S. and Ph.D. degrees in electrical engineering from the California Institute of Technology, Pasadena, CA, USA, in 1991 and 1995, respectively. He was a Research Scientist with the Optical Networking Systems and Testbeds Group, Bell Communications Research, an Assistant Professor of electrical engineering with the University of Hawaii, Manoa, Honolulu, HI, USA,

and a Product Line Manager and Senior Technology Advisor with Chorum Technologies. From 2002 to 2018, he was the Janet and Mike Greene endowed Professor and Jenkins Garrett Professor of electrical engineering with the University of Texas – Arlington, Arlington, TX, USA. He is currently the Mary and Richard Templeton Centennial Chair Professor in electrical and computer engineering with Southern Methodist University, Dallas, TX, USA. He has authored or coauthored and edited numerous peer-reviewed technical journal and conference papers, book chapters, proceedings and books. He holds 16 patents in RF MEMS, MEMS optical, liquid crystal, nano-scale fabrication, and wireless medical sensor technologies. His research works have been covered by media extensively including *Forbes*, *National Geographic* magazine, National Public Radio, and CBS Henry Ford Innovation Nation. Dr. Chiao was the recipient of the Lockheed Martin Aeronautics Company Excellence in Engineering Teaching Award, Tech Titans Technology Innovator Award, Research in Medicine award in the Heroes of Healthcare, IEEE Region 5 Outstanding Engineering Educator Award, IEEE Region 5 Excellent Performance Award, 2012-2014 IEEE MTT Distinguished Microwave Lecturer Award, 2017-2019 IEEE Sensors Council Distinguished Lecturer Award, and 2011 Edith and Peter O'Donnell Award in Engineering by The Academy of Medicine, Engineering and Science of Texas. He was the Chair of several international conferences including 2018 IEEE International Microwave Biomedical Conference. He was the Chair of the IEEE MTT-S Technical Committee 10 Biological Effect and Medical Applications of RF and Microwave, Technical Program Chair of the 2019 IEEE International Wireless Symposium, and an Associate Editor for IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES. He is the founding Editor-in-Chief of IEEE JOURNAL OF ELECTROMAGNETICS, RF, AND MICROWAVES IN MEDICINE AND BIOLOGY.

#### TC-23 & TC-25 TOPIC EDITOR: WIRELESS COMMUNICATIONS & WIRELESS POWER TRANSFER AND ENERGY CONVERSION



**ZHIZHANG (DAVID) CHEN** (Fellow, IEEE) received the B.Eng. degree in radio engineering from Fuzhou University, Fuzhou, China, the master's degree in radio engineering from Southeast University, Nanjing, China, and the Ph.D. degree in electrical engineering from the University of Ottawa, Ottawa, ON, Canada. In 1993, he was an NSERC Postdoctoral Fellow with McGill University, Montreal, QC, Canada. He is currently with the College of Physics and Information Engineering, Fuzhou University, on leave from the

Department of Electrical and Computer Engineering, Dalhousie University, Halifax, NS, Canada, where he is a Professor and the former Head of the Department of Electrical and Computer Engineering. He has been an Adjunct or a Visiting Professor with the University of Nottingham, Nottingham, U.K.; École Nationale Supérieure des Télécommunications de Bretagne, Plouzané, France; Shanghai Jiao Tong University, Shanghai, China; Fuzhou University; Hong Kong University of Science and Technology, Hong Kong; and University of Electronic Science and Technology of China, Chengdu, China. He has authored or coauthored more than 450 journal and conference papers in computational electromagnetics, RF/microwave electronics, antennas, and wireless technologies. He was one of the originators of the unconditionally stable methods that have been highly cited and used. His research interests include time-domain electromagnetic modeling techniques, antennas, wideband wireless communication and sensing systems, and wireless power technology. His team also developed several nonlinear ultra-wideband receivers and planar wireless power transfer transmitting and receiving structures. Dr. Chen was the Guest Editor of IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES, IEEE MICROWAVE MAGAZINE, IEEE JOURNAL OF ELECTROMAGNETICS, RF AND MICROWAVES IN MEDICINE AND BIOLOGY, and *International Journal of Numerical Modeling* (Wiley) and an Associate Editor for IEEE JOURNAL OF MULTISCALE AND MULTIPHYSICS COMPUTATIONAL TECHNIQUES. He was also the founding Chair of the joint Signal Processing and Microwave Theory & Techniques Chapter of IEEE Atlantic Canada, Chair of the IEEE Canada Atlantic Section, and a Member of the Board of Directors for IEEE Canada during 2000–2001. He is currently the Track Editor of IEEE TRANSACTIONS ON MICROWAVE AND TECHNIQUES, Topic Editor of IEEE JOURNAL OF MICROWAVES, and an elected Member of the Ad-Com of IEEE Antennas and Propagation Society. He was the recipient of the 2005 Nova Scotia Engineering Award, 2006 Dalhousie graduate teaching award, 2007 and 2015 Dalhousie Faculty of Engineering Research Award, 2013 IEEE Canada Fessenden Medal, and Dalhousie University Professorship. He is a Fellow of the Canadian Academy of Engineering and Engineering Institute of Canada.

#### TC-24 & TC21 TOPIC EDITOR: MICROWAVE/MM-WAVE RADAR, SENSING, AND ARRAY SYSTEMS & TERAHERTZ TECHNOLOGY AND APPLICATIONS



**KEN B. COOPER** (Senior Member, IEEE) received the A.B. degree in physics from Harvard College, Cambridge, MA, USA, in 1997, and the Ph.D. degree in physics from the California Institute of Technology, Pasadena, CA, USA, in 2003. Following postdoctoral research in superconducting microwave qubits, he has been an RF Microwave Engineer with Jet Propulsion Laboratory (JPL), since 2006. His work with JPL has included the development of scanning 340 GHz and 670 GHz imaging radars for concealed object

detection, a compact 95 GHz Doppler radar and 270/560 GHz spectrometer for cometary jet observation, and differential absorption radars at 170 GHz and 560 GHz for humidity sounding on Earth and Mars. He was the recipient of the Lew Allen Award for Excellence, Ed Stone Award for an Outstanding Research Publication and a principal designation for the development of active THz sensors, systems, and techniques from JPL.



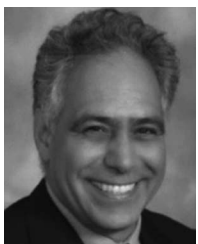
## TC-12 TOPIC EDITOR: MICROWAVE HIGH-POWER TECHNIQUES



**STEVE C. CRIPPS** (Life Fellow, IEEE) received the master's and Ph.D. degrees from Cambridge University, Cambridge, U.K., in 1970. After working for several years with the Pioneering Gallium Arsenide Group, Plessey Research, he emigrated to the United States, where he worked for 15 years in various engineering and management positions with Watkins Johnson, Loral, and Celeritek. In 1996, he returned to the United Kingdom, as an Independent Consultant before taking on an academic post with Cardiff University, Cardiff, U.K.,

where he is currently a Distinguished Research Professor. He has authored several bestselling books on RPPA design and is a regular contributor to IEEE MICROWAVE MAGAZINE with his popular "Microwave Bytes" column. Dr. Cripps was the recipient of the 2008 IEEE Microwave Application Award.

## TC-22 &amp; TC-10 TOPIC EDITOR: MICROWAVE PHOTONICS &amp; SIGNAL GENERATION AND FREQUENCY CONVERSION



**AFSHIN S. DARYOUSH** (Fellow, IEEE) received the B.S. degree in electrical engineering and applied physics from Case Western Reserve University, Cleveland, OH, USA, in 1981, and the M.S. and Ph.D. degrees in electrical and computer engineering from Drexel University, Philadelphia, PA, USA, in 1984 and 1986, respectively. He is currently a Professor of electrical and computer engineering with Drexel University, where he has developed courses in devices, circuits, and sub-systems employed in microwaves, photonics, and

antennas. He also conducts research in microwave photonics applied to telecommunications and biomedical engineering that resulted in more than 300 technical articles, 21 patents, and eight book chapters. In 2011, he became a Member of the Franklin Institute's Committee on Science and the Arts. Dr. Daryoush was the recipient of the Drexel University's Graduate Teaching Award in 2000, IEEE Philadelphia Section's Franklin Key Award in 2015, and Drexel University's Alumni Award in 2018. After receiving the Microwave Prize in 1986, his 13 articles have been recognized as the best student papers in various IEEE conferences. He has also organized various IEEE conferences since 1993, particularly serving as the TPC Chair of Radio Wireless Symposium 2008 (RWS 2008) and Chair of the Radio and Wireless Week 2009 (RWW2009), Microwave Photonics 2010 (MWP 2010), Benjamin Franklin Symposium on Microwave and Antenna Sub-Systems 2014 (BenMAS 2014), and International Microwave Symposium 2018 (IMS 2018).

## TC-29 TOPIC EDITOR: MICROWAVE AEROSPACE SYSTEMS

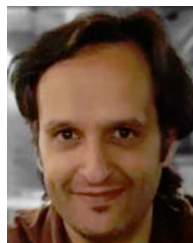


**NELSON J. G. FONSECA** (Senior Member, IEEE) received the M.Eng. degree in electrical engineering from Ecole Nationale Supérieure d'Electrotechnique, Electronique, Informatique, Hydraulique et Télécommunications (ENSEEIH), Toulouse, France, in 2003, the M.Sc. degree in electrical engineering from the Ecole Polytechnique de Montreal, Montreal, QC, Canada, in 2003, and the Ph.D. degree in electrical engineering from Institut National Polytechnique de Toulouse – Université de

Toulouse, Toulouse, in 2010. He is currently an Antenna Engineer of the Antenna and Sub-Millimetre Wave Section, European Space Agency, Noordwijk, The Netherlands. Since November 2020, he has been holding an Honorary Appointment as a Professional Fellow with the University of Technology Sydney, Sydney, NSW, Australia. He has authored or coauthored more than 270 papers in peer-reviewed journals and conferences and has more than 50 patents issued or pending. His research interests include multiple beam antennas for space missions, beam-former theory and design, ground terminal antennas, transfer of technology from and to terrestrial systems, including 5G networks, and novel manufacturing techniques. Dr. Fonseca was the Chair of the 38th ESA Antenna Workshop in 2017, and Co-Chair of the 2018 IET Loughborough Antennas & Propagation Conference (LAPC

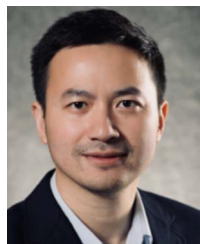
2018). He was an Associate Editor for IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES from 2020 to 2022 and a Co-Guest Editor of an issue focused on microwave aerospace systems in IEEE MICROWAVE MAGAZINE in 2022. He is currently an Associate Editor for *IET Microwaves, Antennas and Propagation* and IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION, and the Topic Editor of IEEE JOURNAL OF MICROWAVES. He is also the Chair of the newly founded IEEE MTT-S Technical Committee 29 (TC-29) on Microwave Aerospace Systems. He has been a Board Member of the European School of Antennas and Propagation since January 2019, and is also the coordinator of the ESA/ESoA course on Antennas for Space Applications, for which he was voted best lecturer by the participants of the 2020 edition. He is an elected EurAAP Regional Delegate representing Benelux during 2021–2023. Dr. Fonseca was the recipient of several prizes and awards, including the Best Young Engineer Paper Award at the 29th ESA Workshop on Antennas in 2007, ESA Teamwork Excellence Award in 2020, Best Applied Technology Antenna Paper Award at EuCAP 2022, and multiple ESA Technical Improvement Awards.

## TC-5 TOPIC EDITOR: FILTERS



**ROBERTO GÓMEZ-GARCÍA** (Senior Member, IEEE) received the Dipl.-Eng. degree in telecommunication engineering and the Ph.D. degree in electrical and electronic engineering from the Polytechnic University of Madrid, Madrid, Spain, in 2001 and 2006, respectively. Since 2006, he has been an Associate Professor with the Department of Signal Theory and Communications, University of Alcalá, Alcalá de Henares, Spain. He has been for several research stays with the C2S2 Department, XLIM Research Institute, University

of Limoges, Limoges, France; Telecommunications Institute, University of Aveiro, Aveiro, Portugal; U.S. Naval Research Laboratory, Microwave Technology Branch, Washington, DC, USA; and Purdue University, West Lafayette, IN, USA. He is also an Adjunct Part-Time Professor with the University of Electronic Science and Technology of China, Chengdu, China, and was an Invited Professor with the Gdansk University of Technology, Gdansk, Poland, during 2019–2020. He has authored or coauthored more than 100 papers in international journals and more than 140 papers in international conferences in his research areas, which include the design of fixed/tunable high-frequency filters and multiplexers in planar, hybrid, and monolithic microwave-integrated circuit technologies, multifunction circuits and systems, software-defined radio and radar architectures for telecommunications, remote sensing, and biomedical applications. Dr. Gómez-García was a Member of the Technical Review Board for several IEEE and EuMA conferences. He is a Member of the IEEE MTT-S Filters (MTT-5), IEEE MTT-S RF MEMS and Microwave Acoustics (MTT-6), IEEE MTT-S Wireless Communications (MTT-23), IEEE MTT-S Biological Effects and Medical Applications of RF and Microwave (MTT-28), and IEEE CAS-S Analog Signal Processing Technical Committees. He was the recipient of the 2016 IEEE Microwave Theory and Techniques Society (MTT-S) Outstanding Young Engineer Award. He was an IEEE CAS-S Distinguished Lecturer during 2020–2021. He was an Associate Editor for IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES from 2012 to 2016 and IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS—PART I: REGULAR PAPERS from 2012 to 2015. He was the Senior Editor of IEEE JOURNAL ON EMERGING AND SELECTED TOPICS IN CIRCUITS AND SYSTEMS from 2016 to 2017. He was Guest Editor of several special/focus issues and sections in IEEE and IET journals. In addition to his role on IEEE JOURNAL OF MICROWAVES, he is the new Editor-in-Chief of IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS, an Associate Editor of IEEE JOURNAL OF ELECTROMAGNETICS, RF AND MICROWAVES IN MEDICINE AND BIOLOGY, IEEE ACCESS, *IET Microwaves, Antennas, and Propagation*, and *International Journal of Microwave and Wireless Technologies*, and the MTT-S Newsletter Working Group Chair.

**TC-6 TOPIC EDITOR: RF MEMS AND MICROWAVE ACOUSTICS**


**SONGBIN GONG** (Senior Member, IEEE) received the B.S. degree in electrical engineering from Huazhong University of Science and Technology, Wuhan, China, in 2004, and the Ph.D. degree in electrical engineering from the University of Virginia, Charlottesville, VA, USA, in 2010. He is currently an Associate Professor and Intel Alumni Fellow with the Department of Electrical and Computer Engineering and Holonyak Micro and Nanotechnology Laboratory, University of Illinois at Urbana-Champaign, Urbana, IL, USA. His

primary research interests include the design and implementation of MEMS and acoustic devices, components, subsystems for RF front ends, and hybrid microsystems based on the integration of MEMS devices with circuits or photonics for signal processing. He was the recipient of the 2014 Defense Advanced Research Projects Agency Young Faculty Award, 2017 NASA Early Career Faculty Award, 2019 Dean's Award for Excellence in Research at UIUC, and 2019 IEEE Ultrasonics Early Career Investigator Award. Along with his students and postdocs, he was the recipient of best paper awards at the 2017 and 2019 IEEE International Frequency Control Symposium and the 2018 and 2019 IEEE International Ultrasonic Symposium and the 2nd place in the Best Paper Competition at the 2018 International Microwave Symposium. He was an Associate Editor for IEEE TRANSACTIONS ON ULTRASONICS, FERROELECTRICS, AND FREQUENCY CONTROL and JOURNAL OF MICROELECTROMECHANICAL SYSTEMS, and also the Technical Committee Chair of MTT-6 RF-MEMS and Microwave Acoustics of the IEEE Microwave Theory and Techniques Society.

**TC-7 TOPIC EDITOR: MICROWAVE SUPERCONDUCTIVITY AND QUANTUM TECHNOLOGIES**


**MICHAEL C. HAMILTON** (Senior Member, IEEE) received the B.S.E.E. degree from Auburn University, Auburn, AL, USA, in 2000, and the M.S.E.E. and Ph.D. degrees in electrical engineering from the University of Michigan, Ann Arbor, MI, USA, in 2003 and 2005, respectively. From 2006 to 2010, he was a Member of Technical Staff with MIT-Lincoln Laboratory, where he worked on instrument-level and system-level projects for next-generation geostationary imaging for weather satellite systems, testing and modeling of highly

scaled and environmentally-optimized CMOS devices subjected to extreme environmental (cryogenic) conditions, and modeling, design, fabrication and test of advanced technologies for high-frequency RF sample-and-hold and analog digital conversion circuits based on fully-depleted silicon-on-insulator transistors and CCD structures. He joined the Department of Electrical and Computer Engineering, Auburn University, Auburn, AL, USA, as an Assistant Professor in 2010, and was promoted to a Professor in 2019. In addition to his research group with Auburn University, Auburn, AL, USA, he is currently the Director of the Alabama Micro/Nano Science and Technology Center. In 2022, he joined the Google Quantum AI Team as a Visiting Faculty Researcher. His research interests include superconducting electronics technologies, micro/nano fabrication, packaging and integration of high-speed systems, signal and power integrity of densely integrated systems, application of micro and nanostructures for enhanced performance of RF and microwave systems and packaging for extreme environments, including cryogenic and quantum systems. He is also the Auburn University IEEE Student Chapter Faculty Advisor and the Chair of MTT-7 Technical Committee on Microwave Superconductivity and Quantum Technologies.

**TC-21 TOPIC EDITOR: TERAHERTZ TECHNOLOGY AND APPLICATIONS**


**DMITRY KHOKHLOV** received the M.S., Ph.D., and Doctor of Science (Russian analog of the Habilitation degree in Germany) degrees from M.V. Lomonosov Moscow State University, Moscow, Russia, in 1980, 1982, and 1992, respectively. Since 1982, he has been with the Department of Physics, M.V. Lomonosov Moscow State University, in positions from Junior Research Fellow up to Full Professor, since 1997, and the Head of the Chair of General Physics, and Condensed Matter Physics, since 2006. In 2008, he was elected as

Correspondent Member of the Russian Academy of Sciences. Since 2013, he has been the Head of the Expert Council on Condensed Matter Physics of the Russian Foundation for the Basic Research. Since 2015, he has also been the Head of the Expert Council on International Research Projects of the same Foundation. He has been active in teaching and he has developed several lecture courses for undergraduate and graduate students and supervised more than 30 M.Sc. students and about 15 Ph.D. dissertations. He has authored or coauthored more than 350 research/conference papers, edited one research monograph, and filed two patents. His research interests include physics of narrow-gap semiconductors, development of sensitive detectors of terahertz radiation, photoelectric phenomena under terahertz excitation, organic semiconductors, and several other areas. He is also the Principal Investigator of more than 15 research grants from different Russian national agencies.

**SPECIAL SERIES TOPIC EDITOR**


**ALLISON MARSH** (Senior Member, IEEE) received the B.S. degree in engineering from Swarthmore College, Swarthmore, PA, USA, and the Ph.D. degree in the history of science, medicine, and technology from Johns Hopkins University, Baltimore, MD, USA. She is currently an Associate Professor of history and the Co-Director of the Ann Johnson Institute for Science, Technology & Society, University of South Carolina, Columbia, SC, USA. Her research focuses on how

the general public comes to understand complex engineering ideas through informal education, specifically in museum settings. She sees history as a Trojan Horse to get people interested in learning more about how engineering affects society. Before coming to the University of South Carolina, she was a Curator and the Winton M. Blount Research Chair with Smithsonian National Postal Museum. Dr. Marsh is the Contributing Editor to IEEE SPECTRUM and writes the monthly "Past Forward" column. She was the recipient of the IEEE-USA Award for Distinguished Literary Contributions furthering Public Understanding and Advancement of the Engineering Profession for work publicizing the Smithsonian's orphaned engineering collections in 2014. She is a vocal advocate for women in STEM and is pioneering the Women in Microwaves oral history project in conjunction with the IEEE History Center.

**TC-1 TOPIC EDITOR: FIELD THEORY AND COMPUTATIONAL EM**


**FRANCISCO MESA** (Fellow, IEEE) received the B.Sc. and Ph.D. degrees in physics from the University of Seville, Seville, Spain, in 1998 and 1991, respectively. From 1992 to 1997, he was an Assistant Professor with the Department of Applied Physics, University of Seville, where he was promoted to an Associate Professor in 1997 and Full Professor in 2010. Between 1992 and 2004, he enjoyed four stays in U.S. universities, the first one with the Polytechnic Institute of Brooklyn, New York City, NY, USA, and three more with the

University of Houston, Houston, TX, USA. From July to December 2019, he was a Visiting Researcher with the KTH (Royal Institute of Technology), Stockholm, Sweden. Since 1988, he has been a Member of the Microwave Group, University of Seville. During the first years of his research, he worked on computational electromagnetism and on the diverse theoretical aspects of wave propagation involving these structures. Later, he worked on the modeling of metamaterials and periodic planar structures, contributing to the



development of analytic (or quasi-analytic) equivalent circuits to characterize such structures and to find physically insightful explanations of some exotic phenomena. More recently, he has worked on higher symmetries applied to electromagnetic propagation and on the design of geodesic lenses. Dr. Mesa has been an IEEE Fellow proposed by the IEEE MTT Society since January 2014. He was an Associate Editor for IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES from 2013 to 2016, and a Member of the IEEE MTT-S Technical Committee MTT-1 (Field Theory and Computational EM).

#### TC-26 TOPIC EDITOR: RFID, WIRELESS SENSORS, AND IOT



**PAOLO MEZZANOTTE** (Member, IEEE) was born in Perugia, Italy, in 1965. He received the Ph.D. degree from the University of Perugia, Perugia, Italy, in 1997. Since 2007, he has been an Associate Professor with the University of Perugia, where he has been involved in teaching the classes on radiofrequencies engineering and systems and circuits for IoT. Since 2014, he has been the Vice Head of the Department of Engineering, University of Perugia. His present H-index is 24. His research activities are testified by more than 170 publica-

tions in the most important specialized journals and at the main conferences of the microwave scientific community. His research interests include the development of microwave circuits on bio-compatible substrates and enabling technologies for IoT. He is an Associate Editor for *ACES Journal*. From January 2017 to December 2019, he was the Chair of the IEEE Technical Committee MTT-24- RFID Technologies.

#### TC-13 TOPIC EDITOR: MICROWAVE CONTROL TECHNIQUES



**CHRISTOPHER D. NORDQUIST** (Senior Member, IEEE) received the B.S., M.S., and Ph.D. degrees in electrical engineering from Pennsylvania State University, University Park, PA, USA, in 1997, 1998, and 2002, respectively. At Pennsylvania State University, he was an Undergraduate and Graduate Research Assistant from 1995 to 1998 and a National Defense Science and Engineering Graduate Fellow from 1998 to 2001, where he explored heterogeneous integration of compound semiconductor devices through self-assembly. In

2002, he joined Sandia National Laboratories, Albuquerque, NM, USA, where he is currently a Distinguished Member of Technical Staff with the Department of RF/Optoelectronics. He has coauthored more than 80 journal and conference publications and holds nine patents in these areas. His research interests and activities include the design, fabrication, integration, and application of emerging micromachined, and solid-state RF and microwave devices. In this context of exploring new approaches that target key future needs, he has explored the application of a broad range of advanced technology sets including Si, GaAs, InP, GaN, MEMS, and advanced materials. Dr. Nordquist is a Senior Member of the IEEE Electron Device and Microwave Theory and Technology Societies. He is currently the Chair of the IEEE MTT-13 Technical Committee on Microwave Control Materials and is on the Editorial Board of IEEE JOURNAL OF MICROWAVES. He was also the Technical Program Co-Chair for the 2018 IEEE International Microwave Workshop in Advanced Materials, on the IEEE CSICS program committee from 2004 to 2006, a reviewer for several IEEE journals, and was a key contributor to Sandia's 2011 R&D100 Award-winning Microresonator Filters and Frequency References Team.

#### TC-9 TOPIC EDITOR: MICROWAVE AND MILLIMETER-WAVE SOLID-STATE DEVICES



**DAVID S. RICKETTS** (Senior Member, IEEE) received the B.S. and M.S. degrees in electrical engineering from Worcester Polytechnic Institute, Worcester, MA, USA, and the Ph.D. degree in electrical engineering from Harvard University, Cambridge, MA, USA. He is currently a Full Professor of electrical and computer engineering with North Carolina State University, Raleigh, NC, USA. Prior to moving to academia, he spent more than eight years in industrial R&D in the development of integrated circuits in mixed-signal, RF

and power management applications. His work has appeared in *Nature* and in numerous IEEE conferences and journals and was selected for the 2008 McGraw-Hill Yearbook of Science and Engineering. He is the author of two books: *The Designer's Guide to Jitter in Ring Oscillators* and *Electrical Solitons*. His research interests include physics, material science and circuit design, investigating the ultimate capabilities of microelectronic devices, and how these are harnessed by differing circuit topologies to produce the highest performing systems. Dr. Ricketts is the Track Editor of IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES, Topic Editor of IEEE JOURNAL OF MICROWAVES, and Chair of the MTT Technical Committee 9 on Microwave Devices. He was the recipient of the NSF CAREER Award, DARPA Young Faculty Award, and George Tallman Ladd Research Award. In addition as an educator, he was the recipient of the 2009 Wimmer Faculty Teaching Fellow at Carnegie Mellon University, 2013 Harvard University Bok Center Teaching Award, and 2021 William F. Lane Outstanding Teaching Award at NCSU. Since 2015, he has taught experiential hands-on workshops on building a QAM Radio and a FMCW RADAR across the globe at all of the main microwave conferences.

#### TC-8 TOPIC EDITOR: RF NANOTECHNOLOGY



**LUCA ROSELLI** (Fellow, IEEE) joined the University of Perugia, Perugia, Italy, in 1991. In 2000, he founded the spin-off WiS Srl, Foligno, Italy. He was involved in electronic technologies for the Internet of Things for six years. He is currently a Qualified Full Professor with the University of Perugia, where he teaches applied electronics and coordinates the High Frequency Electronics Laboratory. He has authored more than 280 papers (H-i 28, i10 82, and has more than 3000 citations in Google Scholar) and a book *Green RFID Systems*

(Cambridge Univ. Press, 2014). His research interests include HF electronic systems with special attention to RFID, new materials, and wireless power transfer. From 2008 to 2012, Dr. Roselli was a Member of the Board of Directors of ART Srl, Urbino, Italy. He is a Member of the list of experts of the Italian Ministry of Research, the past Chair of the IEEE Technical Committees MTT-24-RFID, Vice Chair of 25-RF Nanotechnologies, 26-Wireless Power Transfer, ERC Panel PE7, and Advisory Committee of the IEEE-WPTC; and Chairman of the SC-32 of IMS. He is also the Co-Chair of the IEEE Wireless Sensor Network Conference. He organized the VII Computational Electromagnetic Time Domain in 2007 and the first IEEE Wireless Power Transfer Conference in 2013. He is an Associate Editor for IEEE MICROWAVE MAGAZINE. He is involved with the boards of several international conferences. He is also a reviewer for many international journals, including PROCEEDINGS OF THE IEEE, IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES, and IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS.

#### TC-16 TOPIC EDITOR: MICROWAVE AND MILLIMETER-WAVE PACKAGING, INTERCONNECTS, AND INTEGRATION



**KAMAL K. SAMANTA** (Senior Member, IEEE) received the graduation degree in science (physics) and Engineering (ECE), the double master's degree in management (R&D) and technology (mmW), and the Ph.D. degree in microwave engineering from the University of Leeds, Leeds, U.K. He has extensive experience of about 25 years and led a multidisciplinary government. He performed scientific and industrial research and technology/product development activities for a wide range of industries, including satellite/space, defense/security, atomic reactor/green energy, high power, semiconductor, and wireless communications, covering frequency MHz to THz and power from  $\mu\text{W}$  (MMICs) to megawatts (SSPAs). His developed products (space-qualified and military- and consumer-grade) include advanced multi-layer/3D components (with antennas/filters), devices, circuits (GaN/GaAs/Si, MMICs/MCM), and systems. He was the Chief/Senior Principal/Lead R&D Engineer, Scientist, and Consultant. He was with Thales Aerospace, U.K. (Radar, EW, and ESM Systems), European Aeronautics Defense and Space (EADS) Astrium (Airbus), U.K., (GaN, HPA, Satellite Comm), Indian Space

(EADS) Astrium (Airbus), U.K., (GaN, HPA, Satellite Comm), Indian Space



Research Organization, ISRO, (satellite payload circuits, Tx/Rx), IPR, Department of Atomic Energy (2MW, 64 active phased array system), Milmeqa (GaN SSPAs), and RFMD and Filtronics Comp Semiconductor (MF MMICs: pt-to-pt radios, PAs). He is currently with Sony Europe B V, U.K., as the Chief Technologist, microwave and mmW, and Technical Lead for the next-generation front-end modules (5G/beyond). He has authored or coauthored more than 75 peer-reviewed publications (first/sole authored) and has delivered more than 45 invited talks, including keynotes/panels at IEEE MTT-S conferences. His research interests include multidisciplinary and multiphysics research and development of novel active/passive devices, multilayer/3D miniaturized components, monolithic integrated circuits (GaAs/SiGe/GaN/InP, PAs), and cost-effective multichip and system-on-package modules, and leading industrial solutions. Dr. Samanta was the recipient of the Commonwealth Fellowship, Best International Researcher Award, and Engineering Excellence Award from IET, London, during 2004–2005. He is a Fellow of IET and Life Fellow of IETE, and a Chair/member of IEEE MTT-S Technical Committees: MTT-16 (packaging/integration), MTT-14 (integrated circuits), MTT-12 (high power), and TC-5 (filters). He is on the TPC of major IEEE MTT-S conferences and was the Guest Editor of special issues published in IEEE microwave journals and magazine. He was/is an Associate Editor for IEEE MICROWAVE AND WIRELESS COMPONENTS LETTERS during 2013–2018, IEEE MICROWAVE MAGAZINE, IET MAP, and IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES.

#### TC-27 TOPIC EDITOR: CONNECTED AND AUTONOMOUS SYSTEMS



**HASAN SHARIFI** (Senior Member, IEEE) received the bachelor's and master's degrees in electrical engineering and the Ph.D. degree in the areas of microelectronics and nanotechnology from Purdue University, West Lafayette, in 1994, 1997, and 2007, respectively. He is currently a Manager of the Department of RF and EO/IR Subsystems, HRL Laboratories, Malibu, CA, USA. His research interests include design, fabrication, and integration of RF/millimeter wave components and subsystems for next-generation phased-array radar, EW

and communication systems, and low-cost, high-performance EO/IR imaging sensors. Before joining HRL, he was a Research Staff Member with Birck Nanotechnology Center, Purdue University, from 2005 to 2009, where he worked on CMOS-based RF integrated circuits and advanced heterogeneous integration and packaging. He has authored or coauthored more than 70 journal and refereed conference papers and holds more than 40 issued patents. He was the recipient of a number of awards, including special and extraordinary merit awards from Purdue University and HRL Labs. He was the Technical Program Committee and Editor of the IEEE Silicon Monolithic Integrated Circuits in RF Systems Conference. He is a Member of IEEE Microwave Theory and Technology and Advanced Packaging societies.

#### TC-14 TOPIC EDITOR: MICROWAVE AND MM-WAVE INTEGRATED CIRCUITS



**ALBERTO VALDES-GARCIA** (Senior Member, IEEE) received the B.S. degree (Hons.) in electronic systems engineering from the Monterrey Institute of Technology, Toluca, Mexico, in 1999, and the Ph.D. degree in electrical engineering from Texas A&M University, College Station, TX, USA, in 2006. In 2000, he joined Motorola Broadband Communications, Nogales, Mexico, as an RF Design Engineer. In 2006, he joined IBM Research, Yorktown Heights, NY, USA, where he is currently a Principal Research Staff Member, Manager of the

RF Circuits and Systems Group. In 2013, he was an Adjunct Assistant Professor with Columbia University, New York, NY, USA. He holds more than 75 issued U.S. patents and has authored or coauthored more than 100 peer-reviewed publications. He is the Co-Editor of the book *60 GHz Technology for Gbps WLAN and WPAN: From Theory to Practice* (Wiley, 2011). His research interests include mm-wave systems for communications and imaging applications. Dr. Valdes-Garcia was the recipient of the 2005 Best Doctoral Thesis Award presented by the IEEE Test Technology Technical Council and 2007 National Youth Award for Outstanding Academic Achievements, presented by the President of Mexico, a co-recipient of the 2010 George Smith Award presented by the IEEE Electron Devices Society, 2017 Lewis Winner Award

for Outstanding Paper presented by IEEE International Solid-State Circuits Conference, and 2017 IEEE JOURNAL OF SOLID-STATE CIRCUITS Best Paper Award. Within IBM, he was twice a co-recipient of the Pat Goldberg Memorial Award to the best paper in computer science, electrical engineering, and mathematics published by IBM Research (between 2009 and 2017). He was inducted into the IBM Academy of Technology in 2015 and was recognized as an IBM Master Inventor in 2016 and 2019. From 2006 to 2009, he was with the IEEE 802.15.3c 60 GHz Standardization Committee. Since 2009, he has been a Technical Advisory Board Member with the Semiconductor Research Corporation, where he was the Chair of the Integrated Circuits and Systems Sciences Coordinating Committee, in 2011 and 2012, respectively. Since 2016, he has been a Member of the IEEE MTT-S Microwave and Millimeter-Wave Integrated Circuits Technical Committee, where he was the Chair during 2020–2021. In 2013, he was selected by the National Academy of Engineering for its Frontiers of Engineering Symposium.

#### TC-4 TOPIC EDITOR: MICROWAVE PASSIVE COMPONENTS AND TRANSMISSION LINE STRUCTURES



**KE WU** (Fellow, IEEE) received the B.Sc. degree (Hons.) in radio engineering from Nanjing Institute of Technology (now Southeast University), Nanjing, China, in 1982, and the D.E.A. degree (Hons.) and the Ph.D. degree (Hons.) in optics, optoelectronics, and microwave engineering from the Institut National Polytechnique de Grenoble, University of Grenoble, Grenoble, France, in 1984 and 1987, respectively. He is currently the Endowed Industrial Research Chair of future wireless technologies and a Professor of electrical engineering

with the École Polytechnique de Montréal (University of Montreal), Montreal, QC, Canada, where he is also the Director of the Poly-Grames Research Center. He was the Canada Research Chair in RF and millimeter-wave engineering and Founding Director of the Center for Radiofrequency Electronics Research of Quebec. He held/holds visiting/ honorary professorships with various universities around the world and has graduated more than 78 Ph.D. and 95 M.Sc. students. He has authored or coauthored more than 1400 refereed papers, and a number of books and book chapters and filed more than 80 patents. Dr. Wu was the General Chair of the 2012 IEEE MTT-S International Microwave Symposium and 2016 President of the IEEE Microwave Theory and Techniques Society (MTT-S). He was an Inaugural North-American representative in the General Assembly of the European Microwave Association. He was the recipient of many awards and prizes, including the inaugural IEEE MTT-S Outstanding Young Engineer Award, 2004 Fessenden Medal of IEEE Canada, 2009 Thomas W. Eadie Medal from the Royal Society of Canada, Queen Elizabeth II Diamond Jubilee Medal, 2013 Award of Merit of Federation of Chinese Canadian Professionals, 2014 IEEE MTT-S Microwave Application Award, 2014 Marie-Victorin Prize (Prix du Quebec), 2015 Prix d'Excellence en Recherche et Innovation of Polytechnique Montréal, 2015 IEEE Montreal Section Gold Medal of Achievement, 2019 IEEE MTT-S Microwave Prize, 2021 EIC Julian C. Smith Medal, 2022 IEEE MTT-S Outstanding Educator Award, and 2022 IEEE AP-S John Kraus Antenna Award. He was also an IEEE MTT-S Distinguished Microwave Lecturer and is a Fellow of the Canadian Academy of Engineering, the Royal Society of Canada, and the National Academy of Science and Engineering of Germany.

#### TC-2 TOPIC EDITOR: DESIGN AUTOMATION



**QIJUN ZHANG** (Fellow, IEEE) received the Ph.D. degree in electrical engineering from McMaster University, Hamilton, ON, Canada, in 1987. He was a Research Engineer with Optimization Systems Associates Inc., Dundas, ON, Canada, during 1988–1990, developing advanced optimization software for microwave modeling and design. In 1990, he joined the Department of Electronics, Carleton University, Ottawa, ON, Canada, where he is currently a Chancellor's Professor. He is an author of the book *Neural Networks for RF and*

*Microwave Design* (Boston, MA, USA: Artech House, 2000), a co-editor of *Modeling and Simulation of High-Speed VLSI Interconnects* (Boston, MA, USA: Kluwer, 1994) and *Simulation-Driven Design Optimization and*

*Modeling for Microwave Engineering* (London, U.K.: Imperial College Press, 2013). His research interests include modeling, optimization, and neural networks for high-speed/high-frequency electronic design and has more than 300 publications in the area. Dr. Zhang is a Fellow of the Canadian Academy of Engineering and the Engineering Institute of Canada. He was an Associate Editor for *IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES* during 2020–2022, Associate Editor for the *International Journal of RF and Microwave Computer-Aided Engineering* during 2010–2018 and the General Chair of the IEEE MTT-S International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization in 2015.

#### ASSISTANT EDITOR



**JACKIE STEELE** received the B.S. degree in journalism/public relations from Cal Poly San Luis Obispo, CA, USA, and the master's degree in international communication from ISCOM, Paris, France. She joined *IEEE JOURNAL OF MICROWAVES* as an administrative and media editor in July 2023. Her experience includes copywriting, strategic communications and social media management in technology, and innovation-focused environments.

#### ADMINISTRATIVE EDITOR



**KARA MCARTHUR** received the B.A. degree in sociology and completed graduate work in health-care ethics from Rice University, Houston, TX, USA. She is currently on two Institutional Review Boards, an oncology IRB and a community IRB in the Dominican Republic. She is an American Medical Writers Association certified medical editor and writer. She has more than 20 years of experience in scholarly publishing, including as the Founding Managing Editor of the *Engineering in Medicine and Biology Society's* first Gold Open

Access journal. Past positions include the Managing Editor of Cambridge University Press's *International Journal of Technology Assessment in Health Care* and the Director of Communications for the Department of Medicine, Baylor College of Medicine, Houston. She has more than 20 peer-reviewed research publications. Her freelance work includes writing, editing, and evaluation research for national and international nonprofits.

#### PRODUCTION EDITOR



**JOANNA GOJLIK** received the B.A. degree in journalism/professional writing from The College of New Jersey, Ewing, NJ, USA, the M.A. degree in liberal studies from the University of North Carolina at Greensboro, Greensboro, NC, USA, and the Professional Certificate in editing from New York University, New York, NY, USA. Since 2004, she has been with the IEEE Publications Operations Department, where she is currently a Journals Production Manager. Over the years, she has been managing a large portfolio of journals/transactions/magazines, including the flagship IEEE journal *PROCEEDINGS OF THE IEEE* since 2007 and the IEEE Computer Society flagship magazine *Computer* since 2021. She has extensive experience in journals copyediting, proofreading, layout, and overall journals production.