


# Introduction to the Spring 2023 Issue

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(Editorial)

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**ABSTRACT** In this release of IEEE JOURNAL OF MICROWAVES we complete our MTT 70th Anniversary issue with an additional six papers that did not make our deadline for the original January publication date. We also bring you fifteen regular papers on a wide variety of microwave topics and applications from wireless signaling inside oil and gas pipelines to textile-based wearable transmission lines. Our performance statistics continue to rise, with January 2023 usage data exceeding 35,000, thus doubling our previous record set in January 2021 with our Inaugural issue. We have also now bubbled up in the popularity charts to #3 out of 233 IEEE journals for usage per article published in 2021 and 2022 – an exceedingly proud moment for a journal that has yet to be archived on any database other than IEEE Xplore and will likely not receive an impact factor for another two years!

**INDEX TERMS** Spring issue, opening editorial, MTT 70th Anniversary Special Issue, usage per article.

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## I. INTRODUCTION

Welcome to our spring 2023 issue of IEEE JOURNAL OF MICROWAVES (JMW). This month we present sixteen regular issue papers and complete our MTT 70th Anniversary special issue with six papers that did not make our original submission deadline. The full set of twenty-seven articles that comprise the special anniversary issue, plus a dedicated introduction, will be re-ordered, repaginated, and re-released as a single full-color print volume for distribution at the 2023 MTT-S International Microwave Symposium (IMS) in San Diego, CA, USA in mid-June 2023 and via request through our journal webpage: <https://mtt.org/publications/journal-of-microwaves/70th-anniversary-issue/>.

Our monthly usage numbers<sup>1</sup> hit an all-time high in January 2023, exceeding 35,000 and more than doubling our prior monthly record set by our inaugural issue release in 2021. Our total usage through March 1, 2023 is now above 288,000. Even without the record count from this past January, we have moved up in the IEEE Xplore usage per article published<sup>2</sup> chart to #3 of 233 IEEE journals, with a count

of 1618 views per article! The current “cites per article” sits at 7.01 on the IEEE Publishing Operations Production Portal (POPP) as of March 9, 2023. Although we cannot correlate either usage or cites per article with a future impact factor, we are at least exceedingly happy with how well we are doing with our readers and authors at this early stage.

We hope the combined winter and spring issues comprising the full MTT 70th anniversary issue content will spur even greater interest in JMW. Meanwhile, we encourage more of you who have perhaps been waiting to see how we would progress as a new publication, to submit your research to us. As I have stated in past editorials, we promise we will to do our best to make sure your experience is a positive one. In this regard, we are again planning a big reception, panel session, and publications booth event<sup>3</sup> at the upcoming MTT Society’s IMS meeting in San Diego on the evening of June 13th where we hope to be able to meet reviewers, authors, and readers one-on-one to discuss our philosophy, publication

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<sup>1</sup>Usage count is the number of times an individual article is either accessed directly online or downloaded to a user through IEEE Xplore. This usage count is recorded in the separate Publishing Operations Production Portal (POPP) Analytics database and updated at the start of each calendar month.

<sup>2</sup>Our total usage (download) count per article published through Dec. 2022 sits at 1618 on the IEEE POPP system. For all of 2021 and 2022 we place third out of 233 established IEEE journals, holding our standing at the end of 2021.

<sup>3</sup>For information see: <https://mtt.org/ims2023-journal-event/>

goals, and content. Please plan to come if you are attending this conference.

In our last issue [1], we introduced our Outstanding Reviewers program and our 2021/2022 honorees. You can also find their names on our new Reviewer Recognition webpage: <https://mtt.org/publications/journal-of-microwaves/reviewer-recognition/>. We also announced our winning article for our 2021 Best Paper prize which you can download here: <https://ieeexplore.ieee.org/document/9318744> and our runner-up, which is accessible here: <https://ieeexplore.ieee.org/document/9318753>. Our best paper prize committee is now working on the articles from JMW Volume 2 and we hope to announce another winning paper and a new set of outstanding reviewers in January 2024. We are also planning to introduce a new editorial series this summer which we are calling “Making Waves.” This series will be composed of general interest articles on popular, but also controversial, topics in the microwave world. We hope it will stimulate some back-and-forth discussion. And now, onto our technical content for IEEE JOURNAL OF MICROWAVES, Volume 3, issue 2.

## II. REGULAR ISSUE CONTENT

As with our January 2023 issue, this April release is also divided into two parts. The first part contains our regular paper contributions, which have been accumulating since early December. The second portion represents Part 2 of our MTT 70th Anniversary special issue and contains additional papers that either were received too late, or took an extended time in the review process and could not be included in our January release. As already stated, these extra papers will be combined with the 70th Anniversary issue papers from the January issue and re-released in a single print compendium. All the articles can also be retrieved using a quote delimited search on IEEE Xplore with the phrase “MTT 70th Anniversary special issue.”

This month we have a pretty well packed set of regular paper contributions spanning an unusually wide swath of topics. Our lead-off article is a fascinating study and demonstration of a wireless communications system, targeted for oil and gas pipelines and using circular waveguide modes for propagating the signals. The authors, Konstantinos Kossenas, Symon Podilchak, and Martin Beveridge, all hail from Scotland, U.K. This interesting applications paper comes complete with a nice video demonstration that is sure to please! The paper is titled “Microwave System Development for Wireless Communications inside Oil and Gas Well Pipelines.”

Our second regular submission moves us from geology to astronomy – Earth to space. Jacob Kooi and a large team primarily from the NASA Jet Propulsion Laboratory in Pasadena, CA, USA, describe a broad-bandwidth VLBI (very long baseline interferometry) receiver operating at a significantly higher frequency than prior instrumentation. The receiver is part of the ICRF (International Celestial Reference Frame) which provides highly accurate position information for celestial objects. The paper, “A Multi-octave 8 GHz – 40 GHz Receiver for Radio Astronomy,” uses state-of-the-art

microwave technology and techniques and makes for very interesting reading.

Moving from the macroscopic and cryogenic environment of celestial space to the microscopic test and measurement environment of cryogenic wafer probing “On-Wafer Vector-Network-Analyzer Measurements at mK Temperatures,” was sent to us by MTT Life Fellow Dylan Williams at the National Institute of Standards and Technology (NIST) Boulder and a local team in Colorado, USA. The paper discusses the very difficult tasks involved in calibrating and accurately measuring scattering parameters from superconducting transmission lines integrated on printed circuit boards at millikelvin temperatures. The realized techniques have applications for interrogating quantum computing circuits and devices and the measurement system is demonstrated at frequencies up to 15 GHz.

The use of machine learning to enhance electromagnetic (EM) modelling is the subject of “PACOSYT: A Passive Component Synthesis Tool Based on Machine Learning and Tailored Modeling Strategies towards Optimal RF and mm-Wave Circuit Designs.” The paper was contributed by Fabio Passos at the Telecommunications Institute in Lisbon and colleagues in Portugal and Spain. It describes a new software tool for designing optimized inductor and transformer circuits. The software uses open source code and has the capability of being directly integrated with other more expansive EM design and simulation packages.

Our next several papers are all on the topic of microwave radar, which has a substantial repeat author pool within our JMW community. Christian Waldschmidt of Ulm University along with colleagues from Technical University of Munich and Robert Bosch GmbH in Germany, contributed “Enhancing the Dynamic Range of OFDM Radars using Non-Linear Operation and Symbol-Based Equalization.” The paper looks at characterizing and mitigating some of the common problems encountered in orthogonal frequency-division multiplexing (OFDM) modulation techniques. A new methodology for transmit operation is proposed and demonstrated to improve OFDM radar performance.

A second paper from Christian Waldschmidt and his radar group at Ulm University in Germany titled, “UAV-Based Bistatic SAR-Imaging Using a Stationary Repeater,” proposes and analyzes a new bistatic synthetic aperture radar employing a repeater rather than two complete radar systems. The less complex arrangement provides both mono and bistatic SAR imaging capability with a single dataset.

“The Impact of Antenna Array Calibration Errors on MIMO and Multi-Channel Synthetic Aperture Radar Imaging” is the title of another paper from Martin Vossiek’s group in Erlangen, Germany. The article discusses a method for bounding the distortions caused by calibration errors in specific radar scenarios and predicting the number and position of ghost images. Validation is performed with a 76 GHz FMCW MIMO radar.

Radar systems and all simultaneously operated transmit/receive front-ends require extreme isolation in the Tr/Rx

channels. The paper, “Improving Isolation in Monostatic Simultaneous Transmit and Receive Systems Using a Quasi-Symmetrical Self-Interference Cancellation Architecture,” from Elias Alwan’s group at Florida International University, USA presents a design that yields 33-42 dB of transmit/receive isolation in the ISM band (2.4 GHz). The realization has competitive performance and uses only two circulators, a hybrid coupler, and a specialized cancellation circuit.

Moving from radar systems to transmission line systems, we have a second unusual applications article this issue from Symon Podilchak at University of Edinburgh and Heriot-Watt University and colleagues in Scotland. This contribution is on wearable transmission lines and is titled “Flexible Textile-based Coaxial Transmission Lines for Wearable Applications.” The paper describes a 50 ohm coaxial line made from metallic and low-loss polymer threads. Extensive characterization and performance under various bending and moisture conditions are presented. The transmission lines are designed to operate in the 2.4 GHz ISM band and provide a basis for some very interesting microwave wearable circuits and applications.

In “Performance Evaluation of Broadband Characterization of Coupled Transmission Lines Even- and Odd-Mode Propagation Constants using Differential and Common Mode S-Parameters,” Enrique Márquez-Segura and student Mario Pérez-Escribano of Universidad de Málaga, Spain discuss the proper excitation to be applied to transmission lines carrying both even and odd modes. They show potential errors if proper excitations are not utilized, produce figures of merit, and experimentally verify their models up to 67 GHz.

Dielectric loss measurements are the subject of “A Conformal Mapping-Based Broadband Method to Extract Propagation Properties of Dielectrics using Coplanar Waveguides with Air Pockets.” The paper was contributed by Eduardo Rojas and student Seng Loong Yu at Embry-Riddle Aeronautical University in Florida. The authors use a coplanar waveguide with integral air slots to model and measure losses against slot depth and to extract accurate permittivity data for the substrate. The technique is demonstrated from 2-29 GHz and is shown to work well on hard-to-characterize low-loss-tangent materials in the range of 0.02-0.055.

Bracketing our sights on filters now, we include two papers on this popular microwave topic in this issue. The first, from Zai-Cheng Guo and Longji Chen at Nanjing University and Lei Zhu at University of Macau in China, describes a stacked cavity filter with enhanced stopband performance. The paper is “Modular Design of Waveguide Bandpass Filters with Improved Stopband and High Selectivity.” The second filter article, “Widely Tunable TM-Mode Dielectric Filters with Constant Absolute Bandwidth Using Re-Entrant Caps,” comes from Michael Höft and student Abdulrahman Widaa at Kiel University in Germany. It presents a uniquely

tunable combline filter with constant bandwidth over the full tuning range. Tuning is controlled by an inserted cap that moves up and down in the filter resonator cavity. The design is extremely wide band and boasts low insertion loss. The filters are demonstrated in the 1-3 GHz frequency range.

Our last regular paper for this April issue is from James Buckwalter, student Jeff Shih-Chieh, and Wonho Lee at UC Santa Barbara, USA. The paper is titled “High-Efficiency 200-GHz Neutralized Common-Base Power Amplifiers in 250-nm InP HBT;” and covers the design and performance of two indium phosphide based HBT power amplifiers operating in the 180-220 GHz band. The authors achieved almost 20 dBm output power and 13% power added efficiency in the 185-210 GHz range using 4-way power combining.

We hope you enjoy these regular papers in addition to our special MTT 70th Anniversary issue papers which follow.

### III. MTT 70TH ANNIVERSARY SPECIAL ISSUE PAPERS

Due to the large number of contributions and the restricted time schedule for input and review of our special issue papers, we were forced to break our MTT 70th Anniversary special issue into two parts. The first part, consisting of 21 papers, appeared in our winter release of IEEE JOURNAL OF MICROWAVES [1]. The second part contained herein, consists of five additional invited manuscripts which are summarized below. After all of the special issue papers have appeared online as part of the first two issues in volume 3 of IEEE JOURNAL OF MICROWAVES, we are hoping to collect the articles, re-order them, add a new dedicated introductory editorial, and then generate an archival quality, full-color print issue (similar to our inaugural print release [3]) that we will distribute at the June 2023 International Microwave Symposium. We also hope to distribute the print issue through the postal service to a select number of direct requestors. Details for how to receive one of these special print copies will appear on our website as well as in our July issue.

The special issue papers that appear in this issue include an extensive historical overview of the MTT Society as well as several overview papers on specific subfields, and a couple of papers on current research topics of growing interest and applicability.

We open our special issue papers with an article that all 11,000 plus members of the MTT Society should be eager to read. It is contributed by MTT-S honorary life member, John T. Barr IV. The paper comprises a seven-decade overview of the society’s activities and accomplishments. John has meticulously combed through all of the Administrative Committee meeting minutes, International Microwave Symposia final reports, IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES special conference issues, MTT-S Newsletters, and our historic photos collection to bring us this most comprehensive overview to date of our society

activities and accomplishments. This 37 page overview covers the early roots and the 70 years since the organization's founding in 1952, going up to present day. You will find a virtual laundry list of details and accomplishments, along with some historic documents, photos, and references that are very hard to come by in a simple database search. If you have an interest in the detailed heritage, directions, and accomplishments of our local community of microwave engineers, you will not want to miss reading "Seven Decades of MTT-S."

Our second 70th Anniversary issue paper is from well-known researcher Naoki Shinohara and a series of very highly regarded energy harvesting, RFID, and wireless power transfer experts, and led by Kyriaki Niotaki at the Institut Polytechnique de Paris, France. "RF Energy Harvesting and Wireless Power Transfer for Energy Autonomous Wireless Devices and RFIDs" is an extensive review paper that includes almost every expert we have within the MTT Society and provides a great overview of the technologies, historic development, and current challenges facing wireless charging and energy harvesting in a wide range of existing and upcoming applications.

Prolific radar and device expert Christian Waldschmidt, with Tobias Chaloun and Susanne Brandl at Ulm University, and colleagues from LPKF Laser and Electronics AG, Garbsen, Fraunhofer IZM, Berlin and Magdeburg University, all in Germany, contribute a very interesting overview of new heterogeneous substrate technologies for the integration of devices and components on low loss, thermally efficient glass ceramics. Their paper, "RF Glass Technology is going Mainstream: Review and Future Applications," gives a great overview into a potentially ubiquitous future substrate technology and includes 175 references.

Also showcasing a potential future fabrication technology is an article from Nelson Fonseca at ESTEC, The Netherlands and colleagues O. A. Peverini, M. Lumia, G. Addamo and G. Virone from Istituto di Elettronica e di Ingegneria dell'Informazione e delle Telecomunicazioni (IEIIT) in Turin, Italy. "How 3D Printing is Changing RF Front-Ends for Space Applications," describes the advantages of 3D printing for enhancing RF front-end components. Several unique array architectures and hard-to-fabricate 3D antennas are presented.

Nils Pohl and his team at Ruhr University in Bochum, Germany present a 125 GHz vector modulator circuit on silicon-germanium which can be used for phase shifting, switchable amplification, and binary phase modulation in MIMO and phased array radar applications. The circuit has very competitive performance, high gain, and digital control. The title is "Compact and Digitally Controlled D-Band Vector Modulator for Next-Gen Radar Applications in 130 nm SiGe BiCMOS."

Our final special issue paper also looks at emerging materials technologies. It is from Tejinder Singh at University of

Waterloo, Canada and colleagues from Sandia National Labs, USA, and King Abdullah University of Science and Technology, Saudi Arabia. The article discusses chalcogenide phase change and metal insulator transition materials that are now being used to realize reconfigurable RF circuits, filling the gap between traditional semiconductor diodes and microelectromechanical switches. The paper is "Recent Advancements in Reconfigurable mmWave Devices Based on Phase-Change and Metal Insulator Transition Materials."

In order to make it possible to bring up all the papers in both Part 1 and Part 2 of the MTT 70th Anniversary special issue on IEEE Xplore or other article search engines, every paper contains the index terms "MTT 70th Anniversary Special Issue." By grouping all five words in quotation marks, the entire set of published special issue papers can be accessed within a single search.

We hope you find these, and all our special issue articles as well as our regular contributions, both interesting and useful. Please visit our website: <https://www.mtt.org/publications/journal-of-microwaves> for updates and information on how to get the special MTT 70th Anniversary issue print that is planned to be available this June.

#### IV. 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 to keep 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>4</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 multiple journals. Our efforts are also aided by a senior Administrative Editor, Kara McArthur, a very experienced Assistant Editor, Sharri Shaw, 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 we would like to acknowledge exceptional help and support from IEEE's Louis Vacca and Joanna Gojlik for getting all of our very first special issue content completed and published, and for arranging for the special printing and distribution of this content in a limited release full-color paper

<sup>4</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/>).

volume. The EiC would also like to thank the Topic Editors who have gone above and beyond in processing all the papers for this issue, but especially the ones designated for Part 1 and Part 2 of the 70th Anniversary Special Issue, which required special handling and processing to meet our deadlines. The EiC would also like to again thank Prof. Ke Wu for his exceptional and continuing service to JMW and for the extra effort and time he has put into making the special anniversary issue a reality.

## REFERENCES

- [1] P. H. Siegel, "Introduction to the winter 2023 issue," *IEEE J. Microwaves*, vol. 3, no. 1, pp. 4–15, Jan. 2023.
- [2] P. H. Siegel, "Microwaves are everywhere: 'SMM: Nano-microwaves,'" *IEEE J. Microwaves*, vol. 1, no. 4, pp. 838–852, Oct. 2021.
- [3] P. H. Siegel, "Introduction to the IEEE Journal of Microwaves," *IEEE J. Microwaves*, vol. 1, no. 1, pp. 5–13, Jan. 2021.

## 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 & MICRO-WAVE/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 RFPA 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 & TC-10 TOPIC EDITOR: MICROWAVE PHOTONICS & 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).

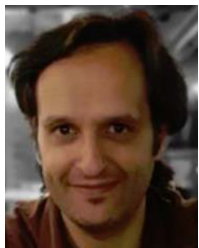
#### TC-29 TOPIC EDITOR: MICROWAVE AEROSPACE SYSTEMS



**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 (ENSEEIHT), 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

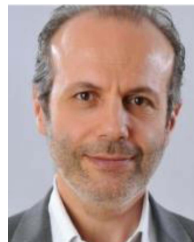


**FRANCISCO MESA** (Fellow, IEEE) received the B.Sc. and Ph.D. degrees in physics from the University of Seville, Seville, Spain, in 1998 and 1991, respectively. From 1992 to 1997, he was an Assistant Professor with the Department of Applied Physics, University of Seville, where he was promoted to an 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. Prof. 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).

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#### 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. Prof. 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  $\mu$ W (MMICs) to megawatts (SSPAs). His developed products (space-qualified and military- and consumer-grade) include advanced multilayer/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 Research Organization, ISRO, (satellite payload circuits, Tx/Rx), IPR, Department of Atomic Energy (2MW, 64 active phased array system), Milmega (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.

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#### 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

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. Prof. 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



**SHARRI SHAW** currently resides in Grand Rapids, MI, USA. She received the B.A. degree in English and a minor in psychology from Saginaw Valley State University, University Center, MI, USA, in 1994, and the master's degree in education with initial certification (M.Ed.) Program from Aquinas College, Grand Rapids, MI, USA. From 2002 to 2005, she was a teacher in Michigan. From 2006 to 2010, she was an Assistant Editor for IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES. She currently holds the same

position with IEEE MICROWAVE MAGAZINE, and is the Publications Administrator for IEEE TRANSACTIONS ON TERAHERTZ SCIENCE AND TECHNOLOGY. She started her additional new role as an Assistant Editor for IEEE JOURNAL OF MICROWAVES in November 2021. She received the Secondary Level Teacher Certification from Aquinas College.

#### 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.