IEEE Journal of Microwaves

Received 24 June 2024; accepted 24 June 2024.
Date of current version 12 July 2024.

Digital Object Identifier 10.1109/JMW.2024.3419772

Introduction to the Summer 2024 Issue

PETER H. SIEGEL (Life Fellow, IEEE)

(Editorial)

THz Global, La Canada, CA 91011 USA
Department of Electrical Engineering, California Institute of Technology, Pasadena, CA 91125 USA
NASA Jet Propulsion Laboratory, Pasadena, CA 91109 USA

(e-mail: peter@thzglobal.com)

ABSTRACT Welcome to the summer 2024 issue of IEEE JOURNAL OF MICROWAVES! This month we bring you twenty-one new research papers plus our 2023 Impact Factor! After three and a half anxious years and countless hours of effort we have now received our Clarivate rankings and the news is good. The 2024 Journal Citation Report came out on June 20 and IEEE JOURNAL OF MICROWAVES received a journal impact factor (JIF) of 6.9, putting us 34th of 354 journals in electrical engineering and **3rd** amongst journals in the Emerging Sources Citation Index (ESCI). Our Scopus Citescore was also received and lists us at 10.7. We are off to a good start and have plans to move to bimonthly issues in 2025. Keep an eye out for our upcoming special issue on Microwaves in Climate Change towards the end of this year.

INDEX TERMS Opening editorial, summer issue, web of science, impact factor, CiteScore.

I. JMW NEWS

We now have an impact factor! On June 20th, Clarivate released its 2024 Journal Citation Report. IEEE JOURNAL OF MICROWAVES was listed with a journal impact factor (JIF) of 6.9, putting us 34th amongst 354 journals (90th percentile, first Quartile) in electrical and electronic engineering and 3rd amongst EE journals on the emerging sources citation index (ESCI)! Although the formula is well advertised and transparent, actually calculating an impact factor for a particular journal is not as simple as it looks. The value is determined by counting the total number of citations appearing in Web of Science indexed articles throughout 2023 to those articles we published in 2021 and 2022, and then dividing by the number of articles we published in 2021 and 2022. The difficult part is of course determining the numerator because the citations must appear only within papers published in 2023, and most databases just keep track of the total citations a paper receives in all years since it was published. Fortunately, Clarivate did the calculation for us and came out at 6.9. Just to be certain, I did the calculation manually (paper by paper and citation by citation) and found Clarivate's number to be more or less correct (the discrepancy being related to which papers we count as "research" and which we count as "editorial" or "special features)". Simultaneously, we also received a CiteScore from Scopus which came to 10.7. It is worth taking a slightly deeper look at the Clarivate rankings and the CiteScore to see how we compare with other journals.

The CiteScore is a bit easier to unwrap, so we start with this metric. The cites-per-article count on each journal indexing service differ based on the content carried on the particular index. In the case of IEEE's Xplore Analytics, the internal database that EiC's use to keep track of many different metrics for their journals, the IEEE JOURNAL OF MICROWAVES cite count is listed at 12.41 per article out of 252 articles published to date (as of July 1). This cite count is updated monthly and includes all articles carried on IEEEXplore. The same citations-per-article statistic on Web of Science has us at 9.58 out of 265 articles that are currently indexed (WoS has a 1–3 month lag in article indexing after posting on IEEEXplore, but is updated more frequently and includes Early Access articles). Scopus has JMW at 10.7 cites per article for 232 articles and puts us in the 92nd percentile of all journals in Condensed Matter Physics! So much for Elsevier.

As you can see it is a daunting task to cross-compare indexing platforms and statistics, but we must be aware of these in order to gauge both current and future interest within our local community as well as where we stand overall in the science publishing universe.

Looking more closely at the Journal Citation Report for JMW, we find that most of our cites came from articles we published in 2021 (71%) and the vast majority of our citations (over 90%) came from IEEE journals. This is not surprising as we were not indexed on Web of Science or Scopus until the end of 2023. Within the IEEE suite of journals, JMW was

© 2024 The Authors. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 License. For more information, see https://creativecommons.org/licenses/by-nc-nd/4.0/

cited almost equally by the IEEE Transactions on Antennas and Propagation, the IEEE Transactions on Microwave Theory and Techniques, and by JMW articles themselves. IEEE Access was a close 4th. The largest non-IEEE cite count came from MDPI's Sensors (ISSN 1424-8220). Our largest contributing countries are the USA, followed by Germany (50% less papers), China (20% of US total), then Canada, Italy, Netherlands, Japan, France, England, Spain, and Sweden - each with about 10% of the US count. The larger number of German papers is likely due to IEEE's "Read and Publish" arrangement with this country, but we also have a very loyal following of authors from several prestigious (and prodigious) academic institutions in Germany. Finally, looking at some additional JCR metrics of note, JMW's article influence score came in at 1.893 (the mean is 1) which indicates that our articles are having above average influence. Also, we were extremely pleased to see that we came in 3rd out of 87(if I counted correctly) journals on the Emerging Sources Citation Index (ESCI). This is an amazing achievement!

Going back to our traditional tracking metrics, JMW's monthly usage counts (views and downloads) topped 575,500 at the end of June, and the usage per article has risen from 1531 at the end of 2023 to 1635 on July 1, 2024. The IEEEXplore cites per article count as of July 1 was 12.41.

In other news, we have received final approval to increase our issue count from four to six beginning in January 2025. We plan to release bimonthly throughout 2025 and possibly through 2026 depending on where we want to take the journal moving forward. This EiC's desire is to stay broad-based and high-value, so we will be trying to keep to 100-150 or so papers per year at least through the next 18 months.

Finally, we remind authors and readers that our paper deadline for our upcoming special issue on *Microwaves in Climate Change* is upon us, and we are looking forward to receiving articles relevant to the call. We may extend the special issue into 2025 with a "Part 2" if it shows itself to be a popular as well as very relevant topic in order to accommodate some late papers, and perhaps some new authors that were hesitating to submit to a journal without an impact factor!

II. SUMMER ISSUE CONTENT

We had a bit of an uptick in our article submission count after the release of our January issue and have accumulated 21 new research papers for this summer release. As usual, we try to span a very large swath of the microwave technology and applications areas, and the July issue papers continue this trend. Despite a large concentration of radar and filter papers, we also have a biomedical article, two theory papers, some device and circuit articles, a couple of cross-over antenna papers, metasurface lenses and mirrors, and even an article on power beaming.

We begin our issue with a very nice review article from the well respected bio-RF group at the University of Rennes, France. The paper [A1], "Physical Interactions Between Millimeter Waves and Human Body: From Macro- to Micro-Scale," by Giulia Sacco and Maxim Zhadobov reviews the interactions and impact of 5G-band frequencies on human skin, updating both recent studies and their own conclusions over the past ten years. Several new results are presented that highlight the effects of skin thickness, age, body curvature, the effect of clothing, and interactions at both the sub-wavelength and subcellular level – micro-scale interactions, that are changing the way we perceive and protect against excessive SAR (specific absorption rate). This is a great update for those just getting into this important area of RF safety as we add more and more RF devices (and potential exposure) within our environment.

Our second paper this issue is from one of our most prodigious contributors to JMW, Christian Waldschmidt at Ulm University in Germany. This paper [A2], "On Distributed Radar Networks: Signal Model, Analysis, and Signal Processing," with first author Vinzenz Janoudi, a graduate student at Ulm, and colleagues at both Ulm and Mercedez-Benz in Sindelfingen, Germany, describes a technique to increase the virtual aperture of a MIMO-based radar antenna network by increasing the antenna-to-antenna spacing, but without compromising the range resolution. The authors show that traditional Fourier transform techniques cannot be used to realize this large antenna spacing advantage and they go on to describe an alternative signal processing model that can be employed. The new methodology is verified on a 76–81 GHz automotive mutliple-input and multiple-output (MIMO) radar system with 64 channels and antennas spaced at twice the wavelength, comprising a half-meter aperture with a range resolution of 3 cm.

Our third paper comes from the notable RF power beaming group at Kyoto University in Japan, led by Naoki Shinohara, along with Space Power Technologies in Kyoto founded by Minoru Furukawa. The authors describe a low-cost power beaming system at 5.8 GHz that has a reconfigurable beam direction. The circuit uses a switchable 2D Rotman lens feeding a large 2D patch array (for creating the focused beam), rather than more expensive phase shifters, to steer the beam. The system is demonstrated on a distributed LED panel with selectable power-on regions triggered by electronically steering the RF beam from place to place on the panel. Focusing onto the panel takes place in the near field of the lens-plus-array beam former and transmitter, and significant power transfer occurs. The paper is titled [A3] "Realization of Electrically-switched Dynamic Focused Beam Charging System with a Reconfigurable Phase-change Cascaded Feed Network for Wireless Power Transfer."

Another prolific contributor to JMW, Nils Pohl at Ruhr University, Bochum, along with students and colleagues from Fraunhofer Institute for High Frequency Physics and Radar Techniques, Wachtberg, and Infineon Technologies AG, Neubiberg, all in Germany, describe a very broad band FMCW radar system that combines two voltage controlled oscillators tuned in opposite directions and coupled through a mixer to realize a total tuning range of 66% from 74 to 178 GHz. Although the wide tuning results in higher phase noise overall, it is not so dramatic a decline as to be a significant hindrance in most applications. The extra bandwidth enables range resolution differences down to only 2mm! This is a significant achievement for millimeter-wave FMCW radar instrumentation. The paper is [A4] "Ultra-Wideband Transceiver MMIC Tuneable from 74.1 GHz to 147.8 GHz in SiGe Technology."

In [A5], "C/Ka Concurrent Dual-Band GaN MMIC Based on Shorted Quarter-Wavelength Line Topology," Taylor

Barton and student Adam Der, tackle the wide band set-asides for 5G by describing and demonstrating a dual-band high power GaN amplifier operating at 4–6 and 26–31 GHz. The method, which de-couples the low frequency and high frequency matching networks, is generalizable and the presented C/Ka band MMIC has greater than 30 dB of output power over both bands, gain above 12 dB, and a power added efficiency of 20–30%.

Our next contribution, from Sebastion Fregonese and Thomas Zimmer at the University of Bordeaux, France, discusses improvements to standard on-wafer calibration techniques at 40 GHz and beyond. The authors use a combination of electromagnetic simulations and through-reflect-line (TRL) measurements to better determine the 16-term error correction matrix used for network analyzer calibration employing on-wafer standards. The improved technique helps to correct probe mismatch and discontinuities introduced between differing frequency bands. The authors implement their method using a BiCMOS 55 nm chip technology to realize their on-wafer standards. The paper is [A6] "Establishing On-Wafer Calibration Standards for the 16-Term Error model: Application to Silicon High-Frequency Transistor Characterization."

Jose Pedro and a team at the University of Santiago, Portugal also look at TRL calibration techniques, but from a more fundamental perspective. They show that the accuracy of the de-embedding method, especially with differential impedance on the probe and device side, is very dependent on the size and form of the mismatch. Proper construction of the probes so that they most closely match the device under test is thus very critical. They illustrate their points with detailed examples of specialized launching probes and experiments on test devices with varying real and complex impedances. The paper is a significant step forward in helping understand and mitigate the wide variation of measurement errors that typically accompany high frequency TRL calibration procedures. The paper [A7] is "The Impact of a Taper Impedance Transformation on the TRL De-Embedding Error."

In [A8], T. Pfahler, A. Scheder, A. Bridier, M. Nagel and M. Vossiek, "A Foil Flip-Chip Interconnect with an Ultra-Broadband Bandwidth of 130 GHz and Beyond for Heterogeneous High-End System Designs," the authors present a very broadband substrate-to-substrate interconnect based on co-planar waveguide (CPW) that has very low insertion loss (0.3dB) and small mismatch (<20 dB) over a frequency range of 1 to 130 GHz. The interconnect uses a flip-and-place design to join two separated MMIC chips with matching CPW lines. The bridging foil circuitry replaces and performs much better than traditional ribbon bonds, especially above 50 GHz. It is also flexible and can be used to join chips that differ in height above a common substrate.

Metasurface lenses and mirrors are the subject of our next article from Christoph Kohlberger and Andreas Stelzer, at University of Linz, and Saeid Karamzadeh at Silicon Austria Labs, Austria. "Active and Passive Lenses From Coupled Square Ring Slots," [A9] details the structure and performance of square ring resonators arrayed on stacked (two-layer) printed circuit boards to create both mirrors and lenses at 26 GHz. The lenses are particularly intriguing given their flat contour and good sidelobe performance. The authors also demonstrate a tunable focus using active varactor elements on the resonators to adjust the phase.

In a second paper on metasurfaces, Xin You and Panagioltis Kosmas from King's College, U.K., present a more accurate circuit model for reconfigurable metasurfaces using Floquet mode theory. They apply their analysis and optimization techniques on metasurfaces tuned with varactor elements and show excellent agreement with finite element simulators, but with the ability to dynamically control the performance. The paper is [A10], "Equivalent Circuit Modeling of a Novel Reconfigurable Metasurface with Independent Control of Amplitude and Phase based on Floquet Modal Expansion."

The problem of unwanted transceiver vibration in active edge sensing radar systems is tackled by Stanford University's Nikhil Poole and Amin Arbabian in [A11] Anchor-Based, Real-Time Motion Compensation for High-Resolution mmWave Radar." The authors present a real-time motion compensation algorithm that can improve the signal-to-noise of these FMCW radar systems by more than 20 dB using post-processing with a latency of less than 240 ms. The algorithm also reduces multimode vibrational artifacts that cause intermodulation sidebands. The resulting early demonstrations of the performance of the new algorithm are impressive and once fully perfected and tested, it should find use in many applications, including the targeted vehicular radars.

A second contribution from Christian Waldschmidt and colleagues at Ulm University in Germany, involves the synchronization of individual elements in a large radar network [A12]. "Uncoupled Digital Radars Creating a Coherent Sensor Network" describes a technique to categorize and reduce sampling frequency offset, carrier frequency offset, and timing offset errors in large radar networks employing multiple sensors. The authors demonstrate their approach on a 77 GHz multiple-element radar measurement system and show the levels of individual element synchronization that are required to achieve optimal performance.

In another interesting contribution from the prolific group of Nils Pohl at Ruhr University Bochum, and Fraunhofer Institute for High Frequency Physics and Radar Techniques in Wachtberg, Germany, the authors discuss and demonstrate a fairly new harmonic radar technique based on fractional (rather than integer) harmonic multiplication. Traditional harmonic radar systems using second or even third harmonic multipliers in the transmitter have been widely used in the past as specialized car radar RFID tags to separate out reflected signals coming from vehicles directly in the front (or rear) of a moving car from clutter that comes from objects or vehicles in adjacent lanes. The harmonic detection greatly increases primary signal detection in a very cluttered environment. However, finding available frequency spectrum at both a fundamental and harmonic frequency within the allowable RF allocation bands is difficult. If the requirement for a direct harmonic frequency pair is eliminated and a non-integer multiplication is allowed, it opens up a huge application space for this type of clutter reducing RFID style radar. The authors propose and illustrate their radar circuit implementation concept using 80 and 140 GHz (1.75 multiplication factor). They compare their new results to prior systems from the same

group as well as other inharmonic radar applications that have been deployed over the last few years. Although they measure reduced range sensitivity compared to earlier systems, the demonstrated instrument could be deployed within the already allocated automotive radar spectral bands at 76–81 and 134–141 GHz, which do not have harmonically related frequency spans. The paper is [A13] T. Braun, J. Schopfel, C. Bredendiek, J. Forero Bernal, and Nils Pohl, "Introducing Inharmonic Radar: Tag Detection in the Automotive Bands of Present and Future at 76–81/134–141 GHz via Fractional Multiplication."

Our last radar paper contribution to this issue comes again from Martin Vossiek and colleagues at Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, and is titled [A14] "Constellation Estimation, Coherent Signal Processing, and Multiperspective Imaging in an Uncoupled Bistatic Cooperative Radar Network." The article discusses a new signal processing scheme targeted for automotive radars that synchronizes phases and scattering signals from different directive elements in uncoupled bistatic radar networks and results in more accurate localization (below 6 cm) and angular resolution (less than 2.5 degrees) of targets. The authors test their algorithm on 77 GHz automotive radar systems.

We change over to the subject of circuit matching networks in the paper by Farzad Yazdani and Mansour Raafat at the University of Waterloo, Canada, with [A15] "Dual-Band Reconfigurable Impedance Matching Networks." The paper addresses the problems associated with matching components and connecting transmission lines over broad bandwidths and details a dual-band approach using tunable phase shifters and filters. An example of the methodology is included for a 3.4/3.7 GHz reconfigurable impedance matching network with a widely varying complex load impedance. The method is expected to apply to a wide range of broadband matching problems.

Another matching problem – this time for feeding a 30 GHz circularly polarized antenna array – comes to us from Z. Al Masri, A. Jabri, Y. Tawk, and J. Costantine at the American University of Beirut, Lebanon. The paper [A16] "A Groove Gap Waveguide Feeding Network for Dual-Circularly Polarized Antenna Arrays," shows the design of a groove waveguide structured feed for a large corporate array. The feed can provide ± 116 degrees of phase shift from 28–32 GHz and has a realized insertion loss of only 0.55 dB.

In [A17] "Arbitrary-Order Output Intercept Points of an Analog Receive Beamforming System," authors from the US Naval Research Laboratory present an approach to identify the impact of nonlinear RF behavior from elements in an analog receive beam forming array. They identify upper and lower bounds for the signal distortion and present a comprehensive and general analysis method for characterizing output signals from analog arrays with one or more "bad" non-linear elements, typically in the low noise amplifier stage. The method is very general, however, and can be applied in a wide variety of nonlinear circuit arrays.

An unusual stacked CPW line to waveguide transition is the subject of [A18] "Broadband GCPW-to-Waveguide Transition in Multi-layer Dielectric Substrates with Modified V-shaped and Double Patch in 270 GHz Band," from C. Chokchai et al. at the Nagoya Institute of Technology in Japan. The paper shows the design and performance of a waveguide bandwidth transition covering roughly 240–310 GHz with insertion loss below 2.5 dB and input reflection loss below 10 dB. The unusual structure of the transition makes it interesting and might open up other similar style interconnects with good performance at millimeter-wave frequencies.

Dimitra Psychogiou from University of Cork, Ireland, and colleagues, contributed a paper that presents a novel 3D printed bandpass filter structure which can be monolithically integrated onto a variety of substrates and uses a dome-shaped resonator for the signal separating element. "Monolithically-Integrated 3D Printed Bandpass Filters Using Highly-Miniaturized Dome-Shaped Resonators," [A19] contains the analysis, construction, and measurements on several very novel looking structures to realize first, second, and third order filters in the 5–10 GHz frequency range with high Q, good bandwidth, and small size.

Our next to last paper is a very practical application in numeric analysis to transform semi-infinite regions to compact wavelength scale structures that greatly facilitate finite element calculations. The authors have such a clearly written abstract it is easiest to simply reproduce it here [A20]: "In this paper we introduce the use of several different Infinite Mapping Layers to model open boundaries in the 2-D Finite Element Method for the computation of transmission line parameters. The transformation maps a semi-infinite interval to a finite interval, thereby providing a simple and accurate description of open boundaries while keeping the size of the computational domain very compact. The method has been evaluated and tested on a variety of common transmission line geometries appearing in the literature and its accuracy is validated by comparing the results with canonical cases having closed expressions and with arbitrary geometries computed with commercial software tools. Various geometrical transformations have been developed and tested, and their performances evaluated in terms of accuracy and efficiency. Finally, the possibility of using a radial Infinite Mapping Layer has also been considered." The paper is titled "Modeling Transmission Lines With Open Boundaries via Infinite Mapping Layer," and comes to us from our colleagues in Italy at Polytechnic Institute in Milan and from Madrid, Spain.

We close off our summer issue with another nice analysis paper from Francisco Mesa and Oscar Quevedo-Teruel at the University of Seville, Spain, and students from KTH Institute of Technology, Sweden, titled [A21] "Simulation Conditions to Compute the Dispersion Diagram of 3D Periodic Structures." Taking a look at the dispersion characteristics of common 3D periodic building blocks, the authors suggest proper methods to set up these structures in commercial EM simulators and then extract the dispersion (propagation) characteristics of volumes constructed of the simple building blocks. Finally, the authors show that body-centered cubic and face-centered cubic arrangements have isotropy and bandwidth advantages over structures composed of simple cubic building blocks.

That completes our summer 2024 issue papers. We hope you will continue to contribute to and support our publication and we are looking forward to ending our fourth year with the release of our Microwaves in Climate Change special issue based on [1].

ACKNOWLEDGMENT

The author would like to thank IEEE's Bill Trippe and ME Brennan for their help in getting JMW indexed on Web of Science and Scopus, and for all their efforts in communicating with and securing an impact factor from Clarivate in only our fourth year of publication.

APPENDIX

RELATED ARTICLES

[A1] G. Sacco and M. Zhadobov, "Physical interactions between millimeter waves and Human body: From macro- to micro-scale," *IEEE J. Microwaves*, early access, Jun. 2024, doi: 10.1109/JMW.2024.3407712.

[A2] V. Janoudi, P. Schoeder, T. Grebner, N. Appenrodt, J. Dickmann, and C. Waldschmidt, "On distributed radar networks: Signal model, analysis, and signal processing," *IEEE J. Microwaves*, early access, Jun. 2024, doi: 10.1109/JMW.2024.3414471.

[A3] W. Shao, B. Yang, S. Horiuchi, N. Shinohara, and M. Furukawa, "Realization of electrically-switched dynamic focused beam charging system with a reconfigurable phase-change cascaded feed network for wireless power transfer," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 348–359, Jul. 2024, doi: 10.1109/JMW.2024.3412029.

[A4] F. Vogelsang, J. Bott, D. Starke, C. Bredendiek, K. Aufinger, and N. Pohl, "Ultra-wideband transceiver MMIC tuneable from 74.1 GHz to 147.8 GHz in SiGe technology," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 360–371, Jul. 2024, doi: 10.1109/JMW.2024.3401479.

[A5] A. T. Der and T. W. Barton, "C/ka concurrent dual-band GaN MMIC based on shorted quarter-wavelength line topology," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 372–380, Jul. 2024, May 31, 2024, doi: 10.1109/JMW.2024.3401246.

[A6] S. Fregonese and T. Zimmer, "Establishing on-wafer calibration Standards for the 16- term error model: Application to Silicon high-frequency transistor characterization," *IEEE J. Microwaves*, early acess, Jun. 2024, doi: 10.1109/JMW.2024.3413865.

[A7] J. Louro, L. C. Nunes, F. M. Barradas, P. M. Cabral, and J. C. Pedro, "The impact of a taper impedance transformation on the TRL de-embedding error," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 389–403, Jul. 2024, 2024, doi: 10.1109/JMW.2024.3405018.

[A8] T. Pfahler, A. Scheder, A. Bridier, M. Nagel, and M. Vossiek, "A foil flip-chip interconnect with an ultra-broadband bandwidth of 130 GHz and beyond for heterogeneous high-end system designs," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 404–415, Jul. 2024, doi: 10.1109/JMW.2024.3406919.

[A9] C. Kohlberger, S. Karamzadeh, and A. Stelzer, "Active and passive lenses from coupled square ring slots," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 416–427, Jul. 2024, doi: 10.1109/JMW.2024.3397552.

[A10] X. You and P. Kosmas, "Equivalent circuit modeling of a novel reconfigurable metasurface with independent control of amplitude and phase based on floquet modal expansion," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 428–439, Jul. 2024, doi: 10.1109/JMW.2024.3381986.

[A11] N. Poole and A. Arbabian, "Anchor-based, real-time motion compensation for high-resolution mmWave radar," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 440–458, Jul. 2024, doi: 10.1109/JMW.2024.3399096.

[A12] J. Aguilar, D. Werbunat, V. Janoudi, C. Bonfert, and C. Waldschmidt, "Uncoupled digital radars creating a coherent sensor network," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 459–472, Jul. 2024, doi: 10.1109/JMW.2024.3405633.

[A13] T. Braun, J. Schopfel, C. Bredendiek, J. Forero Bernal, and N. Pohl, "Introducing inharmonic radar: Tag detection in the automotive bands of present and future at 76–81/134–141 GHz via fractional multiplication," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 473–485, Jul. 2024, doi: 10.1109/JMW.2024.3412415.

[A14] P. Fenske, T. Koegel, R. Ghasemi, and M. Vossiek, "Constellation estimation, coherent signal processing, and multiperspective imaging in an uncoupled bistatic cooperative radar network," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 486–500, Jul. 2024, doi: 10.1109/JMW.2024.3393120.

[A15] F. Yazdani and M. R. Raafat, "Dual-band reconfigurable impedance matching networks," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 501–511, Jul. 2024, doi: 10.1109/JMW.2024.3396353.

[A16] Z. Al Masri, A. Jabri, Y. Tawk, and J. Costantine, "A groove gap waveguide feeding network for dual-circularly polarized antenna arrays," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 512–520, Jul. 2024, doi: 10.1109/JMW.2024.3404832.

[A17] M. J. Mondich, F. Bucholtz, J. M. Singley, and K. J. Williams, "Arbitrary-order output intercept points of an analog receive beamforming system," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 521–536, Jul. 2024, doi: 10.1109/JMW.2024.3405348.

[A18] C. Chokchai, Y. Sugimoto, K. Sakakibara, M. Yamazaki, H. A. Diawuo, and N. Kikuma, "Broadband GCPW-to-waveguide transition in multi-layer dielectric substrates with modified V-shaped and double patch in 270 GHz band," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 537–547, Jul. 2024, doi: 10.1109/JMW.2024.3413791.

[A19] K. Zhao, C. Elmiger, and D. Psychogiou, "Monolithically-integrated 3D printed bandpass filters using highly-miniaturized dome-shaped resonators," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 548–557, Jul. 2024, doi: 10.1109/JMW.2024.3414130.

[A20] G. Garcia-Contreras, J. Córcoles, J. A. Ruiz-Cruz, M. Oldoni, L. Codecasa, and G. G. Gentili, "Modeling transmission lines with open boundaries via infinite mapping layer," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 558–567, Jul. 2024, doi: 10.1109/JMW.2024.3385047.

[A21] H. Wang, O. Zetterstrom, P. Castillo-Tapia, F. Mesa, and O. Quevedo-Teruel, "Simulation conditions to compute the dispersion diagram of 3D periodic structures," *IEEE J. Microwaves*, vol. 4, no. 3, pp. 568–580, Jul. 2024, doi: 10.1109/JMW.2024.3384418.

REFERENCE

[1] R. S. Siegel and P. H. Siegel, "Making waves: Microwaves in climate change," *IEEE J. Microwaves*, vol. 3, no. 3, pp. 863–880, Jul. 2023, doi: 10.1109/JMW.2023.3283395.

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, 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, NY, 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 Faculty Associate in electrical engineering and Senior Scientist in biology with the California Institute of Technology, Pasadena, CA, USA, from 2002 to 2014. At JPL, he founded and led for 25 years, the Submillimeter Wave Advanced Technology (SWAT) Team, a group of more than 20 scientists and engineers developing THz technology for NASA's near and long-term space missions which 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, Senior Scientist Emeritus of biology and electrical engineering with Caltech, and Senior Research Scientist Emeritus and Principal Engineer with the NASA Jet Propulsion Laboratory. He was the recipient of 75 NASA technology awards, ten NASA team awards, 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. He was the Founding Editor-in-Chief of IEEE TRANSACTIONS ON TERAHERTZ SCIENCE AND TECHNOLOGY, from 2010 to 2015, and the Founder in 2009, Chair through 2011, and 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 has 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 on advanced microwave imaging methods.

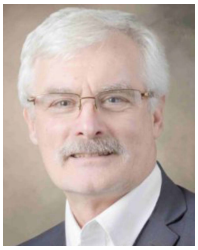
He was the recipient of the University Academic Award of the Technical University of Munich in 2007, Innovation Award of Rohde & Schwarz in 2009 and 2018, and IEEE MTT Microwave Prize Award of 2013. He is the Chair of the IEEE N42.59 Standard for Measuring the Imaging Performance of Active mmWave Systems for Security Screening of Humans. His R&D focus extends to microwave and mmWave imaging, stand-off THz sensing, multistatic radars, advanced signal-processing techniques, terahertz technology, and 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 recent years, he has been advancing the qualifications of automotive radars, towards autonomous driving capabilities.

TC-11 TOPIC EDITOR: MICROWAVE LOW-NOISE TECHNIQUES

JOSEPH BARDIN (Fellow, 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 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.

He 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 The Johns Hopkins University, Baltimore, MD, USA, in 1983. He was a Professor for more than 14 years with the University of Massachusetts Dartmouth, Dartmouth, MA, USA. Since 1997, he has been the Faculty Member with the Department of Electrical and Computer Engineering, Villanova University, Villanova, PA, USA, where he is currently a Full Professor. 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.

He is currently the Editor-in-Chief of IEEE MICROWAVE MAGAZINE and an ex-officio 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.

He 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 is 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 engneering 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 Department of Electrical and Computer Engineering, Dalhousie University, Halifax, NS, Canada, where he is a Professor and the Head of the Department of Electrical and Computer Engineering. He is an Adjunct or a Visiting Professor with the University of Nottingham, Nottingham, U.K., École Nationale Supérieure des Télécommunications de Bretagne, Brest, France, Shanghai Jiao Tong University, Shanghai, China, Fuzhou University, Fujian, China, 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. His research interests include time-domain electromagnetic modeling techniques, antennas, wideband wireless communication and sensing systems, wireless power technology, bioelectricity, and bioelectromagnetics. He was one of the originators of the unconditionally stable methods that have been highly cited and used. His team also developed several nonlinear ultra-wideband receivers and planar wireless power transfer transmitting and receiving structures. He was the Guest or Track 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 an elected Member of the Ad-Com of the IEEE Microwave Theory and Technology 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 Distinguished 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, where he has been recognized with the Lew Allen Award for Excellence, Ed Stone Award for an Outstanding Research Publication, a NASA Exceptional Technology Achievement Medal, and Principal and Senior Research Scientist designations for the development of active THz sensors, systems, and techniques. 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.

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 1970s. 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. He 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. degree 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 subsystems employed in microwaves, photonics, and antennas. He also conducts research in microwave photonics applied to telecommunications and biomedical engineering which resulted in more than 300 technical articles, 27 patents, and ten book chapters. Since 2011, he has been a Member of the Franklin Institute's Committee on Science and Arts and serves as chair of the Electrical Engineering cluster.

He was the recipient of the Drexel University's Graduate Teaching Award in 2000, IEEE Philadelphia Section's Franklin Key Award in 2015, Drexel University's Alumni Award in 2018, and College of Engineering Innovation Award in 2020. He was inducted into the National Academy of Inventors in 2023. After receiving the Microwave Prize in 1986, 13 joint articles of his students have been recognized as the best student papers in various IEEE conferences. He has also organized various IEEE conferences since 1993, particularly 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). He is also the co-chair of MTT-S' TC-22 and Chair of Philadelphia joint chapter of AP/MTT societies.

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, 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, France, in 2010.

After working as an Antenna Engineer successively for Thales Alenia Space, Toulouse, Centre National d'Etudes Spatiales, Toulouse, and European Space Agency, Noordwijk, The Netherlands, he recently joined Anywaves, Toulouse, as Innovation Manager. From 2020 to 2023, he has held an Honorary Appointment as Professional Fellow with the University of Technology Sydney, Sydney, NSW, Australia. He has authored or coauthored more than 300 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, and transfer of technology from and to terrestrial systems, including 5G networks and novel manufacturing techniques.

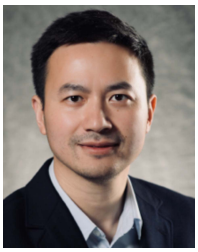
He was an Associate Editor for IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES from 2020 to 2022 and a co-Guest Editor of two issues focused on microwave aerospace systems in the *IEEE Microwave Magazine* in 2022 and 2023. He is currently an Associate Editor for *IET Microwaves, Antennas and Propagation* and IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION and the Topic Editor of IEEE JOURNAL OF MICROWAVES. He was the successively vice-Chair during 2020–2021 and Chair during 2022–2023 of the IEEE MTT-S Technical Committee 29 (TC-29) on Microwave Aerospace Systems. From 2019 to 2023, he was a Board Member of the European School of Antennas and Propagation. He was also the EurAAP Regional Delegate representing Benelux for the term 2021–2023. He 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 2024 IEEE JOURNAL OF MICROWAVES Best Paper award.

TC-5 TOPIC EDITOR: FILTERS

ROBERTO GÓMEZ-GARCÍA (Fellow, 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 about 145 papers in international journals and 180 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.

He was a Member of the Technical Review Board for several IEEE and EuMA conferences. He is a Member of the IEEE MTTS 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 Technology Society (MTT-S) Outstanding Young Engineer Award. During 2020–2021, he was an IEEE CAS-S Distinguished Lecturer. He was an Associate Editor for IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES from 2012 to 2016, IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS—PART I: REGULAR PAPERS from 2012 to 2015, IEEE ACCESS, *IET Microwaves, Antennas, and Propagation*, and *International Journal of Microwave and Wireless Technologies*. He was the Senior Editor of IEEE JOURNAL ON EMERGING AND SELECTED TOPICS IN CIRCUITS AND SYSTEMS from 2016 to 2017 and MTT-S Newsletter Working Group Chair. 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 Editor-in-Chief of IEEE MICROWAVE AND WIRELESS TECHNOLOGY LETTERS during 2022–2024, and an Associate Editor for IEEE JOURNAL OF ELECTROMAGNETICS, RF AND MICROWAVES IN MEDICINE AND BIOLOGY.

TC-6 TOPIC EDITOR: RF MEMS AND MICROWAVE ACOUSTICS



SONGBIN GONG (Senior Member, IEEE) received the B.S. degree in electrical engineering from the 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 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 the Best Paper Awards from the 2017 and 2019 IEEE International Frequency Control Symposium and 2018 and 2019 IEEE International Ultrasonic Symposium and 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 Technology Society.

TC-7 TOPIC EDITOR: MICROWAVE SUPERCONDUCTIVITY AND QUANTUM TECHNOLOGIES

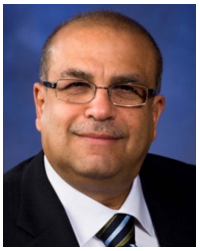
MICHAEL C. HAMILTON (Senior Member, IEEE) received the B.S.E.E. degree from Auburn University, Auburn, AL, USA, in 2000, and the M.S.E.E. and Ph.D. degrees in electrical engineering from The University of Michigan, Ann Arbor, MI, USA, in 2003 and 2005, respectively. From 2006 to 2010, he was a Member 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-hold and analog digital conversion circuits based on fully-depleted silicon-on-insulator transistors and CCD structures. 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 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. He is also the Auburn University IEEE Student Chapter Faculty Advisor and 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 Habilitaet 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 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 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 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.

TC-9 & TC-5 TOPIC EDITOR: MICROWAVE AND MILLIMETER-WAVE SOLID-STATE DEVICES & FILTERS



RAAFAT MANSOUR (Fellow, IEEE) was with COM DEV Cambridge, ON, Canada during 1986–1999, where he held various technical and management positions in COM DEV's Corporate R&D Department. He is currently a Professor of electrical and computer engineering with the University of Waterloo, Waterloo, ON, and holds Tier 1 - Canada Research Chair (CRC) in Micro-Nano Integrated RF Systems. He held an NSERC Industrial Research Chair (IRC) during 2001–2005 and 2006–2010. He holds 44 US and Canadian patents and more than 420 refereed IEEE publications to his credit. He is a coauthor of a 23-chapter Book published by Wiley and has contributed 7 chapters to five other books. He founded the Centre for Integrated RF Engineering with the University of Waterloo https://uwaterloo.ca/centre-integrated-rf-engineering/. It houses a clean room and a state-of-the-art RF test and characterization laboratory. He was the Technical Program Chair of the 2012 IEEE International Microwave Symposium. He is a Fellow of Canadian Academy of Engineering and Engineering Institute of Canada. He was the recipient of the 2014 Professional Engineers Ontario (PEO) Engineering Medal for Research and Development and the 2019 IEEE Canada A.G.L. McNaughton Gold Medal Award.

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 was the Curator and Winton M. Blount Research Chair with Smithsonian National Postal Museum, Washington, DC, 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.

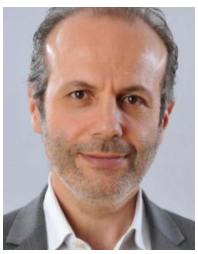
She is the Contributing Editor of IEEE SPECTRUM and writes the monthly "Past Forward" column. In 2014, she was the recipient of the IEEE-USA, Award for Distinguished Literary Contributions furthering Public Understanding and Advancement of the Engineering Profession for work publicizing the Smithsonian's orphaned engineering collections. 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 a Full Professor in 2010. During 1992–2004, he enjoyed four stays in U.S. universities, the first one with the Polytechnic Institute of Brooklyn, New York, 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. He has worked on higher symmetries applied to electromagnetic propagation and design of geodesic lenses.

Since January 2014, he has been an IEEE Fellow proposed by the IEEE MTT Society. He was an Associate Editor for IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES from 2013 to 2016, and Member of 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 radio frequencies 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 publications 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. He was an Undergraduate and Graduate Research Assistant from 1995 to 1998 and the National Defense Science and Engineering Graduate Fellow from 1998 to 2001, with The Pennsylvania State University, 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 his research areas, which 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.

He 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 on the Editorial Board of IEEE JOURNAL OF MICROWAVES. He was also the Technical Program Co-Chair of 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-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, Perugia, Italy, 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 Green RFID Systems (Cambridge University Press, 2014). His research interests include HF electronic systems with special attention to RFID, new materials, and wireless power transfer.

From 2008 to 2012, he 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 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 TECHNOLOGY LETTERS.

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

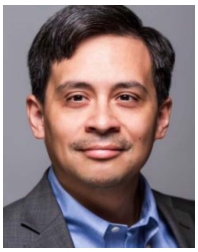
KAMAL K. SAMANTA (Senior Member, IEEE) received the graduation degree in science (physics), and engineering (ECE) the double master's degree in management (R&D), and technology (mmW), and the Ph.D. degree in microwave engineering from the University of Leeds, Leeds, U.K. He has extensive experience of 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 μW (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 MTTS 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.

He was the recipient of the Commonwealth Fellowship, Best International Researcher Award, and Engineering Excellence Award from IET, London, (2004/2005). He is a Fellow of IET, 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 a Guest Editor of special issues published in IEEE microwave journals and magazines. 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 microelectronics and nanotechnology from Purdue University, West Lafayette, IN, USA, in 1994, 1997, and 2007, respectively. 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 is currently a Manager of the Department of RF and EO/IR Subsystems, HRL Laboratories, Malibu, CA, USA. He has authored or coauthored more than 75 journal and refereed conference papers and holds more than 40 issued patents. 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. He was the recipient of a number of awards, including special and extraordinary merit awards from Purdue University and HRL Labs. He was on the Technical Program Committee and the Editor of IEEE Silicon Monolithic Integrated Circuits in RF Systems Conference. He is a Member of Microwave Theory and Technology and Advanced Packaging societies.

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



ALBERTO VALDES-GARCIA (Fellow, 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. His research interests include mm-wave systems for communications and imaging applications. He is the Co-Editor of the book *60 GHz Technology for Gbps WLAN and WPAN: From Theory to Practice* (Wiley, 2011).

He is the winner of the 2005 Best Doctoral Thesis Award presented by the IEEE Test Technology Technical Council. He was the recipient of the 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. He has been 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 (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 the Nanjing Institute of Technology, Nanjing, China, (now Southeast University) in 1982, the D.E.A. and Ph.D. degrees (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 in Future Wireless Technologies and 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 the 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 80 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.

He 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 a Fellow of the Canadian Academy of Engineering, Royal Society of Canada, and 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, during 1988–1990, developing advanced optimization software for microwave modeling and design. In 1990, he joined the Department of Electronics, Carleton University, Ottawa, ON, 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), the 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.

He 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 and *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. In July 2023, she joined IEEE JOURNAL OF MICROWAVES as an administrative and media Editor. 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 healthcare 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*. She was the Managing Editor of Cambridge University Press's *International Journal of Technology Assessment in Health Care* and Director of Communications for the Department of Medicine, Baylor College of Medicine, Houston, TX, USA. 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 managed a large portfolio of journals/transactions/magazines, including the flagship IEEE journal PROCEEDINGS OF THE IEEE since 2007 and the IEEE Computer Society's flagship magazine *Computer* since 2021. She has extensive experience in journals copyediting, proofreading, layout, and overall journals production.