RWW

RWS | SiRF | WiSNet | PWR | SHaRC

21 - 24 January 2024
San Antonio, Texas, USA

Program Book

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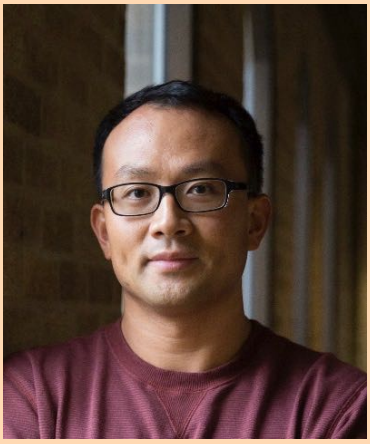
IEEE | MTT-S MHz To THz Community | AESS | IEEE Antennas and Propagation Society

Welcome Messages

GREETINGS FROM THE GENERAL CHAIR OF RADIO & WIRELESS WEEK 2024



General Chair
Changzhi Li

Welcome to the 19th IEEE Radio & Wireless Week (RWW) in San Antonio, TX, USA! The city is located in the heart of Texas and is known for an eclectic mix of Mexican, German, French, and Old West cultures that combine to create an "only in San Antonio" experience. The conference venue Grand Hyatt San Antonio River Walk celebrates the history and charm of the Alamo City with a welcoming spirit and an elegant style. The hotel is located right on the River Walk in downtown San Antonio, steps from top attractions like the Alamodome, AT&T Center and The Alamo.

Over the years, RWW has become an icon of "January family reunion" for the wireless and microwave community from all over the world to discuss the latest trends based on five co-located conferences: the IEEE Topical Conference on Power Amplifiers for Wireless and Radio Applications (PAWR), the Topical Meeting on Silicon Monolithic Integrated Circuits in RF Systems (SiRF), IEEE Topical Conference on Wireless Sensors and Sensor Networks (WiSNet), IEEE Space Hardware and Radio Conference (SHaRC), and Radio and Wireless Symposium (RWS). Each topic-conference has its focus days: PAWR on Monday, SiRF on Monday and Tuesday, WiSNet and SHaRC on Wednesday, all of which take place along with RWS sessions Monday through Wednesday. This core technical program is strengthened by several workshops, technical panels, and short courses to address the latest trends in radio and wireless.

The 2024 class of MTT-S Distinguished Microwave Lecturers will present their talks during a dedicated track on Monday morning, which is a perfect opportunity to get a comprehensive overview on some topic areas. Professional panel sessions of female and young professional role models will be again organized by the Women in Microwave and Young Professional teams on Sunday night. Two world renowned keynote speakers will give their insights during the plenary session on Tuesday morning, where the winners of the student paper competition will also be awarded. Attendees are also welcome to a PAWR/ARFTG joint panel and a Space Night on Monday and Tuesday nights, respectively.

Besides four exciting technical workshops on Sunday afternoon, an entrepreneurial workshop "From Lab to Market: Empowering Researchers for Entrepreneurial Success" will be open to all conference attendees on Monday afternoon. For the first time, MTT-S is organizing an information session to "Demystify the IEEE Fellow Nomination" on Monday afternoon. RWW is also very proud to announce the collaboration with the editorial offices of the IEEE Transactions on Microwave Theory and Techniques (T-MTT), IEEE Microwave and Wireless Technology Letters (MWTL), and IEEE Journal of Microwaves (JMW), which offer journal/letter authors of the past year opportunities to present at RWW and enjoy professional interaction with conference attendees.

The ARFTG is again co-locating their conference with RWW. Besides the ARFTG conference with technical papers and short courses, a joint ARFTG & RWW exhibition will be hosted to showcase the latest products and solutions from industry. The exhibition floor will also highlight an industry reception open to all conference attendees, as well as a demo track. ARFTG and PAWR are also hosting a joint panel session on Monday night. Another highlight is the co-located Internet of Things (IoT) summit, one of the very successful collaborations of RWW with other communities.

At this moment, we would like to warmly welcome you and thank you for coming to RWW 2024. We wish you enjoy the week in San Antonio!

RWW2024 General Chair,
Changzhi Li, Texas Tech University

Technical Program Chair's Welcome Message

TPC Chair
Václav Valenta

Dear colleagues, RWW and ARFTG participants, it is a great pleasure to welcome you on the behalf of the technical program committee to another edition of the famous radio wireless week! Our committee put together a very attractive program to ensure fruitful exchange and establish collaboration links between scientific community, industry and academia, young professionals, and radio enthusiasts. More than 180 papers from academia and industry from more than 20 countries worldwide were thoroughly reviewed to assure high standards of scientific publishing and over 30 technical sessions are open this year.

Given the success from past years, specific panel sessions, workshops or hands-on activities and summits are held again in addition to the focused technical sessions, bringing the main players together to share the latest results from wide spectrum of RF fields in an interactive way.

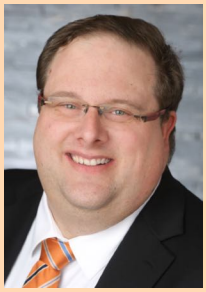
Beside the technical program, please check the timing for social events, networking and light receptions that are the unique opportunities for technical exchange, dissemination of your research outcomes and promotion of radio-wireless technologies and techniques worldwide!

RWW is also an important platform for the technical and professional development of young professionals and students. Based on the initial evaluation by the TPC, a group of finalists were selected to participate in the student paper competition, which will feature both elevator pitch presentations and interactive forum discussions. Don't miss out on the opportunity to meet our bright young researchers! The best student papers will be recognized during the plenary session.

Let me finish this welcome message with the famous quote of Edward Everett Hale, suitable not only to RWW newcomers – "Coming together is a beginning, keeping together is progress, working together is success!". Enjoy your time at RWW and in San Antonio!

RWW2024 Technical Program Chair,
Václav Valenta, European Space Agency

RWW 2024 STEERING COMMITTEE



General Co-Chair
Holger Maune

Finance Chair
Roberto Gomez-Garcia

General Chair:
Changzhi Li, Texas Tech University

General Co-Chair:
Holger Maune, Otto-von-Guericke-Universität Magdeburg

Technical Program Chair:
Václav Valenta, European Space Agency

Finance Chair:
Roberto Gomez-Garcia, University of Alcala

Topical Conferences

PAWR Co-Chairs:
Vittorio Camarchia, Politecnico di Torino
John Dooley, Maynooth University

WiSNet Co-Chairs:
Paolo Mezzanotte, University of Perugia
Fabian Lurz, Otto-von-Guericke-Universität Magdeburg

SHaRC Co-Chairs:
Marie Piasecki, NASA Glenn Research Center
Jan Budroweit, German Aerospace Center

SiRF Chair:
Robert Schmid, Johns Hopkins Applied Physics Lab

Distinguished Microwave Lecturers Chair:
Markus Gardill, Brandenburg University of Technology

Workshops Chairs:
Jan Budroweit, German Space Agency
Pushkar Bajirao Kulkarni, Qualcomm

Technical Lectures:
Juan A. Becerra, Universidad de Sevilla

IoT Summit Liaison:
Charlie Jackson, Northrop Grumman
Jasmin Grosinger, Graz University of Technology

Women in Engineering Chair:
Jasmin Grossinger, Graz University of Technology

Student Paper Contest Co-Chairs:
Ken Kolodziej, MIT Lincoln Laboratory
Ifana Mahbub, UT Dallas

Student Initiative Chair
Michael Chung-Tse Wu, Rutgers University

University Demo Chair:
Mario Pauli, Karlsruhe Institute of Technology

Young Professionals Chair:
Davi Rodrigues, Texas Tech University

Publications Chair:
Markus Gardill, Brandenburg University of Technology
Glauco Fontgalland, Universidade Federal de Campina Grande

Publicity Co-Chairs:
Venkata Vanukuru, GlobalFoundries
Eduardo Rojas-Nastrucci, Embry-Riddle Aeronautical University

Microwave Magazine Special Issue Editor:
Chia-Chan Chang, National Chung-Cheng University

MTT Transactions Mini Special Issue Editors:
Václav Valenta, European Space Agency

Exhibition/Sponsorships Chair:
Elsie Vega, IEEE MCE
Susie Horn, SMH Consulting

RWW Executive Committee Chair:
Robert Caverly, Villanova University

Conference Management:
Elsie Vega, IEEE MCE
Cassandra Carollo, IEEE MCE

Visa Letters:
Cassandra Carollo, IEEE MCE

Webmasters:
Min Hua, Raysilica
Joel Arzola, Raytheon Technologies

At Large (Advisors):
Alexander Koelpin, Hamburg University of Technology
Kevin Chuang, Analog Devices
Nuno Borges Carvalho, Universidade de Aveiro
Rashaunda Henderson, University of Texas at Dallas

Conference Information

REGISTRATION HOURS:

Registration will be open during the following times in the Texas Ballroom Foyer:

- Sunday, 21 January 2024 7:00AM - 6:00PM
- Monday, 22 January 2024 7:00AM – 6:00PM
- Tuesday, 23 January 2024 7:00AM - 6:00PM
- Wednesday, 24 January 2024 7:00AM - 12:00PM

EXHIBIT HOURS:

The joint RWW/ARFTG Exhibition area will be open during the following times:

- Monday, 22 January 2024 1:00PM – 7:00PM
- Tuesday, 23 January 2024 9:00AM – 5:00PM

Please refer to the conference website at http://www.radiowirelessweek.org/exhibits for the latest information and details on how to become a sponsor and exhibit at RWW.

SOCIAL EVENTS, NETWORKING, AND LITE RECEPTIONS:

- Sunday 21 January 2024 before the WiM event in Bowie
- Joint RWW/ARFTG Welcome Reception Monday, 22 January 2024 5:30PM – 6:30PM Location: Exhibit Hall – Texas Ballroom
- Tuesday 23 January 2024 at 5:30 PM before the MTT-S Space Night event in the Texas B

EXHIBITORS & SPONSORS

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ACE ACCURATE CIRCUIT ENGINEERING

VIRGINIA DIODES

BMF BOSTON MICRO FABRICATION

Exhibitors

AMCAD Engineering — Advanced Modeling for Computer-Aided Design

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BNC Berkeley Nucleonics Corp

ERAVANT — MAKING MILLIMETERWAVE ACCESSIBLE

Junkosha — Enabling Technology Innovators

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RWW Topical Conferences

RADIO AND WIRELESS SYMPOSIUM

RWS2024 Chair
Changzhi Li, Texas Tech University

RWS2024 Co-Chair
Holger Maune, Otto-von-Guericke-Universität Magdeburg

RWS2024 Technical Program Committee

High-speed and Broadband Wireless Technologies:
Upkar Dhaliwal, Jennifer Kitchen, Masaaki Kojima, Jing Wang, Muh-Dey Wei, Dietmar Kissinger, Kevin Chuang

Emerging Wireless Technologies & Novel Engineered Materials:
Hyun Kyu Chung, Alessandro Cidronali, Ahmad Hoorfar, Sangkil Kim, Syed Abdullah Nauroze, Spyridon Pavlidis, Junyu Shen, Hjalti Sigmarsson

Wireless System Architecture and Propagation Channel Modeling:
Juan Antonio Becerra, Ugo Dias, Aly Fathy, Paulo Ferreira, Maria J. Madero-Ayora, Chenming Zhou, Pravin Premakanthan

Wireless Digital Signal Processing and Artificial Intelligence:
Nuno Carvalho, Markus Gardill, Rui Ma, Eiji Okamoto, Arnaldo Oliveira, Ken Kolodziej, Pushkar Kulkarni

Applications to Bio-Medical, Environmental, and Internet of Things:
Chia-Chan Chang, Robert Caverly, Syed Islam, Mohammad-Reza Tofighi, Chau Yuen, Changzhan Gu, Daniel Rodriguez, Jenshan Lin

Antenna Technologies, MIMO and Multi-Antenna Communications:
Wasif Khan, Dariush Mirshekar, Jiang Zhu, You Zou, Rashaunda Henderson, Jeremy Muldavin, Edward Niehenke

Passive Components & Packaging:
Roberto Gomez-Garcia, T.-S. Jason Horng, Dimitra Psychogiou, Yu-Chen Wu, Li Yang, Jong Gwan Yook, Bayaner Arigong, Sai-Wa Wong

MM-Wave to THz Systems & Applications:
Shanthi Bhagavatheeswaran, Yi-Jan (Emery) Chen, David Delrio, Nathalie Deltimple, Glauco Fontgalland, Minoru Fujishima, Renato Negra, Hiroshi Okazaki, Sergio Pacheco, Xin Wang, Xinwei Wang, Yu Ye

POWER AMPLIFIERS FOR RADIO AND WIRELESS APPLICATIONS (PAWR)

Power amplifiers are often the most critical component of RF/microwave communications systems and consequently the focus of intense research to achieve increased linearity and power efficiency. New forms of power amplification are being developed to meet the needs of the wireless communication equipment industry and the world's demand for greater information transmission. PAWR2024 will feature innovative work in (but not limited to) the following areas of RF/microwave power amplifier technology:

- High Power/Wideband Active Devices
- Power Amplifiers for Mobile, Avionics and Space
- Modeling and Characterization
- Advanced Circuit Design and Topologies
- Green Power Amplifier Technology
- Integration Technology
- Packaging and Reliability
- Linearization and Efficiency Enhancement Techniques
- Applications, Novel Architectures and System Analysis

PAWR2024 Chair
Vittorio Camarchia, Politecnico di Torino

PAWR2024 Co-Chair
John Dooley, Maynooth University

PAWR2024 Technical Program Committee

Modeling and Characterization:
Ehsan Azad, Filipe Barradas, Vittorio Camarchia, Stephen Maas, Jose Pedro, Zoya Popovic, Patrick Roblin, David Runton, Kefei Wu

Advanced Circuit Design and Topologies:
Paolo Colantonio, Nathalie Deltimple, Paolo de Falco, Jose A. Garcia, William Hallberg, Wolfgang Heinrich, Bumman Kim, Chao Lu, Anna Piacibello, Francesc Purroy, Frederick Raab

Packaging and Reliability:
Florinel Balteanu, Robert Caverly, Murat Eron, Ming Ji, Chang-Ho Lee, Don Lie

Linearization and Efficiency Enhancement Techniques: Taylor Barton, Juan A. Becerra, Wenhua Chen, Kevin Chuang, Armando Cova, Christian Fager, Pere Gilabert, Allen Katz, Morten Olavsbråten, Anding Zhu

WIRELESS SENSORS AND SENSOR NETWORKS (WiSNet)

Wireless sensors and wireless sensor networks are crucial components for manufacturing, structural health, security monitoring, environmental monitoring, smart agriculture, transportation, commercial applications, localization, tracking systems and other important and emerging applications. WiSNet2024 is intended to stimulate discussion and foster innovation on these components and applications.

WiSNet2024 Chair
Paolo Mezzanotte, University of Perugia

WiSNet2024 Co-Chair
Fabian Lurz, Otto-von-Guericke-Universität Magdeburg

WiSNet2024 Technical Program Committee

Wireless Sensors for IoT Communication and Applications:
Georg Fischer, Tuami Lasri, Federico Alimenti, Reinhard Feger, Davi Valerio de Queiroz Rodrigues

Wireless Sensors for Radar, Positioning, Tracking, and Imaging:
Alexander Koelpin, Paolo Mezzanotte, Changzhi Li, Zahir Alsulaimawi, Arne Jacob, Mario Pauli, Hendrik Rogier, Valentina Palazzi, Spyridon Daskalakis

Wireless Sensors Circuits& System Technologies:
Alessandra Costanzo, Diego Masotti, Wang Wang, J-C Chiao, Serioja Tatu, Fabian Lurz, Guoan Wang

WSN Hardware-Software CoDesign:
Amr Fahim, Manos Tentzeris, Jennifer Williams, Kamal Samanta, Nils Pohl, Emanuele Cardillo

Innovations in Wireless Sensor Networks:
Marco Dionigi, Rahul Khanna, Luciano Tarricone, Maurizio Bozzi, Xianming Qing, Kai-Ten Feng, Xuyu Wang

RWW Topical Conferences

SPACE HARDWARE AND RADIO CONFERENCE (SHaRC)

The IEEE Space Hardware and Radio Conference (IEEE SHaRC) addresses new concepts, novel implementations, as well as emerging applications for space-based hardware for communications, earth observation, and other novel disruptive services. To meet recent needs, there has been a renaissance of interest and investment in space- and suborbital- based systems especially for high-data-rate communications networks. These new global satellite networks are disruptive, rely on new system and subsystem design paradigms, and are an enabler for many novel applications. The IEEE Space Hardware and Radio Conference provides a forum for discussions on this new frontier.

SHARC2024 Chair
Marie Piasecki, NASA Glenn Research Center

SHARC2024 Co-Chair
Jan Budroweit, German Aerospace Center

SHARC2024 Technical Program Committee

Systems, Hardware, and Electronics for Space:
Thomas Ussmueller, Nuno Carvalho, Jasmin Grosinger, Ramesh Gupta, James McSpadden, Steven Reising, Steven Rosenau, Rick Sturdivant, Vaclav Valenta, Robert Weigel, Markus Gardill, Federico Clazzer

Mission Concepts, Operations, Regulation, and Standardization:
Jan Budroweit, Goutam Chattopadhyay, Rudy Emrick, Dale Force, Charles Jackson, Holger Maune, Thomas Royster, Klaus Schilling, Zizung Yoon, Sachidananda Babu, Dustin Schroeder, Marwan Younis

SILICON MONOLITHIC INTEGRATED CIRCUITS IN RF SYSTEMS (SIRF)

SiRF2024 will mark the 24th topical meeting on SiRF, with a renewed emphasis on promoting a dialogue between IC designers and researchers promoting non-standard technologies, exploiting the maturity of Silicon processes, but addressing the challenges of tomorrow. SiRF2024 will chronicle recent advances in our dynamic field, and provide the platform for developing new ideas, and candid exchange. Invited speakers will stimulate our discussions, with an emphasis on emerging technologies.

SIRF2024 Chair
Robert Schmid, Johns Hopkins APL

SIRF2024 TPC Chair
Mehmet Kaynak, Texas Instruments

SIRF2024 TPC Co-Chair
Ickhyun Song, Hanyang University

SIRF2024 Publicity Chair
Austin Chen, Peraso, Inc.

SIRF2024 Executive Committee
Yi-Jan Emery Chen, Julio Costa, Vadim Issakov, Mehmet Kaynak, Chien-Nan Kuo, Donald Lie, Venkata Koushik Malladi, Monte Miller, Sergio Pacheco, Nils Pohl, Hasan Sharifi, Ahmet Cagri Ulusoy, Václav Valenta, Roee Ben-Yishay, Saeed Zeinolabedinzadeh

SIRF2024 Technical Program Committee

RF, Millimeter-wave and THz Integrated Circuit Front Ends:
Amit Jha, Michael Oakley, Ickhyun Song, Cagri Ulusoy, Robert Schmid, Roee Ben-Yishay, Rahul Kodkani, Austin Chen, Christopher Coen

Wireline Communication Circuits and Silicon-Photonics Integrated Circuits:
Saeed Zeinolabedinzadeh, Juergen Hasch, Vadim Issakov, Aleksey Dyskin, Ankur Guha Roy

High Speed Data Converters & Mixed Signal Circuits:
Wei-Min (Lance) Kuo, Hsieh-Hung Hsieh, Monte Miller, Chien-Nan Kuo, Arindam Sanyal

Devices, Materials, Modeling, and Measurement:
Mehmet Kaynak, Ming-Ta Yang, Katsuyoshi Washio, Julio Costa, Jean-Pierre Raskin, Pierre Blondy, Venkata Malladi, Vikas Shilimkar, Florian Herrault, Xun Gong

IEEE INTERNET OF THINGS (IoT) SUMMIT

The Seventh IEEE Internet of Things (IoT) Vertical and Topical Summit at Radio & Wireless Week (RWW) 2024 is devoted to biomedical IoT applications. Technologies for sensing, signal processing and computing, data storage, and communications are important ingredients in architecting biomedical solutions that are important to human health and human well-being. There are at least five aspects to biomedical IoT applications that are important for the general population. They include the following:

- The practice of medicine
- Public health
- Personal lifestyle
- Environmental exposure
- Biomedical research

Many of the advancements in the field have significantly benefited from the pace of innovation in the capabilities and performance improvements in electronics and the exploitation of methods and techniques for measuring and generating electromagnetic signals across the spectrum - from light to microwave frequencies. They have also benefited from the ability to create new materials, miniaturize electronic components, embed sophisticated signal processing and computation in devices, and lastly, harness new sensing and actuation methods, such as the uses of microelectromechanical systems and microfluidic devices, and new data interpretation techniques, such as the breakthroughs in artificial intelligence (AI) and machine learning (ML) algorithms. The applications range from personal wearables, widely available as consumer goods, to specialized medical instrumentation focused on specific diseases or conditions. They cover the detection of pathogens in our environment, the direct monitoring and management of chronic disease symptoms, and ways of dealing with human impairments through devices that restore or enhance body functions. The science and engineering involved are multidisciplinary and require collaboration between technical and professional disciplines and communities of practice.

Event Overview • Sunday, 21 January 2024

Event Overview • Monday, 22 January 2024

Room: Texas A	Room: Texas B	Room: Texas C	Room: Crockett AB	Room: Republic	Room: Seguin AB	Room: Texas D-F
8:00						
MTT-S Distinguished Microwave Lecturers' Talks Part 1	PAWR Mo1B Advanced Circuit Design and Topologies 1	SIRF Mo1C Power Amplifiers	Journal Paper Session 1 Metasurfaces, Transmission Media, and Circuit Modeling	ARFTG NVNA User's Forum	ARFTG/NIST Short Course (Day 2)	
9:40						
Coffee Break						
10:10						
MTT-S Distinguished Microwave Lecturers' Talks Part 2	PAWR Mo2B Modeling and Characterization	SIRF Mo2C Phase Shifters and Tunable Components	WISNET Panel RFID as a Sustainable Route to Digital Twins	ARFTG On-Wafer User's Forum		
11:50						
Lunch Break						
						Exhibition
13:30						
RWS Mo3A High-speed and Broadband Wireless Technologies	PAWR Mo3B Advanced Circuit Design and Topologies 2	SIRF Mo3C Millimeter-Wave Signal Generation	Student Paper Contest Elevator Pitches	ARFTG Session A Advances in Measurements I	Journal Paper Session 2 Electronic Devices and Active Circuits	
15:10						
Coffee Break						
15:40						
Workshop From Lab to Market: Empowering Researchers for Entrepreneurial...	PAWR Mo4B Linearization and Efficiency Enhancement Techniques	SIRF Mo4C Devices, Technology, and Integration	Demystify IEEE Fellow Nomination	ARFTG Session B On-Wafer Measurements and Calibration	Journal Paper Session 3 Transmitters and Receivers	Student Paper Contest Interactive Forum
17:20						
17:30						
						RWW/ARFTG Joint Reception
18:30						
PAWR/ARFTG Joint Panel						
19:30						

Event Overview • Tuesday, 23 January 2024

Room: Texas A	Room: Texas B	Room: Texas C	Room: Republic	Room: Lone Star A-C	Room: Seguin A-B	Room: Texas D-F
8:00						
RWS Tu1A Antenna and Beamforming Technologies	SiRF Tu1B Amplifier Design	SIRF Tu1C Radar and Sensor Circuits and Architectures	ARFTG Session C Advances in Measurements II		Journal Paper Session 4 Radar, Localization, and Sensory Systems	Exhibition
9:40						
Coffee Break						
10:10						
				Joint RWW/ARFTG Plenary Session		
11:50						
Lunch Break						
13:30						
			ARFTG Session D On-Wafer and EVM Measurements			Poster Session RWW & ARFTG Including demo track presentations.
15:10						
Coffee Break						
15:40						
RWS Tu3A Bio-Medical Applications		SIRF Tu3C Voltage-Controlled Oscillators	ARFTG Session E Generalized Network Analysis and Load-Pull		Journal Paper Session 5 Power Amplifiers	
17:20						
17:30						
	MTT-S Space Night					
19:30						

Event Overview • Wednesday, 24 January 2024

Room: Texas A	Room: Texas B	Room: Texas C	Room: Republic A	Room: Republic B	Room: Republic C
8:00					
RWS We1A Wireless Digital Signal Processing and Artificial Intelligence	WisNet We1B Wireless Sensing and Localization Concepts	SHaRC We1C Microwave Subsystems and Antennas for Space		ARFTG Workshop Traditional vs. Data and Artificial Intelligence Driven Modeling: Battle of the Ages	
9:40					
Coffee Break					
10:10					
RWS We2A Passive Components and Filters	WisNet We2B Recent Developments of Smart Radar Sensors	SHaRC We2C Space Communication Systems			
11:50					
Lunch Break					
13:30					
RWS We3A Emerging Wireless Technologies	WisNet We3B Advanced Signal Processing and Machine Learning Concepts in Radar Sensing	Journal Paper Session 6 Phase Shifters, Switches, and Resonators		Short Course Characterization of MMIC DPAs: from wafer screening to system level	IoT Summit
15:10					
Coffee Break					
15:40					
RWS-WiSNet We4A Advancements in wireless sensing and communication	WisNet We4B Emerging Concepts for Wireless Sensors			Short Course High Efficiency CMOS Power Amplifiers: Design Challenges and Outlook	
17:20					

Workshop

RF and Millimeter-Wave Communication Systems: Design and Analysis

Organizer:
Mathworks

Room: Crockett AB

Abstract:

The current trend for wireless systems to operate at millimeter wave (mmWave) frequencies and over wide bandwidth drives challenging requirements for RF front ends. In this webinar, you will learn how MATLAB and Simulink can be used for modeling RF and mmWave transceivers, performing RF budget analysis, and simulating wideband adaptive architectures.

We will first address typical RF data analysis tasks, such as reading and writing Touchstone files, transforming, visualizing, and fitting S-parameters for distributed elements. As a second step, we will discuss how to model and simulate amplifiers, matching networks, and antenna arrays operating at mmWave frequencies. Using virtual prototypes, we will simulate wideband transmitters and receivers including co-existence and interference scenarios, beam-squinting and antenna coupling, and dynamic EVM measurements for different communications standards such as 5G FR2.

With practical examples, we will demonstrate how to optimize baseband signal processing algorithms and control logic together with RF transceivers to compensate for RF impairments, to increase resilience to interfering signals, and to support multiple communication standards.

Workshop

Power Amplifier Design and Linearization Techniques

Organizers: John Dooley, Maynooth University and
Pushkar Kulkarni, Qualcomm

Room: Crockett CD

Abstract:

PA design paradigm changes from mm-wave to sub-mm-wave frequencies. We will look at the device technology (Si and III-V) capabilities and the amplifier architectures, derive compact transistor modeling and its translation to system figures of merit. The device level reliability mechanisms, its circuit-level impacts and the architecture-level mitigation techniques, including the case for PMOS based PAs will be discussed. We will survey the sub-mm-wave PA designs which tend to be simpler architectures with power combining and more stages, with class-A bias and lesser harmonic control. These exacerbate the reliability, stability and thermal concerns.

Program:

1. General overview of Wireless Systems; Prof. John Dooley, Maynooth University
2. Current pinch-points for mmWave system design; Rahul Mushini, Maynooth University/NXP
3. Reliable mm-Wave and Sub-THz PA Design; Dr. Jefy Jayamon, Qualcomm
4. Agile Transmitters: Efficiency Enhancements using Digital Predistortion and Envelope Tracking Power Amplifiers; Dr. Paul Draxler, MaXentric Technologies LLC
5. Neural Networks for DPD; Andrius Vaicaitis, Maynooth University/Analog Devices

Workshop

Ground Stations and Advanced Ground Station Networks

Organizer:
Jan Budroweit, DLR

Room: Republic BC

Abstract:

Ground stations are the backbone for any kind of satellite communication. The evolution of those terrestrial satellite communication infrastructures has become extremely diverse from classic ground stations as everyone knows with big dishes for deep space communication, small ground stations on the rooftop of university buildings as well as new technologies such as inter satellite link communication for 24/7 access to low Earth orbit satellites. In this workshop we will provide a great set of speakers with insights from different perspectives, incl. space agencies, academia and commercial services.

13:30
14:30
15:30
16:30
17:30

Distinguished Women in Microwaves Event

Organizer: Jasmin Grosinger, Graz University of Technology, Austria

Room: Bowie

19:00

Distinguished Women in Microwaves Event

The Women in Microwaves (WiM) event at the upcoming IEEE Radio & Wireless Week (RWW) 2024 will spotlight distinguished women who have advanced the field of microwave theory and technology considerably. Three outstanding women in microwaves will talk about their respective research fields and careers. A light reception will accompany the event, allowing us to network and connect. Prof. Lei Guo from the Dalian University of Technology, China, will talk about Wireless Power Harvesters: A Charging Solution for IoT Applications. Dr. Kiki Ikossi, a 2020-2022 ASEE Science and Technology Policy Fellow at the National Science Foundation, Alexandria, VA, USA, will give details on Semiconductors for GHz to THz Devices. And Sara Barros from Thales Nederland B.V., The Netherlands, will dive deep into The Evolution of Surface Radar and Naval Platform Integration.

Wireless Power Harvesters: A Charging Solution for IoT Applications

Speaker: Lei Guo, Dalian University of Technology, China

Abstract: The realization of Internet-of-Things (IoT) relies on a large amount of geographically distributed wireless sensor nodes (WSNs). Traditional power supply cords prevent the large-scale utilization and mobility of the WSNs, while the batteries as substitutes for supply cords are not optimal solutions due to the limited lifetime, high cost, and undesired ecological effects. In this scenario, wireless power harvesting technologies provide a new approach to remotely charging or powering WSNs. This talk will discuss analytical methods for evaluating and designing radio frequency (RF) power harvesters by considering the wide adaptability to frequencies, input power, and load conditions. Based on the analysis, high-efficiency multi-band or wide-power-range RF power harvester systems will be designed and discussed. The feasibility of the proposed RF power harvesters will also be demonstrated in a real low-power wireless sensor platform. The proposed wireless power harvesting techniques have the potentials to be implemented in IoT applications where powering issues are critical.

Semiconductors for GHz to THz Devices

Speaker: Kiki Ikossi, 2020-2022 ASEE Science and Technology Policy Fellow at the National Science Foundation, Alexandria, VA, USA

Abstract: High-performance devices, integrated circuits for future energy-efficient high-speed communication networks, and IoT sensors demand high-performance semiconductor devices that can be integrated into advanced systems. This talk will examine the properties sought for heterostructure devices for GHz to THz applications. Challenges faced by the key high-speed device technologies that set in motion the communication revolution of our times will be discussed, along with some of the efforts underway for fulfilling the demands of future applications. We will see how the presence of defects and carrier traps in semiconductors hinder device performance and affect efficiency and how future technology can exploit these traps.

The Evolution of Surface Radar and Naval Platform Integration

Speaker: Sara Pena Barros, Thales Nederland B.V., The Netherlands

Abstract: Naval forces are exposed to several different threats with elaborate behaviors, especially uncrewed air and surface vehicles, in a complex above-water environment. This translates into a need for superior air and surface detection, tracking, and classification performance. In a high-intensity Above Water Warfare context, the integration of all sensors provides a higher quality and faster tactical picture, giving a clear, rapid full situational awareness (air, surface) and increased defense capabilities of the whole task group. This talk will focus on the hand-in-hand evolution of surface radar with an evergrowing-in-complexity threat scenario and the challenges of naval platform integration of such (multi-) sensor systems.

20:15

Young Professionals Panel

Organizer: Davi Rodrigues, The University of Texas at El Paso

Room: Bowie

20:30

Young Professionals Panel

This interactive session will offer a rare opportunity to tap into the minds of accomplished professionals who have navigated the complexities of either industry or academia. The panelists will provide guidance to young professionals and answer questions from the audience. Join us at the Young Professionals Panel for a chance to connect, learn, and ignite your career!

Panelists:

Dr. Tejinder Singh

Tejinder Singh received the Ph.D. degree (with highest academic honor) in electrical and computer engineering from the University of Waterloo, Waterloo, ON, Canada, in 2020. He is currently a Principal Member of Technical Staff, Office of the CTO at Dell Technologies, ON, Canada and an Adjunct Assistant Professor at the University of Waterloo, ON, Canada.

Dr. Taiyun Chi

Taiyun Chi received the B.S. degree (with highest Hons.) from the University of Science and Technology of China (USTC), Hefei, China, in 2012, and the Ph.D. degree from the Georgia Institute of Technology, Atlanta, GA, USA, in 2017. He is currently an Assistant Professor with the Department of Electrical and Computer Engineering, Rice University, Houston, TX, USA.

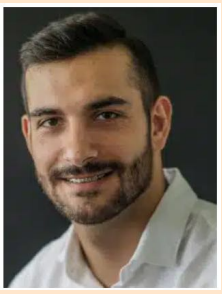
Dr. Valentina Palazzi

Valentina Palazzi received the M.Sc. degree (magna cum laude) in electronic engineering and the Ph.D. degree in industrial and information engineering from the University of Perugia, Italy, in 2014 and 2018, respectively. Since 2019, she has been a researcher with the High Frequency Electronics Laboratory, Department of Engineering, University of Perugia, Italy.

Sara Pena Barros

Sara Pena Barros received her MSc in Electronics Engineering and Telecommunications in 2013 from the University of Aveiro, Portugal. She is an Advanced Development Engineer at Thales and involved in low TRL research activities related to the development of advanced waveform concepts and novel radar technology; she also leads Integrated Topside Design studies for Navies worldwide.

Dr. Ricardo Figueiredo



Ricardo Figueiredo received the M.Sc. degree and the Ph.D. degree in electronics and telecommunications engineering from the Universidade de Aveiro, Aveiro, Portugal, in 2018 and in 2023, respectively. He is currently a Research Associate at the Instituto de Telecomunicações, Aveiro.

Dr. Kiki Ikossi

Kiki Ikossi has Ph.D. and M.S. degrees in Electrical and Computer Engineering from the University of Cincinnati with an emphasis in Solid State Electronics and a B.S.E.E. from the National Technical University of Athens (EMP), Greece. Dr. Ikossi has held several academia, major research labs, and government positions. Currently, she is an independent Research and Development Science and Technology consultant.

21:30

DML Part 1

DML Special Session

Chair: Markus Gardill

Room: Texas A

PAWR Session Mo1B

Advanced Circuit Design and Topologies 1

Chair: Frederick Raab, Green Mountain Radio Research LLC.
Co-Chair: Vittorio Camarchia, Politecnico di Torino

Room: Texas B

8:00

Maximum Power Transfer Efficiency of MIMO-WPT System

Speaker: Qiaowei Yuan

Abstract: This lecture introduces a universal approach for calculating the power transfer efficiency (PTE) and maximum power transfer efficiency (MPTE) of a Multiple Input Multiple Output Wireless Power Transfer (MIMO-WPT) system. The method is applicable to various wireless power coupling techniques and can accommodate any number of transmitters and receivers. The approach, known as E-MIMO, utilizes the Rayleigh quotient and is based on an equivalent M+N ports S-parameters circuit network of the MIMO-WPT system. The process of computing PTE and MPTE for a MIMO-WPT system will be thoroughly explained in a step-by-step manner, accompanied by numerous practical applications, demonstrating the versatility of the approach. Additionally, the lecture will introduce an essential potential application for array beamforming.

8:20

8:40

Additive Manufacturing: Emerging Opportunities for Microwave Components

Speaker: Cristiano Tomassoni

Abstract: The Additive Manufacturing (AM) technology, also known as 3D-printing technology, offers several interesting and attractive features, including fast prototyping, geometry flexibility, easily customizable products, and low cost (in some cases). However, using such technologies for microwave devices is not straightforward as AM has not been specifically developed for microwave components, and in most cases, some adaptation and post-processing is necessary. Furthermore, there are many AM technologies available, and it is important to understand their characteristics before selecting one.

In the presentation, an overview of the different AM technologies available will be provided. Additionally, an analysis of some of the most common AM technologies used for the manufacturing of microwave components will be conducted in more detail, with the help of several examples. Several microwave components manufactured with some of the most popular AM technologies will be shown, along with a detailed description of the manufacturing process, post-processing, and all actions necessary to make the component perform well. Furthermore, it will be shown how the flexibility of this technology allows the development of new classes of components with non-conventional geometries that can be exploited to obtain high-performing components in terms of compactness, weight, losses, etc.

9:00

9:20

9:40

Mo1B-1: Load mismatch and isolator removal: an old new rabbit hole for power amplifier design

Authors: Roberto Quaglia, Cardiff University

Mo1B-2: A Concurrent 2.45-5.8 GHz Power Amplifier with an Optimal Dual-band Matching Method

Authors: Sunwoo Lee, Hanyang University; Byeongcheol Yoon, Hanyang University; Jooyoung Jeon, Gangneung-Wonju National University; Junghyun Kim, Hanyang University

Mo1B-3: High-Efficiency GaN Doherty Power Amplifier based on Inverse Class-F Operation

Authors: Anna Piacibello, Politecnico di Torino; Vittorio Camarchia, Politecnico di Torino

9:00

Mo1B-4: A 2.6GHz broadband LDMOS Doherty Power Amplifier for Small-Cell Applications

Authors: Alexis Courty, Ampleon; Christophe Quindroit, Ampleon; Valentin Favard, Ampleon; Mariano Ercoli, Ampleon

Mo1B-5: A compact 27 dBm triple-stack power amplifier for 13 GHz operation in CMOS-SOI

Authors: Sravya Alluri, University of California, San Diego; Vincent W Leung, Baylor University; Peter Asbeck, Ucsd

9:40

SiRF Session Mo1C

Power Amplifiers

Chair: Robert Schmid, Johns Hopkins Applied Physics Laboratory
Co-Chair: Kiki Ikossi, George Mason University

Room: Texas C

Journal Paper Session JP1

Metasurfaces, Transmission Media and Circuit Modeling

Chair: Kamal Samanta, Sony Europe

Room: Crocket AB

8:00

Mo1C-1: Toward High-Power and Multi-Way Silicon-Based mmWave Doherty Power Amplifiers

Authors: Taiyun Chi, Rice Univ.

JP1-1: Dispersion Analysis of Metasurfaces with Hexagonal Lattices with Higher Symmetries

Authors: Oscar Quevedo-Teruel; S. Yang; O Zetterstrom; F. Mesa; O. Quevedo-Teruel

8:20

JP1-2: Maximizing the Gap Height in Gap-Waveguides with Helical Wires Operating at the Vicinity of Resonance

Authors: Walid Dyab; Mourad Ibrahim; Ahmed Sakr; Ke Wu

8:40

Mo1C-2: A Ku-Band Power Amplifier in 22nm FDSOI

Authors: Alexander Haag, Karlsruhe Institute of Technology; Ahmet Cagri Ulusoy, Karlsruhe Institute of Technology

JP1-3: Ultraprecise Printing of D-Band Transmission Lines

Authors: Martin Roemhild; Georg Gramlich; Holger Baur; Thomas Zwick; Norbert Fruehauf

9:00

Mo1C-3: A W-Band Amplifier in FinFET Technology

Authors: Yuen-Sum Ng, National Taiwan University; Yunshan Wang, National Taiwan University; Huei Wang, National Taiwan University

JP1-4: Electromagnetic Parametric Modeling Using Combined Neural Networks and RLGC-Based Eigenfunctions for Two-Port Microstrip Structures

Authors: Wei Liu; Feng Feng; Yan Zhuo; Jianan Zhang; Qian Lin; Kaixue Ma; Qi-Jun Zhang

9:20

Mo1C-4: A D-Band 28 nm CMOS-Bulk Power Amplifier with 12.8 dBm Output Power and 31.3 GHz 3 dB Bandwidth

Authors: Pascal Stadler, Ruhr University Bochum; Hakan Papurcu, Ruhr University Bochum; Justin Romstadt, Ruhr University Bochum; Nils Pohl, Ruhr University Bochum

JP1-5: Signal-Flow-Graph Analysis of Weakly Nonlinear Microwave Circuits Around a Large-Signal Operating Point

Authors: Shuhei Amakawa; Ryotaro Sugimoto; Korkut Kaan Tokgoz; Sangyeop Lee; Hiroyuki Ito; Ryoko Kishikawa

9:40

Monday, 22 January 2024 • Late Morning Sessions

DML Part 2

DML Special Session

Chair: Markus Gardill

Room: Texas A

PAWR Session Mo2B

Modeling and Characterization

Chair: Pere Gilabert, University Politècnica de Catalunya
Co-Chair: Roberto Quaglia, Cardiff University

Room: Texas B

SiRF Session Mo2C

Phase Shifters and Tunable Components

Chair: Cagri Ulusoy, Karlsruhe Institute of Technology
Co-Chair: Vaclav Valenta, European Space Agency

Room: Texas C

10:10

100-300 GHz Wireless Communications

Speaker: Mark Rodwell

Abstract: 100-300 GHz wireless systems can provide very high data rates per signal beam, and, given the short wavelengths, even compact arrays can contain many elements, permitting massive spatial multiplexing for further increased capacity. We will describe the underlying transistor technology, plus IC, antenna, array module, and systems design of 140 GHz massive MIMO wireless hubs and 210 GHz and 280 GHz MIMO backhaul links.

10:30

Mo2B-1: Microwave Transistor Nonlinear Modeling for Power Amplifier Designers: The Revealed Truth

Authors: Antonio Raffo, Università di Ferrara

Mo2B-2: Application of the Cardiff Model for Orthogonal LMBA Response Prediction

Authors: Mengyue Tian, Cardiff University; Jean-Baptiste Urvoy, Cradiff University; Roberto Quaglia, Cardiff University; James Bell, Cardiff University; Paul Tasker, Cardiff University; Steve Cripps, Cardiff University; Jeff Powell, Skyarna Ltd.

Mo2C-1: The role of Varactor, the Nonlinear Semiconductor, for Next Generation of Intelligent and Reconfigurable Radio Nodes

Authors: Najme Ebrahimi, University of Florida

10:50

Mo2B-3: Large-signal characterization and behavioral modeling of mm-wave GaN HEMT switches tailored for advanced power amplifier architectures

Authors: Seyed Urman Ghozati, Cardiff University; Alexander Baddeley, Cardiff University; Roberto Quaglia, Cardiff University

Mo2C-2: A Compact, High Tuning Accuracy and Enhanced Linearity 37-43 GHz Digitally-Controlled Vector Sum Phase Shifter

Authors: Mehran Hazer Sahlabadi, University of Waterloo; Hang Yu, University of Waterloo; Jingjing Xia, Synopsys Inc; Slim Boumazia, University of Waterloo

11:10

Mo2B-4: Electromagnetic Coupling Between Passive Circuits and Non-Uniform Transistor Operation in High-Power Microwave Packaged Devices

Authors: Harutoshi Tsuji, Sumitomo Electric Industries, Ltd.; Ken Kikuchi, Sumitomo Electric Industries, Ltd.; Ayumu Honda, Sumitomo Electric Industries, Ltd.; Hiroshi Yamamoto, Sumitomo Electric Industries, Ltd.

Mo2C-3: A Novel High Q-factor Structure of Digitally Tunable Capacitor for High RF Power Handling Applications

Authors: Wonwoo Seo, Hanyang University; Sunghyuk Kim, Hanyang University; Byunghun Ko, Hanyang University; Jehwan Lee, Hanyang University; Youngbae Choi, Hanyang University; Taejoo Sim, Hanyang University; Junghyun Kim, Hanyang University

11:30

Mo2B-5: Impact of Matching Networks on the Impedance Settling Time in High Frequency Power Amplifiers

Authors: Roberto Quaglia, Cardiff University; Steve Cripps, Cardiff University; Jeff Powell, Skyarna Ltd

Mo2C-4: Compact D-Band Passive Phase Shifters with Fine and Coarse Control Steps in BiCMOS-55nm

Authors: Lorenzo Piotto, University of Pavia; Guglielmo De Filippi, University of Pavia; Mahmoud M Pirbazari, University of Pavia; Andrea Mazzanti, University of Pavia

11:50

WiSNet Panel "RFID as a Sustainable Route to Digital Twins"

Organizers: Valentina Palazzi, University of Perugia
Mahmoud Wagih, University of Glasgow

Room: Crockett AB

10:10

RFID as a Sustainable Route to Digital Twins

Panelists:

- Valentina Palazzi, University of Perugia, Moderator & Organizer
- Mahmoud Wagih, University of Glasgow, Moderator & Organizer
- CJ Reddy, Altair
- Nuno Borges Carvalho, University of Aveiro
- Jasmin Grosinger, TU Graz
- Eduardo Rojas, Embri-Riddle Aeronautical University
- John McVay, Sandia National Laboratories
- Mohammad Zarifi, University of British Columbia

11:50

RWS Session Mo3A

High-speed and Broadband Wireless Technologies

Chair: Changzhan Gu, Shanghai Jiao Tong University
Co-Chair: Michael Brown, Texas Tech University

Room: Texas A

PAWR Session Mo3B

Advanced Circuit Design and Topologies 2

Chair: Peter Asbeck, University of California, San Diego
Co-Chair: Anna Piacibello, Politecnico di Torino

Room: Texas B

13:30

Mo3A-1: 25.9-Gb-s 259-GHz Phased-Array CMOS Receiver Module with 28° Steering Range

Authors: Shinsuke Hara, National Institute of Information and Communications Technology; Mohamed H Mubarak, National Institute of Information and Communications Technology; Akifumi Kasamatsu, National Institute of Information and Communications Technology; Yoshiki Sugimoto, Nagoya Institute of Technology; Kunio Sakakibara, Nagoya Institute of Technology; Kyoya Takano, Tokyo University of Science; Takeshi Yoshida, Hiroshima University; Shuhei Amakawa, Hiroshima University; Minoru Fujishima, Hiroshima University

Mo3B-1: A Ku-band High Gain 40 W GaN HPA MMIC for Satellite Systems in a 0.25-um GaN Technology

Authors: Taejoo Sim, Hanyang University; Seungju Lee, Hanyang University; Dongmin Lee, Hanyang University; Wonseok Choe, MMII Laboratory Co., Ltd.; Minchul Kim, MMII Laboratory Co., Ltd.; Sangmo Kim, RFHIC Corporation; Youngwan Lee, RFHIC Corporation; Kyoungil Na, Agency for Defense Development; Junghyun Kim, Hanyang University

13:50

Mo3A-2: Low-Additive Phase Noise Low-Power Static Frequency Dividers

Authors: Samin Hanifi, University of Virginia; Steven M Bowers, University of Virginia

Mo3B-2: Harmonic-Injection Doherty Power Amplifier: Benefits and Limitations

Authors: Moïse Safari Mugisho, Fraunhofer Institute for Applied Solid State Physi; Christian Friesicke, Fraunhofer Institute for Applied Solid State Physics; Mohammed Ayad, United Monolithic Semiconductors; Thomas Maier, Fraunhofer Institute for Applied Solid State Physics; Ruediger Quay, Fraunhofer Institute for Applied Solid State Physics

14:10

Mo3A-3: An RoE-based Real-Time Radio Spectral Probe

Authors: Guilherme Lourenço, Universidade de Aveiro; Francisco F Serôdio, Instituto De Telecomunicacoes; Luís F Almeida, University of Aveiro; Hugerles S Silva, Instituto De Telecomunicacoes; Arnaldo R Oliveira, Univ. de Aveiro - Inst. de Telecom.

Mo3B-3: An All-Analog Sampled-Line VSWR Sensor

Authors: Grace Gomez, University of Colorado; Devon Donahue, University of Colorado; Robert Macfarland, University of Colorado; Taylor Barton, University of Colorado

14:30

Mo3A-4: Track, Hold, and Reset Network for Eliminating Transient Distortion in Direct Sampling Front-Ends

Authors: Daniel Vorobiev, Texas A&M University; Sakshi Vastrad, Texas A&M University; Linda Katehi, Texas A&M University

Mo3B-4: Ultra-Fast Operating Point Switching for Watt-Level 3.6 GHz Power Amplifiers

Authors: Maximilian G Becker, Technische Universitaet Dresden; Andres Seidel, Technische Universitaet Dresden; Marco Gunia, Technische Universitaet Dresden; Frank Ellinger, Technische Universitaet Dresden

14:50

Mo3A-5: A Wideband 2.18-13.51 GHz Ultra-Low Additive Phase Noise Power Amplifier in InP 250nm HBT

Authors: Pedram Shirmohammadi, University of Virginia; Steven M Bowers, University of Virginia

Mo3B-5: A 22FDX® 2 Stack Power Amplifier for 5G Applications with 19dBm Psat and 49% Peak PAE

Authors: Zaid Al-Husseini, GLOBALFOUNDRIES; Paolo Valerio Testa, GLOBALFOUNDRIES; Shafi Syed, GLOBALFOUNDRIES; Mayuri Padmakar Wanve, GLOBALFOUNDRIES; Chris Boyer, GLOBALFOUNDRIES; Tianbing Chen, GLOBALFOUNDRIES

15:10

SiRF Session Mo3C

Millimeter-Wave Signal Generation

Chair: Taiyun Chi, Rice University
Co-Chair: Austin Chen, Peraso, Inc.

Room: Texas C

Journal Paper Session JP2

Electronic Devices and Active Circuits

Chair: Almudena Suarez Rodriguez, IEEE T-MTT

Room: Seguin AB

13:30

Mo3C-1: A 4.5 dBm SiGe Doubler-Amplifier Chain Covering the Entire D-Band

Authors: Matthias Moeck, Karlsruhe Institute of Technology; Ibrahim Kagan Aksoyak, Karlsruhe Institute of Technology; Cagri Ulusoy, Karlsruhe Institute of Technology

JP2-1: W-Band Graded-Channel GaN HEMTs With Record 45% Power-Added-Efficiency at 94 GHz

Authors: Jeong-Sun Moon; Bob Grabar; Joel Wong; Chuong Dao; Erdem Arkun; Haw Tai; Dave Fanning; Nicholas C. Miller; Michael Elliott; Ryan Gilbert

13:50

Mo3C-2: A SiGe-Based Quadrature D-Band Up-Converter with High Output Power

Authors: Ibrahim Kagan Aksoyak, Karlsruhe Institute of Technology; Matthias Moeck, Karlsruhe Institute of Technology; Cagri Ulusoy, Karlsruhe Institute of Technology

JP2-2: Fully Integrated Avalanche Noise Sources: Reproducibility and Stability Assessment

Authors: Guendalina Simoncini; Federico Alimenti; Valentina Palazzi; Giulia Orecchini

14:10

Mo3C-3: A 300 GHz x9 Multiplier Chain With 9.6 dBm Output Power in SiGe Technology

Authors: Arjith Chandra Prabhu, University of Wuppertal; Janusz Grzyb, University of Wuppertal; Philipp Hillger, University of Wuppertal; Thomas Buecher, University of Wuppertal; Holger Ruecker, IHP Microelectronics; Ullrich Pfeiffer, University of Wuppertal

JP2-3: A Fractional-N Synthesizer Based on Programmable Frequency Multiplier for 5G+ Communication System

Authors: Nam-Pyo Hong; Kyu-Hyun Nam; Jun-Seok Park

14:30

Mo3C-4: 230 GHz Signal Generator for High-Bandwidth Data Links in 130 nm SiGe BiCMOS

Authors: Christian Hoyer, Technische Universitaet Dresden; Luca Steinweg, Technische Universität Dresden; Florian Protze, Technische Universität Dresden; Franz Alwin Dürrwald, Technische Universitaet Dresden; Tilo Meister, Technische Universität Dresden; Frank Ellinger, Technische Universität Dresden

JP2-4: A Dual-Band Rectifier Using Half-Wave Transmission Line Matching for 5G and Wi-Fi Bands RFEH/MPT Applications

Authors: Md. Ahsan Halimi; Taimoor Khan; Shiban K. Koul; Sembiam R. Rengarajan

14:50

15:10

Workshop

From Lab to Market: Empowering Researchers for Entrepreneurial Success

Organizer:
Weston Waldo, Director NSF I-Corps Southwest Region Hub

Room: Texas A

15:40

Abstract:

Are you a researcher with groundbreaking technology seeking to take your innovations from the lab to the market? Join us for an inspiring and informative workshop as part of the prestigious IEEE Radio & Wireless Week! This workshop is dedicated to nurturing entrepreneurship among researchers like you, who are determined to bridge the gap between cutting-edge research and real-world impact.

Led by Weston Waldo, an expert in entrepreneurship and a key member of the newly funded National Science Foundation $15M Southwest Hub I-Corps grant, this workshop offers a unique opportunity to learn essential strategies for commercializing your research findings. The Southwest Hub I-Corps grant's mission is to empower and guide early-stage researchers, providing them with the tools and knowledge needed to navigate the challenging journey of technology commercialization.

During this interactive workshop, you will gain invaluable insights into:

- Identifying Market Opportunities: Understand how to identify and assess potential markets for your technology, ensuring your innovations meet real-world demands and needs.
- Developing a Business Model: Learn how to create a solid business model that aligns with your research, effectively translating your ideas into a commercially viable product or service.
- Market Validation: Discover the importance of market validation and how to engage with potential customers and stakeholders to refine your offerings.
- Funding and Resources: Explore various funding options and support resources available to early-stage researchers, including the opportunities offered by the Southwest Hub I-Corps grant.
- Entrepreneurial Mindset: Cultivate the entrepreneurial mindset required to navigate the challenges of entrepreneurship, including risk-taking, adaptability, and resilience.

Whether you're just starting to explore the world of entrepreneurship or have already taken your first steps, this workshop is designed to equip you with the knowledge, skills, and confidence to successfully bring your technology to the market. Be prepared to engage in stimulating discussions, practical exercises, and networking opportunities with like-minded researchers and seasoned entrepreneurs.

Don't miss this chance to unlock your potential as a technology entrepreneur! Join us at the IEEE Radio & Wireless Week and embark on a transformative journey from lab to market.

16:00

16:20

16:40

17:00

17:20

PAWR Session Mo4B

Linearization and Efficiency Enhancement Techniques

Chair: Antonio Raffo, University di Ferrara
Co-Chair: John Dooley, Maynooth University

Room: Texas B

15:40

Mo4B-1: Artificial neural networks for digital predistortion linearization: more than an academic solution?

Authors: Pere L. L Gilabert, Univ. Politecnica de Catalunya; Wantao Li, University Politècnica de Catalunya; David López-Bueno, Centre Tecnològic de Telecomunicacions de Cataluny; Gabriel Montoro, Universitat Politècnica de Catalunya

Mo4B-2: DPD Algorithm with Long-term Memory Effects Compensation for AlGaN-GaN HEMTs

Authors: Zhijian Yu, Ampleon; Yi Zhu, Ampleon; Radjindrepersad Gajadharsing, Ampleon

Mo4B-3: High Accuracy DPD Approach for Hybrid Beamformer using Novel Training Symbol Mapping

Authors: Rahul Mushini, Maynooth University; Ciara Mcdonald, Maynooth University; Peter Rashev , NXP Semiconductors; Ronan Farrell, Maynooth University; John Dooley, Maynooth University

16:40

Mo4B-4: Investigating Feeding Techniques for High power and High efficiency E band Power Amplifiers

Authors: Bharath Kumar Cimbili, Fraunhofer Institute for Applied Solid State Physi; Christian Friesicke, Fraunhofer IAF; Mingquan Bao, Ericsson; Sandrine Wagner, Fraunhofer IAF; Moïse Safari Mugisho, Fraunhofer Institute for Applied Solid State Physi; Ruediger Quay, Fraunhofer Institute for Applied Solid State Physi

Mo4B-5: A Linearized Calibration Technique Using Modulated Signals for Wideband Dual-Input Doherty Characterization

Authors: Andreas Illmer, Friedrich-Alexander-Universität Erlangen-Nürnberg; Alexander Deublein, Friedrich-Alexander-Universität Erlangen-Nürnberg; Robert Weigel, Friedrich-Alexander-Universität Erlangen-Nürnberg; Thomas Ackermann, Friedrich-Alexander-Universität Erlangen-Nürnberg

17:20

SiRF Session Mo4C

Devices, Technology, and Integration

Chair: Kamel Haddadi, University of Lille
Co-Chair: Mehmet Kaynak, Texas Instruments

Room: Texas C

Journal Paper Session JP3

Transmitters and Receivers

Chair: Roberto Gómez García, IEEE MWTL

Room: Seguin AB

Demystify IEEE Fellow Nomination

Organizer: Jenshan Lin

Room: Crocket AB

15:40

Mo4C-1: 2.5D-3D Heterogeneous Integration

Authors: Ankush Mohan, HRL Laboratories, LLC; John Carlson, HRL Laboratories - Advanced Packaging Group; Tina Seeholzer, HRL Laboratories - Advanced Packaging Group; Clayton Tu, HRL Laboratories - Advanced Packaging Group; Avantika Sodhi, HRL Laboratories - Advanced Packaging Group; Hasan Sharifi, HRL Laboratories - Advanced Packaging Group

JP3-1: In Situ RF Current Assessment for Array Transmission and Optimization

Authors: Adam C. Goad; Charles Baylis; Trevor Van Hoosier; Austin Egbert; Robert J. Marks

JP3-2: Scalable Metamaterial Integrated Digital Coding Transmitting Bit Array for Concurrent Multistream Direct Antenna Modulation

Authors: Shuping Li; Chung-Tse Michael Wu

Mo4C-2: The Chip-Level in-Plane Stress Distribution over BiCMOS Wafers

Authors: Zhibo Cao, IHP Microelectronics; Thomas Voss, IHP – Leibniz-Institut für innovative Mikroelektro; Matthias Wietstruck, IHP – Leibniz-Institut für innovative Mikroelektro; Corrado Carta, IHP – Leibniz-Institut für innovative Mikroelektro; Mehmet Kaynak, Texas Instruments

JP3-3: A mmW Receiver Exploiting Complementary Current Reuse and Power Efficient Bias Point

Authors: Jesse Moody; Stefan Lepkowski; Travis Forbes

16:40

Mo4C-3: Characterization of Silicon Substrates for Sub-THz Electronics, Benefit of The Beatty Resonator Test-Structure

Authors: Luca Lucci, CEA-LETI ; Olivier Valorge, CEA-LETI ; Alexandre Oliveira, CEA-LETI ; Herve Boutry, CEA-LETI ; Christophe Dubarry, CEA-LETI ; Fred Gaillard, CEA-LETI ; Blandine Duriez, CEA-LETI

JP3-4: Phase Offset Calibration in Multi-Channel Radio-Frequency Transceivers

Authors: Guoyi Xu; Edwin Kan

Mo4C-4: ft extraction of HEMT transistors at mm-waves through EM-simulated de-embedding devices

Authors: Mohammed Medbouhi, CEA-LETI ; José Lugo-Alvarez, CEA-LETI ; Philippe Ferrari, TIMA Laboratory, CNRS-Grenoble INP-UJF; Erwan Morvan, CEA-LETI

IEEE Fellow Nomination Info Session

This IEEE Fellow Nomination Information Session at the upcoming IEEE Radio & Wireless Week (RWW) 2024 will offer an opportunity to learn about the IEEE Fellow nomination and elevation process as well as the statistics in the past. In addition to providing information and encouraging nominations, this session aims to provide last-minute help to nominators before the upcoming Fellow nomination deadline on 07 February 2024 (note the much earlier new deadline). IEEE Fellow is a distinction reserved for select IEEE members whose extraordinary accomplishments in any of the IEEE fields of interest are deemed fitting of this prestigious grade elevation. The total number of Fellow recommendations in any one year must not exceed one-tenth of one percent of the IEEE voting membership on record as of 31 December of the year preceding (IEEE Bylaw I-305.9).

Organizer Bio

Dr. Jenshan Lin is a Program Director at the U.S. National Science Foundation (NSF), and a Professor Emeritus at the University of Florida (UF). In his early career prior to joining UF, he was with AT&T/Lucent Bell Laboratories and its spinoff Agere Systems from 1994 to 2003. He has published more than 300 papers and produced 24 patents. Prior to his retirement from UF in January 2022, he graduated 29 Ph.D. students. Dr. Lin was elevated to IEEE Fellow in 2010. He was as an elected IEEE Microwave Theory and Techniques Society (MTT-S) Administrative Committee (AdCom) member from 2006 to 2011. He chaired the MTT-S Fellow Evaluating Committee from 2021 to 2022, after serving as a member of the committee from 2014 to 2017 and the vice chair of the committee in 2018.

15:40
16:00
16:20
16:40
17:00
17:20

17:20

The RWW Student Paper Contest

The purpose of the Student Paper Contest is to reward students for exceptional work and consider group projects as well as individual projects. The RWW Student Paper Contest provides students with the opportunity to share their work and discuss their results with experts from industry and academia. It is open to all students attending the RWW and presenting a paper at one of the topical conferences (RWS, PAWR, WiSNet, SiRF, and SHaRC). Starting from 2017 the Steering Committee established a new format of the Student Paper Contest, which is now a single event for the whole RWW.

The following rules apply for participating at the Student Paper Contest:

- First author must be a student (a full time or a part time). A letter is required from major advisor (Professor) stating that the first author is a registered full-time student or part-time student and has done a substantial portion of the work. Failure to provide this letter will result in disqualification.
- Number of authors on the paper: No limit, including outside authors. Outside authors are defined as co-authors from industry or from other institutions (government labs, other universities, etc.). The outside authors are included to encourage group-project submissions. The review committee will consider the number of authors vs. the level of work presented in the paper in order not to penalize the individual project submissions.
- All students wishing to participate in the contest are required to follow the regular Symposium submission process for papers including registration. Please check the checkbox during the submission process for being considered in the contest.

Student Paper Contest submissions are first evaluated by the Technical Program Committee (TPC), along with all other manuscript submissions, and receive no special consideration when being considered for acceptance to the symposium. Those papers that are accepted for oral presentation, identified as Student Paper submissions, and that meet the criteria (Relevance, Novelty, Quality, and Content) become eligible for the Student Paper Contest. The TPC and the Student Paper Contest Chairs will separately evaluate these papers again to select Student Paper Finalists.

Each Student Paper Finalist is required to prepare a short elevator pitch and a poster. Judges from all topical conferences will select the first and second place winners among the Student Paper Finalists based on the quality of the final paper, the poster presentation, and the oral presentation. The winners will be announced at the Plenary Session on Tuesday. Like last year, the first place winner is invited to write a paper for the IEEE MTT-S Microwave Magazine.

Ken Kolodziej, MIT Lincoln Laboratory
Ifana Mahbub, UT Dallas
RWW Student Paper Contest Chairs

Process & Rules of the Student Paper Contest

Each Student Paper Finalist is required to prepare a short elevator pitch and a poster.

The elevator pitches take place on Monday 22 January from 1:30PM to 3:10PM in room Crockett AB.

The poster presentations take place on Monday 22 January from 3:40PM to 5:20PM during the coffee break in room Texas DF.

For the elevator pitches finalists will be in the role of the entrepreneur and present their idea to potential investors (the judges). There will only be a flip chart for supporting the presentation. Maximum two persons per paper can bring whatever they can carry for a presentation of four minutes.

The winners will be announced in the Plenary Session on Tuesday 23rd January.

Finalists 2024

- **Low Phase Noise 104 GHz Oscillator Using Self-Aligned On-Chip Voltage-Tunable Spherical Dielectric Resonator in 130-nm SiGe BiCMOS**, Yu Zhu, Technische Universitaet Dresden
- **Investigating Feeding Techniques for High power and High efficiency E band Power Amplifiers**, Bharath Kumar Cimbili, Fraunhofer Institute for Applied Solid State Physics
- **A Planar Monopulse Comparator Network Design from Port-Transformation Rat-Race Coupler**, Hanxiang Zhang, Florida State University
- **A 4.5 dBm SiGe Doubler-Amplifier Chain Covering the Entire D-Band**, Matthias Moeck, Karlsruhe Institute of Technology
- **Distributed Radar Network with Polymer Microwave Fiber (PMF) Based Synchronization**, Andawattage Samarasekera, Johannes Kepler University Linz
- **A Modular 61 GHz Vital Sign Sensing Radar System for Long-term Clinical Studies**, Marvin Wenzel, Hamburg University of Technology
- **Device-Free Occupant Counting Using Ambient RFID and Deep Learning**, Guoyi Xu, Cornell University
- **Investigation of a Simple and Versatile Concept for OFDM Radar Target Simulator Enhancement**, Christoph Birkenhauer, Friedrich-Alexander-Universität Erlangen-Nürnberg
- **High-Performance Compact Diplexer Based on the Alternative Low-Cost AF-SIW Technology**, Maxime Le Gall, Exens Solutions
- **DDS-based Multiphase Local Oscillator Generator for Fast-Beam-Switching Phased-Array Antennas**, Shuichi Inaguma, Ritsumeikan University
- **High Accuracy DPD Approach for Hybrid Beamformer using Novel Training Symbol Mapping**, Rahul Mushini, Maynooth University
- **A 23-30 GHz Low-phase-noise 5-Bit Voltage-Controlled Oscillator in 90-nm CMOS Process**, Hong-Yeh Chang, National Central University
- **A 34 GHz CMOS VCO with Transformer Tail-Node Filter and TSPC Frequency Divider in 22 nm FDSOI**, Andre Engelmann, Friedrich-Alexander-Universität Erlangen-Nürnberg
- **Concurrent Vibration and Location Detection Using W-band On-chip Super-Regenerative Oscillator-Based Pulsed Radar**, Donglin Gao, Rutgers Univ.

Joint PAWR/ARFTG Panel
"Exploring the Potential of 6G: Building Upon 5G's Lessons."

Organizer: Vittorio Camarchia, Politecnico di Torino

Room: Texas A

18:30

Exploring the Potential of 6G: Building Upon 5G's Lessons.

Abstract:
Get ready for a vivid discussion on the future of wireless technology. Our panel of industry experts will delve into the possibilities of 6G, leveraging the lessons learned from the era of 5G. Don't miss this exciting opportunity to gain valuable insights into the next generation of wireless communication.

Meet our expert panelists featuring experts from HRL, Fraunhofer, Virginia diodes, Keysight, and NI.

Panelists:

- Jeong Moon, HRL
- Gerhard Schoenthal, Virginia Diodes
- Nuno Borges Carvalho, IT Aveiro
- Mark Pierpoint, Keysight Technology
- Fabian Thome, Fraunhofer Research Institute
- Markus Dasilva, National Instruments
- Alessandro Fonte, Siae Microelectronics

19:30

RWS Session Tu1A

Antenna and Beamforming Technologies

Chair: Vaclav Valenta, European Space Agency
Co-Chair: Ricardo Figueiredo, University of Aveiro

Room: Texas A

SiRF Session Tu1B

Amplifier Design

Chair: Mehmet Kaynak, Texas Instruments
Co-Chair: Robert Schmid, Johns Hopkins Applied Physics Laboratory

Room: Texas B

8:00

Tu1A-1: Beamforming-based Spatial Precoding with Channel Estimation for Massive MIMO-OFDM System

Authors: Chen-Hao Chiu, National Taiwan University; Ju-Hong Lee, National Taiwan University

Tu1B-1: CMOS LNA and VGA for 5G NR Using Gain-Linearity-Boosting and Body Floating Techniques

Authors: Jin-Fa Chang, National Changhua University of Education; Yo-Sheng Lin, National Chi Nan University

8:20

Tu1A-2: A Pencil Beam Parabolic Reflector Antenna Using LSE-NRD Guide at 140 GHz

Authors: Daiya Miyamoto, National Institute of Technology, Kure College; Futoshi Kuroki, National Institute of Technology, Kure College

Tu1B-2: Parametric-Oscillation-Free Efficient SiGe:C Power Amplifier Design for Ku--Ka-Band SATCOM

Authors: Tsung-Ching Tsai, Karlsruhe Institute of Technology; Vaclav Valenta, European Space Agency; Cagri Ulusoy, Karlsruhe Institute of Technology

8:40

Tu1A-3: Spatial Processing with High-Fidelity Antenna Models and Quantized Analog Weights

Authors: John Spitzmiller, Parsons

Tu1B-3: A 94 GHz Bandwidth Transimpedance Amplifier in 55nm SiGe BiCMOS for High Speed Optical Receivers

Authors: Lachlan Cuskelly, University of California, Los Angeles; Christopher Falt, Ciena, Corp.; Peter Schvan, Ciena, Corp.

9:00

Tu1A-4: A Compact and Highly Efficient Circularly Polarized UWB Rectenna for Wireless Power Transfer Application

Authors: Nabanita Saha, University of Texas at Dallas; Sunanda Roy, The University of Texas at Dallas; Ifana Mahbub, University of Texas at Dallas

Tu1B-4: A 200 - 325 GHz Gain-Boosted J-Band Low-Noise Amplifier in a 130 nm SiGe BiCMOS Technology

Authors: Manuel Koch, Friedrich-Alexander-Universität Erlangen-Nürnberg; Sascha Breun, Friedrich-Alexander-Universität Erlangen-Nürnberg; Robert Weigel, Friedrich-Alexander-Universität Erlangen-Nürnberg

9:20

9:40

SiRF Session Tu1C

Radar and Sensor Circuits and Architectures

Chair: Saeed Zeinolabedinzadeh, Arizona State University
Co-Chair: Davi Rodrigues, University of Texas at El Paso

Room: Texas C

Journal Paper Session JP4

Radar, Localization, and Sensory Systems

Chair: Nuno Borges Carvalho, Universidade de Aveiro

Room: Seguin AB

8:00

Tu1C-1: Advances in mmWave Radar Architectures

Authors: Brian Ginsburg, Texas Instruments

JP4-1: A Miniaturized Millimeter-Wave Radar Sensing Microsystem with High Isolation Full-duplex Microstrip Patch Antenna

Authors: Lina Ma; Zesheng Zhang; Jingyun Lu; Changzhan Gu; Junfa Mao

8:20

JP4-2: A Low-IF Doppler Radar With Asynchronous Bandpass Sampling for Accurate Measurement of Displacement Motions

Authors: Fei Tong; Jingtao Liu; Changzhi Li; Changzhan Gu; Junfa Mao

8:40

Tu1C-2: Analysis of a SiGe BiCMOS Detector for a Broadband mmW-integrated EPR Spectrometer

Authors: Selina Eckel, Karlsruhe Institute of Technology; Ahmet Cagri Ulusoy, Karlsruhe Institute of Technology

JP4-3: A Wi-Fi Frequency Band Passive Biomedical Doppler Radar Sensor

Authors: Dongyang Tang; Victor G. Rizzi Varela; Davi V. Q. Rodrigues; Daniel Rodriguez; Changzhi Li

9:00

Tu1C-3: 27 Gb-s PRBS Generator with In-Operation Programmable Taps for PMCW Radar

Authors: Florian Probst, Friedrich-Alexander-Universität Erlangen-Nürnberg; Andre Engelmann, Friedrich-Alexander-Universität Erlangen-Nürnberg; Robert Weigel, Friedrich-Alexander-Universität Erlangen-Nürnberg

JP4-4: 3-D indoor localization and identification through RSSI-Based angle of arrival estimation with real Wi-Fi signals

Authors: Ho-Chun Yen; Liang-Yu Ou Yang; Zuo-Min Tsai

9:20

JP4-5: Noninvasive Internal Body Thermometry With On-Chip GaAs Dicke Radiometer

Authors: Jooeun Lee; Gabriel Santamaria Botello; Robert Streeter; Zoya Popovic

9:40

Joint RWW/ARFTG Plenary Session

Chair: Holger Maune, Otto von Guericke University
Co-Chair: David Blackham, Keysight Technologies

Room: Texas A

10:10

Joint RWW/ARFTG Plenary Session

The Future of Heterogeneous Integration for mmWave Systems: Challenges and Opportunities

Speaker: Madhavan Swaminathan, The Pennsylvania State University, USA

Madhavan Swaminathan is the Department Head of Electrical Engineering and is the William E. Leonhard Endowed Chair at Penn State University. He also serves as the Director for the Center for Heterogeneous Integration of Micro Electronic Systems (CHIMES), an SRC JUMP 2.0 Center.Power Amplifier Design and Linearization Techniques Prior to joining Penn State University, he was the John Pippin Chair in Microsystems Packaging & Electromagnetics in the School of Electrical and Computer Engineering (ECE), Professor in ECE with a joint appointment in the School of Materials Science and Engineering (MSE), and Director of the 3D Systems Packaging Research Center (PRC), Georgia Tech (GT). Prior to GT, he was with IBM working on packaging for supercomputers. He received his MS and PhD degrees in Electrical Engineering from Syracuse University in 1989 and 1991, respectively.

Abstract:

Emerging electronic systems require the dense integration of many chiplets in either 2D or 3D form. The metrics for these systems will be dictated by power, performance, form factor, cost, and reliability. The complexity of these systems is expected to be large given the integration of sensing, wireless, computing, and other functionality on a single packaging platform that combines electronics and photonics together. Such systems pose immense integration challenges but also provide opportunities for innovation on several fronts that include architecture, design, thermal, materials, embedded intelligence, and many more? This presentation will provide a discussion of the State of the Art and opportunities for the future.

Redefining ICs Metrics for OTA Characterization

Speaker: Anouk Hubrechsen, ANTENNEX B.V.

Anouk Hubrechsen received the B.Sc. and M.Sc. degrees in Electrical Engineering from the Eindhoven University of Technology, Eindhoven, The Netherlands, in 2017 and 2019, respectively, where she finished her Ph.D. in 2023 on reverberation-chamber measurements of mmWave antennas. She was a Guest Researcher with the National Institute of Standards and Technology at Boulder, Boulder, CO, USA, in 2018 and 2019. There she was involved in reverberation-chamber metrology for Internet-of-Things applications. She is co-founder and CEO of ANTENNEX B.V., a company that develops instrumentation for measuring integrated antenna systems, based on reverberation-chamber technology. Anouk received the Regional and District Zonta Women in Technology Awards in 2019.

Abstract:

With higher frequencies, integration of antennas and RF electronics means that many measurements now need to be performed over the air. In this talk, we explain the challenges of testing RF electronics in phased-array and antenna-on-chip configurations. They require new types of testing methods. We detail the newest over-the-air measurement techniques for metrics such as noise figure, out-of-band emissions, radiated power spectrum, and field distribution in advanced, highly-integrated devices.

12:00

Interactive Forum IF1 - Room: Texas D-F

13:30

IF1-1: A Compact 2.45-5.5-GHz Dual-Band LNA Design Using Bridged-T Coils

Authors: Jing-Xuan Chou, National Central University; Yo-Shen Lin, National Central University

IF1-2: Single-Voltage-Supply pHEMT-mHEMT 2.4 and 5.8 GHz LNAs Using Power Constrained Design

Authors: Chinchun Meng, National Yang Ming Chiao Tung University; Chung-Yo Lin, National Yang Ming Chiao Tung University; Guo-Wei Huang, Natinal Applied Research Institute

IF1-3: Scalable Multi-tap RF Canceller with Arduino Control for STAR Systems

Authors: Pierre-Francois W Wolfe, MIT Lincoln Laboratory; Kenneth E Kolodziej, Mit Lincoln Laboratory

IF1-4: Robust Estimation for Digital Predistortion with Non-ideal Equalization

Authors: Richard N Braithwaite, Keysight Technologies

IF1-5: Broadband GaN Power Amplifier MMIC with a Nonuniform Transmission Line Output Matching Network

Authors: Paul Flaten, University of Colorado; Zoya Popovic, University of Colorado

IF1-6: Integrated GaN Power Detector for High Power Millimeter-Wave Applications

Authors: Thomas Ufschlag, Institute of Robust Power Semiconductor Systems; Benjamin Schoch, Institute of Robust Power Semiconductor Systems; Dominik Wrana, Institute of Robust Power Semiconductor Systems; Sandrine Wagner, Fraunhofer Institute for Applied Solid State Physics; Dirk Schwantuschke, Fraunhofer Institute for Applied Solid State Physics; Friedbert Van Raay, Fraunhofer Institute for Applied Solid State Physics; Peter Brückner, Fraunhofer Institute for Applied Solid State Physics; Ingmar Kallfass, Institute of Robust Power Semiconductor Systems

IF1-7: An X-band Spatial Power Combining Using Rectangular Waveguide with Dielectric Lens

Authors: Takuma Kinoshita, NIT, Kure college; Yuki Shinhama, NIT, Kure college; Masaru Sato, Fujitsu Ltd.; Futoshi Kuroki, NIT, Kure college

IF1-8: An Ultra-wideband Off-axis Reflector Lens

Authors: Mingyan Zhong, University of Glasgow; Yunan Jiang, University of Glasgow; Yufei Ma, University of Glasgow; Chong Li, University of Glasgow

IF1-9: A Linear Simulation Technique for a Power Traveling-Wave Amplifier

Authors: Waleed Joudeh, Amcom Communications Inc.; Amin Ezzeddine, AMCOM Communications, Inc.

IF1-10: Study of AM-PM Deviation on Power Amplifier Linearization Performances for 5G Applications

Authors: Christophe Quindroit, Ampleon; Kaisseh Houssein, Ampleon; Alexis Courty, Ampleon; Stephan Maroldt, Ampleon

IF1-11: A 3.6GHz Highly Efficient Dual-Driver Doherty Power Amplifier

Authors: Ioannis Peppas, Graz University of Technology; Marco Pitton, Infineon Technologies Austria AG; Mustazar Iqbal, Infineon Technologies; Peter Singerl, Infineon Technologies AG; Bhagath Talluri, Infineon Technologies Nijmegen BV; Martin Mataln, Infineon Technologies Austria AG; Helmut Paulitsch, Graz University of Technology; Wolfgang Bösch, Graz University of Technology

IF1-12: Cost-Effective Allan Deviation Measurement in SDRs Using Integrated ADC

Authors: Alastair L Wiegelmann, Flinders University; Samuel Drake, Flinders.University; Saeed Rehman, Flinders University; Shengjian Chen, Flinders University

IF1-13: Multi-Antenna Array for All Space Communications

Authors: Pavlo Molchanov, AMPAC Science

IF1-14: Energy-Efficient D-Band Power Amplifier Linearization Adopting Back-Gate Feedforward Technique in 22nm FD-SOI

Authors: Helia Ordouei, Technische Universitat Berlin; Friedel Gerfers, Technische Universität Berlin

IF1-15: Impact on Beam-Forming Processes in the Near Field for 5G Ultra-Wideband Waveform

Authors: Maryna Nesterova, APREL Inc.; Stuart Nicol, APREL; Yuliya Nesterova, Carleton University

IF1-18: High Gain Metamaterial Superstrate Loaded Antenna For S band Communication

Authors: Prutha P Kulkarni, Vishwakarma Institute of Information Technology; Vivek S Deshpande, Vishwakarma Institute of Information Tehcnology

IF1-19: Software Configurable Multi-mode Radar Sensor System for Range Tracking and Life Sensing

Authors: John T Crainer, Texas Tech University; Changzhi Li, Texas Tech University

IF1-20: ISAR Imaging of Drones Based on Time Domain Correlation Algorithm Using Millimeter-Wave Fast Chirp Modulation MIMO Radar

Authors: Kenshi Ogawa, National Defense Academy of Japan; Dovchin Tsagaanbayar, National Defense Academy of Japan; Ryohei Nakamura, National Defense Academy of Japan

IF1-21: Wireless Network Deployment Survey

Authors: Arash Ahmadi, École de Technologie Supérieure de Montreal; Zahra Sepehri, École de Technologie Supérieure de Montreal; Marouane Indja, École de Technologie Supérieure de Montreal; Vladan Jevremovic, iBwave Solution Inc.; Ali Jemmali, iBwave Solutions Inc.; Marc-Antoine Lamontagne, iBwave Solutions Inc.; Sylvain G Cloutier, École de Technologie Supérieure de Montreal; Ivanka Iordanova, École de Technologie Supérieure; Chahé Nerguizian, Polytechnique Montreal; Ali Motamedi, École de Technologie Supérieure de Montreal

IF1-22: A Compact 6-12 GHz MMIC Power Amplifier

Authors: Muhammad Y Mahsud, University of Colorado; Prathamesh Pednekar, University of Colorado Boulder - ECEE; Taylor Barton, University of Colorado

IF1-23: A Comprehensive Approach to Extracting Coupling Matrix From Filtenna Measurements

Authors: Sara Javadi, Graz University of Technology; Behrooz Rezaee, Graz University of Technology; Manfred Stadler, Qualcomm Europe, Inc.; Michael Leitner , Qualcomm Europe, Inc.; Wolfgang Bösch, Graz University of Technology

IF1-24: A Wideband Patch Antenna Array with Improved Isolation for Integrated Sensing and Communication

Authors: Lina Ma, Shanghai Jiao Tong University; Changzhan Gu, Shanghai Jiao Tong University; Junfa Mao, Shanghai Jiaotong University

IF1-25: Design of a Six-stage W-band Low-Noise Amplifier Using a 90-nm CMOS Technology

Authors: Yu-Chia Su, National Central University; Rou-Yin Huang, National Central University; Hong-Yeh Chang, National Central University

IF1-26: Compact Dual-Band Negative Group Delay Circuit

Authors: Nathan B Gurgel, Federal University of Campina Grande; Glauco Fontgalland, Federal University of Campina Grande; Isaac Barros, Federal Rural University of Semiarid; Blaise Ravelo, Nanjing University of Science and Technology

IF1-27: Low Power Gesture Sensing System Based on Target Range Using Spiking Neural Networks for Portable Devices

Authors: Muhammad Arsalan, Technische Universität Braunschweig; Avik Santra, Infineon Technologies AG; Vadim Issakov, Technische Universität Braunschweig

IF1-28: Enhancing the Output Power and Efficiency for a Set Noise-Power Ratio of a K-Band Power Amplifier By Means of Analog Pre-Distortion

Authors: Tommaso Cappello, Villanova University; Sarmad Ozan, University of Bristol; Andy Tucker, Filtronic Broadband Ltd.; Peter Krier, Filtronic Broadband Ltd.; Tudor Williams, Filtronic Broadband Ltd.; Kevin Morris, University of Leeds

IF1-29: Class S Power Amplifier System for Radio Applications in the HF Band

Authors: Alexander Ruderer, University of Innsbruck; Alex Putzer, University of Innsbruck; Thomas Ussmueller, University of Innsbruck

IF1-30: A 1.28 mW K-Band Modified Gilbert-Cell Mixer Design in 22nm FDSOI CMOS

Authors: Adilet Dossanov, Technische Universität Braunschweig; Vadim Issakov, Technische Universität Braunschweig

IF1-31: Over-the-Air LoS Propagation Characteristics of Various Indoor Materials at 28 GHz

Authors: Mohammad Alavirad, Dell Technologies; Tejinder Singh, Dell Technologies; Morris Repeta, Dell Technologies

15:10

15:10

Demo Track - Room: Texas D-F

13:30

Bringing EDA-Tool Schematics into LaTeX - An Open-Source Solution

Presenter:
Christof Pfannenmüller

Affiliation:
Friedrich-Alexander-Universität Erlangen-Nürnberg,
Lehrstuhl für Technische Elektronik,
Team Radio & Biomedical Applications

Abstract:
Current EDA tools like PathWave Advanced Design System or Cadence Virtuoso support various formats for data interchange and documentation exports. We propose an open-source solution for directly transferring schematic data to the node-based drawing environment TikZ and its extension CircuiTikZ for electrical schematic drawings. Schematics are exported as XML-based file structures via ADS Board Link (ABL). Using this input, the proposed tool can recalculate components and their placements and convert them to TikZ-based source code. With these, the schematic can be used in LaTeX documents.

Demo Overview:
This demo will contain a live view of several Keysight ADS schematics and their conversion with the proposed open-source JavaScript-based tool. Afterward, the results are shown in a LaTeX document for comparison. A computer with the necessary installed software will be provided. No additional equipment will be required for the demo.

Nature-Inspired All-Space Multi-Antenna Array Architecture

Presenter:
Dr. Pavlo Molchanov

Affiliation:
IPD Scientific LLC

Abstract:
The nature-inspired all-space multi-antenna array architecture combines various techniques to achieve wide-area multi-orbit observation, fast simultaneous signal processing, high directional accuracy, enhanced reliability, and communication quality. The key elements and features of the architecture: Holographic wide area of observation with staring antenna array; Monopulse method of fast simultaneous signals processing; Direct Digitizing Signals on Multi-Axis Overlap Directional Antennas; Integration of Antennas with Signal Conditioning Circuits and SDR; Distributed Placement for System Protection; Transformation and Processing in Multiple Domains. Moreover, the application of wide numerical aperture overlap antennas allows the detection and recognition of different objects in high-scattering mediums by measurement of the Fresnel diffraction patterns and angular spectrum of scattered and diffraction components. Fourier transform and digital multi-domain digitizing can provide reliable recognition of objects by spectrum signatures and separation of transferring medium and objects.

Demo Overview:
The demonstration setup will consist of a low-power transmitter module and a receiving module connected to two separate directional antennas by flexible coaxial cables. The receiving module can be connected to a phase detector or Software Defined Radio (SDR). This setup allows for a demonstration of key features of the array architecture, as well as the recognition of different objects using their spectrum signatures. Remote detection and recognition of concealed objects will be also demonstrated.

mmW-OAI: The Easiest Way to Establish a 5G FR2 End-to-End Test Network

Presenter:
Ethan Lin

Affiliation:
Tmytek

Abstract:
Do you happen to have one or two spare SDRs on hand? Have you ever thought about establishing a complete 5G FR2 end-to-end network with your SDRs?

TMYTEK will introduce the mmW-OAIBOX, an FR2-enabled OAI testbed that TMYTEK worked on with Allbesmart. It is worth noting that this solution has already been delivered to Japan. Incorporating the best of millimeter-wave and OpenAirInterface (OAI), we provide a comprehensive test environment from UE to the core network. The mmW-OAIBOX offers 5G beamformers to mimic gNB and UE array antennas, a frequency converter, a powerful PC installed with the latest OAI stack, including OAI gNB, CN5G, a dashboard, and more.

We will show you how to use the APIs to control TMYTEK FR2 devices, including a 24-44 GHz up/down converter (UD Box) and a 28 GHz mmWave beamformer (BBox), with your SDR development environment. This will include an API introduction, control calls, DLL imports, and more.

There are many topics that need to be addressed in wireless research. We have built the most advanced tools to unleash your creativity, so you are able to develop innovative solutions for the next generation of wireless technology.

15:10

RWS Session Tu3A

Bio-Medical Applications

Chair: Robert Caverly, Villanova University
Co-Chair: Ifana Mahbub, University of Texas at Dallas

Room: Texas A

SiRF Session Tu3C

Voltage-Controlled Oscillators

Chair: Austin Chen, Peraso, Inc.
Co-Chair: Chung-Tse Wu, Rutgers University

Room: Texas C

Journal Paper Session JP5

Power Amplifiers

Chair: Paolo Mezzanotte, University of Perugia

Room: Seguin AB

15:40

Tu3A-1: Concurrent Vibration and Location Detection Using W-band On-chip Super-Regenerative Oscillator-Based Pulsed Radar

Authors: Donglin Gao, Rutgers University; Shuping Li, Rutgers University; Minning Zhu, Rutgers University; Chung-Tse Michael Wu, Rutgers University

Tu3C-1: A 23-30 GHz Low-phase-noise 5-Bit Voltage-Controlled Oscillator in 90-nm CMOS Process

Authors: Po-Yuan Chen, National Central University; Jun-Liang Chen, National Central University; Hong-Yeh Chang, National Central University

JP5-1: Single-Input Broadband Hybrid Doherty Power Amplifiers Design Relying on a Phase Sliding-Mode of the Load Modulation Scheme

Authors: Chenyu Liang; Patrick Roblin; Yunsik Hahn; Jose I. Martinez-Lopez; Hsiu-Chen Chang; Vanessa Chen

16:00

Tu3A-2: A Multi-layer Coil Magnetic Stimulation Device for autonomous function regulation

Authors: Po-Lei Lee, National Central University; Kuo-Kai Shyu, National Central University

Tu3C-2: Low Phase Noise 104 GHz Oscillator Using Self-Aligned On-Chip Voltage-Tunable Spherical Dielectric Resonator in 130-nm SiGe BiCMOS

Authors: Yu Zhu, Technische Universitaet Dresden; Georg Sterzl, University of Stuttgart; Jan Hesselbarth, University of Stuttgart; Tilo Meister, Technische Universitaet Dresden; Frank Ellinger, Technische Universitaet Dresden

JP5-2: A Broadband Asymmetrical Doherty Power Amplifier With Optimized Continuous Mode Harmonic Impedances

Authors: Alex Pitt; Gautam Jindal; Kevin Morris; Tommaso Cappello

16:20

Tu3A-3: Respiratory Dynamics of Thoracic and Abdominal Motion in Doppler Radar Measurements

Authors: Jannatun Noor Sameera, University of Hawaii at Manoa; Alexander Lee, University of Hawaii at Manoa; Victor Lubecke, University of Hawaii Manoa; Olga Boric-Lubecke, University of Hawaii at Manoa

Tu3C-3: A 34 GHz CMOS VCO with Transformer Tail-Node Filter and TSPC Frequency Divider in 22 nm FDSOI

Authors: Andre Engelmann, Friedrich-Alexander-Universität Erlangen-Nürnberg; Florian Probst, Friedrich-Alexander-Universität Erlangen-Nürnberg; Philip Hetterle, Friedrich-Alexander-Universität Erlangen-Nürnberg; Robert Weigel, Friedrich-Alexander-Universität Erlangen-Nürnberg

JP5-3: 3-Way Doherty Power Amplifiers: Design Guidelines and MMIC Implementation at 28 GHz

Authors: Anna Piacibello; Vittorio Camarchia; Paolo Colantonio; Rocco Giofrè

16:40

Tu3A-4: Enhancing Heart Failure Monitoring: Biomedical Radar-Based Detection of Cheyne-Stokes Respiration

Authors: Li Wen, Shanghai Jiao Tong University; Zhi Zhang, Shanghai General Hospital; Jinliang Wang, Shanghai General Hospital; Jiaqi Liu, Shanghai General Hospital; Shuqin Dong, Shanghai Jiao Tong University; Changzhan Gu, Shanghai Jiao Tong University; Junfa Mao, Shanghai Jiao Tong University

Tu3C-4: D-Band VCO with Uniformly Low Phase Noise versus Frequency and Temperature

Authors: Isabel Kraus, Ruhr University Bochum; Herbert Knapp, Infineon Technologies AG; Nils Pohl, Ruhr University Bochum

JP5-4: A Broadband Outphasing GaN Power Amplifier Based on Reconfigurable Output Combiner

Authors: Weiwei Wang; Shiping Li; Shichang Chen; Jialin Cai; Yuanchun Li; Xinyu Zhou; Giovanni Crupi; Gaofeng Wang; Quan Xue

17:00

Tu3C-5: Voltage-Controlled-Oscillator Using 8-shaped Transformer-coupled Transmission Line

Authors: Sheng-Lyang Jang, National Taiwan University of Science and Technology; Yi-Ping Hsieh, National Taiwan University of Science and Technology; Wen-Cheng Lai, Min Chi University of Technology, Taiwan

17:20

MTT-S Space Night

Organizer: Jan Budroweit, German Aerospace Center

Room: Texas B

17:30

MTT-S Space Night

As part of the Radio Wireless Week and its co-located conference "Space Hardware and Radio Conference" (SHaRC), we invite you to the 3rd MTT-S Space Night! The Space Night topic for 2024 is "Ground Stations and Advanced Technologies for Satellite Communications" and we will host a interactive panel discussion with experts from agency, academia and industry. They will provide us insights on recent developments for ground station technologies and satellite communication services, while attendees can interactively contribute to this panel session by asking questions, comment and participating to surveys using their smart phones (no applications required). All registered attendees are also welcome to join the Space Quiz which we will host for the time. Experience an interesting event with us in an entertaining atmosphere, enjoy the interactive panel discussions with experts with light snacks and drinks and don't miss the chance to win great prizes in our space night quiz!

Moderators:

- Marie Piasecki, NASA Glenn Reserach Center
- Jan Budroweit, DLR

Panelists:

- Václav Valenta, ESA
- Allen Katz, College of New Jersey, MACOM Fellow
- Benjamin Schoch, University Stuttgart
- Eyal Trachtman, Addvalue Technologies

19:30

Image credit: SHUTTERSTOCK.COM/Boris Rabtsevich

Wednesday, 24 January 2024 • Early Morning Sessions

RWS Session We1A

Wireless Digital Signal Processing and Artificial Intelligence

Chair: Ken Kolodziej, Massachusetts Institute of Technology
Co-Chair: Markus Gardill, Brandenburg University of Technology

Room: Texas A

WiSNet Session We1B

Wireless Sensing and Localization Concepts

Chair: Paolo Mezzanotte, University of Perugia
Co-Chair: Valentina Palazzi, University of Perugia

Room: Texas B

SHARC Session We1C

Microwave Subsystems and Antennas for Space

Chair: Jan Budroweit, DLR Group
Co-Chair: Charlie Jackson, Earthlink

Room: Texas C

8:00

We1A-1: BeamCIM: A Compute-In-Memory based Broadband Beamforming Accelerator using Linear Embedding

Authors: Nael Mizanur Rahman, Georgia Institute of Technology; Sudarshan Sharma, Georgia Institute of Technology; Coleman B Delude, Georgia Institute of Technology; Wei Chun Wang, Georgia Institute of Technology; Justin Romberg, Georgia Institute of Technology; Saibal Mukhopadhyay, Georgia Institute of Technology

We1B-1: Distributed Radar Network with Polymer Microwave Fiber (PMF) Based Synchronization

Authors: A. Chaminda J Samarasekera, Johannes Kepler University Linz; Sergio Lopez Fernandez, Johannes Kepler University Linz; Reinhard Feger, Johannes Kepler University Linz; Richard Hüttner, Johannes Kepler University Linz; Frank Gruson, ZF Friedrichshafen AG; Siegfried Krainer, Infineon Technologies AG; Andreas Stelzer, Johannes Kepler University Linz

We1C-1: High-Performance Compact Diplexer Based on the Alternative Low-Cost AFSIW Technology

Authors: Maxime Le Gall, Exens Solutions; Anthony Ghiotto, Bordeaux INP; Issam Marah, Exens Solutions

8:20

We1A-2: Active Vector Modulator Design for Self-Interference Cancellation in STAR Systems

Authors: Marcus W Wolff, Massachusetts Institute of Technology, Lincoln La; Pierre-Francois W Wolfe, MIT Lincoln Laboratory; Kenneth E Kolodziej, Mit Lincoln Laboratory

We1B-2: A Three-Dimensional Localization System Based on Magnetic Fields and Induction

Authors: Lukas Messner, University of Innsbruck; Thomas Ussmueller, University of Innsbruck

We1C-2: Demonstration of GaN HEMT MMIC High-Power Amplifier for Lunar Proximity Communications

Authors: Rainee N Simons, NASA Glenn Research Center; Marie T Piasecki, NASA Glenn Research Center; Joseph A Downey, NASA Glenn Research Center; Bryan L Schoenholz, NASA Glenn Research Center

8:40

We1A-3: Modulation Recognition with Untrained Deep Neural Network for IoT and Mobile Applications

Authors: Jongseok Woo, Georgia Institute of Technology; Kuchul Jung, Georgia Institute of Technology; Saibal Mukhopadhyay, Georgia Institute of Technology

We1B-3: Secure Occupancy Sensing with Passive Radar for Spectrally Congested Spaces

Authors: Rachel Ma, Texas Tech University; Aaron B Carman, Texas Tech University; Changzhi Li, Texas Tech University

We1C-3: Mechanical Tuning of an Offset-fed Reflector Antenna

Authors: Taehak Lee, Yuhan University; Sang-Gyu Lee, Korea Aerospace Research Institute; Sang-Burm Ryu, korea Aerospace Research Institute

9:00

We1A-4: Predistortion of Charge Trapping Memory Effects in GaN based RF Power Amplifiers with Artificial Neural Networks

Authors: Patrick Jueschke, Nokia ; Georg Fischer, Friedrich-Alexander-Universität Erlangen-Nürnberg

We1B-4: A Digital Beamforming Approach for Indoor Passive Sensing

Authors: Aaron B Carman, Texas Tech University; Changzhi Li, Texas Tech University

We1C-4: Design and Characterization of a Multi-Channel ADS-B Antenna for Small Satellites

Authors: Jan Budroweit, DLR; Felix Eichstaedt, German Aerospace Center; Ferdinand Stehle, DLR e.V.

9:20

We1A-5: Transfer Learning Optimized PA Behavioral Modeling over 2D Operation States

Authors: Jose M Domingues, University of Aveiro; Hugerles S Silva, Universidade de Aveiro; Nuno Carvalho, Instituto De Telecomunicacoes; Arnaldo R Oliveira, Univ. de Aveiro - Inst. de Telecom.

We1B-5: Wind Turbines Structural Health Monitoring Using a FMCW Radar Mounted on a Drone

Authors: Victor G Rizzi Varela, Texas Tech University; Changzhi Li, Texas Tech University

We1C-5: Microlens Coupler from Integrated Photonic Circuit to Fiber Design for Space Application

Authors: Chengtao Xu, Embry-Riddle Aeronautical University, Daytona Beac; Jayaprakash B Shivakumar, Embry-Riddle Aeronautical University, Daytona Beac; Eduardo Rojas, Embry-Riddle Aeronautical University

9:40

RWS Session We2A

Passive Components and Filters

Chair: Rashaunda Henderson, University of Texas at Dallas
Co-Chair: Bayaner Arigong, Florida A&M University

Room: Texas A

WiSNet Session We2B

Recent Developments of Smart Radar Sensors

Chair: Fabian Lurz, Otto von Guericke University
Co-Chair: Davi Rodrigues, University of Texas at El Paso

Room: Texas B

SHARC Session We2C

Space Communication Systems

Chair: Markus Gardill, Brandenburg University of Technology
Co-Chair: Vaclav Valenta, European Space Agency

Room: Texas C

10:10

We2A-1: A Planar Monopulse Comparator Network Design from Port-Transformation Rat-Race Coupler

Authors: Hanxiang Zhang, Florida State University; Powei Liu, Florida State University; Jonathan Casamayor, Florida State University; Saeed Zolfaghary Pour, Florida A&M University; Mitch Plaisir, Florida State University; Bayaner Arigong, Florida State Univ.

We2B-1: A Modular 61 GHz Vital Sign Sensing Radar System for Long-term Clinical Studies

Authors: Marvin Wenzel, Hamburg University of Technology; Dominik Langer, Hamburg University of Technology; Alexander Koelpin, Hamburg University of Technology; Fabian Lurz, Hamburg University of Technology

We2C-1: Towards Gbps Downlinks from Low-Cost Active Phased Arrays

Authors: Adam Gannon, National Aeronautics and Space Administration; James Downey, National Aeronautics and Space Administration; Bryan L Schoenholz, National Aeronautics and Space Administration

10:30

We2A-2: Compact Multilayer AFSIW Diplexer

Authors: Maxime Le Gall, Exens Solutions; Anthony Ghiotto, Bordeaux INP; Issam Marah, Exens Solutions

We2B-2: Displacement Motion Sensing with Asynchronous Bandpass Sampling Using a Single-Channel Dual-PLL SSB low-IF Doppler Radar

Authors: Fei Tong, Shanghai Jiao Tong University; Jingtao Liu, Shanghai Jiao Tong University; Changzhan Gu, Shanghai Jiao Tong University; Junfa Mao, Shanghai Jiao Tong University

We2C-2: Real-time Wideband Video Synchronization via an Analog QPSK Costas Loop in a Laboratory Demonstration of an E-Band Satellite Downlink

Authors: Janis Woermann, University of Stuttgart; Laura Manoliu, University of Stuttgart; Simon Haussmann, University of Stuttgart; Milos Krstic, IHP Microelectronics; Ingmar Kallfass, University of Stuttgart

10:50

We2A-3: Methodology to Accurately Replicate a Non-Planar Thin-Film Microstrip BEOL in 3D EM Simulation

Authors: Dominik Wrana, University of Stuttgart; Christopher M Groetsch, Keysight Technologies; Benjamin Schoch, University of Stuttgart; Lukas Gebert, University of Stuttgart; Thomas Ufschlag, Universität Stuttgart; Arnulf Leuther, Fraunhofer Institute for Applied Solid State Physics; Roger Lozar, Fraunhofer Institute for Applied Solid State Physics; Ingmar Kallfass, University of Stuttgart

We2B-3: Enhancing Multi-Subject Vital Sign Estimation by Utilizing the Generalized Sidelobe Canceller

Authors: Abdel-Kareem Moadi, University of Tennessee; Chandler J Bauder, University of Tennessee; Abdel-Hamid Djouadi, University of Tennessee; Paul Theilmann, MaXentric Technologies, LLC; Aly E Fathy, University of Tennessee

We2C-3: SDR based radio-frequency noise measurements

Authors: Giacomo Schiavolini, University of Perugia; Giulia Orecchini, Universiti of Perugia; Valentina Palazzi, University of Perugia; Luca Roselli, University of Perugia; Paolo Mezzanotte, University of Perugia; Guendalina Simoncini, University of Perugia; Anna Gregorio, University of Trieste; Federico Alimenti, University of Perugia

11:10

We2A-4: Planar-Magic-T-Based Dual-Band Bandpass Filters

Authors: Xi-Bei Zhao, Xidian University; Feng Wei, Xidian University; Li Yang, University of Alcala; Roberto Gomez-Garcia, University of Alcala

We2B-4: Stepped-Frequency PMCW-Radar Modulation Scheme for Automotive Applications

Authors: Moritz Kahlert, HELLA GmbH & Co. KGaA; Tai Fei, HELLA GmbH & Co. KGaA; Claas Tebruegge, HELLA GmbH & Co. KGaA; Markus Gardill, Brandenburg University of Technology

We2C-4: Pre-Flight Evaluation of a Multi-Channel ADS-B Receiver in a Stratospheric Balloon Mission

Authors: Felix Eichstaedt, German Aerospace Center; Ferdinand Stehle, German Aerospace Center; Jan Budroweit, German Aerospace Center

11:30

We2A-5: Multilayer Dual-Band Bandpass Filter Using Microstrip-to-Slotline Transitions and Transversal Signal-Interference Microstrip Lines

Authors: Li Yang, University of Alcala; Mohamed Malki, University of Alcalá; Roberto Gomez-Garcia, University of Alcala

We2B-5: Tracking Driver's Foot Movements Using mmWave FMCW Radar

Authors: Davi Rodrigues, University of Texas at El Paso; Changzhi Li, Texas Tech University

We2C-5: IDRS, a persistent, always-on connectivity for LEO spacecraft

Authors: Eyal J Trachtman, Addvalue Technologies

11:50

Wednesday, 24 January 2024 • Early Afternoon Sessions

RWS Session We3A

Emerging Wireless Technologies

Chair: Tejinder Signh, Dell Technologies
Co-Chair: Hong-Yeh Chang, National Central University

Room: Texas A

13:30

We3A-1: DDS-based Multiphase Local Oscillator Generator for Fast-Beam-Switching Phased-Array Antennas

Authors: Shuichi Inaguma, Ritsumeikan University; Koki Nagata, Ritsumeikan University; Hideyuki Nosaka, Ritsumeikan University

13:50

We3A-2: Combined RF-Ultrasonic Wireless Powering System for Sensor Applications in Harsh Environment

Authors: Yufei Ma, University of Glasgow; Yunan Jiang, University of Glasgow; Chong Li, University of Glasgow

14:10

We3A-3: The Impact of Interference on Macrodiversity Gain in mmWaveCellular Networks

Authors: Enass F Hriba, Ohio Northern University; Marwan M Alkhweldi, Ohio Northern University

14:30

We3A-4: Modelling of 32-APSK Constellation Distortion and EVM in GaN Power Amplifiers From AM-AM and AM-PM curves

Authors: Gamal M Hegazi, Aethercomm Inc.

14:50

We3A-5: A 100 GHz Varactor-less Fundamental VCO With 12% Tuning Range in 22nm FDSOI Technology

Authors: Nazmus Saquib, Rensselaer Polytechnic Institute; Ahmed Elmenshawi, Rensselaer Polytechnic Institute; Mona Hella, Rensselaer Polytechnic Institute

15:10

WiSNet Session We3B

Advanced Signal Processing and Machine Learning Concepts in Radar Sensing

Chair: Michael Brown, Los Alamos National Laboratory
Co-Chair: Thomas Kurin, Friedrich-Alexander-Universität Erlangen-Nürnberg

Room: Texas B

13:30

We3B-1: A Large-scale Movement Path Fitting Based Phase Compensation Algorithm for FMCW Radar Vital Sign Detection

Authors: Li Sun, Nanjing University of Science and Technology; Ge Bai, Nanjing University of Science and Technology; Changhao Luo, Nanjing University of Science and Technology; Shuaiming Huang, Nanjing University of Science and Technology

13:50

We3B-2: Deep Learning-based Person Detection on a Moving Robot

Authors: Jasmin Gabsteiger, Friedrich-Alexander-Universität Erlangen-Nürnberg; Timo Maiwald, Friedrich-Alexander-Universität Erlangen-Nürnberg; Thomas Kurin, Friedrich-Alexander-Universität Erlangen-Nürnberg; Christian Dorn, Technical University of Munich; Robert Weigel, Friedrich-Alexander-Universität Erlangen-Nürnberg; Fabian Lurz, Hamburg University of Technology

14:10

We3B-3: Gesture Recognition for FMCW Radar on the Edge

Authors: Maximilian Strobel, Infineon Technologies AG; Stephan Schoenfeldt, Infineon Technologies AG; Jonas Daugalas, Infineon Technologies AG

14:30

We3B-4: Device-Free Occupant Counting Using Ambient RFID and Deep Learning

Authors: Guoyi Xu, Cornell University; Edwin C Kan, Cornell University

14:50

We3B-5: Resonate-and-Fire Spiking Neurons for Hand Gesture Label Refinement

Authors: Ahmed Shaaban, Infineon Technologies AG; Zeineb Chaabouni, Infineon Technologies AG; Maximilian Strobel, Infineon Technologies AG; Wolfgang Furtner, Infineon Technologies AG; Robert Weigel, Friedrich-Alexander-Universität Erlangen-Nürnberg; Fabian Lurz, Otto von Guericke University

15:10

Journal Paper Session JP6

Phase Shifters, Switches and Resonators

Chair: Roberto Gómez García, IEEE MWTL

Room: Texas C

13:30

JP6-1: A K-Band Ultra-Wideband Binary Phase Shifter for Phase Modulating Applications in Radar

Authors: Michael C. Brown; Changzhi Li

13:50

JP6-2: Ultrawideband Schiffman Phase Shifter Designed With Deep Neural Networks

Authors: Sensong An; Bowen Zheng; Hang Tang; Hang Li; Zhou Li; Yunxi Dong; Mohammad Haerinia; Hualiang Zhang

14:10

JP6-3: A Plasma-Switch Impedance Tuner with Microsecond Reconfiguration

Authors: Justin Roessler; Alden Fisher; Austin Egbert; Zach Vander Missen; Trevor Van Hoosier; Charles Baylis; Mohammad Abu Khater; Dimitrios Peroulis; Robert J. Marks

14:30

JP6-4: Surface-Acoustic-Wave Devices Based on Lithium Niobate and Amorphous Silicon Thin Films on a Silicon Substrate

Authors: Yansong Yang; Liuqing Gao; Songbin Gong

Short Courses - Room: Republic B

13:30

Characterization of MMIC DPAs - From Wafer Screening to System Level

Lecturer: Anna Piacibello, Politecnico di Torino

Anna Piacibello received the bachelor's and master's degrees in electronic engineering and the Ph.D. degree in electric, electronic and communication engineering from the Politecnico di Torino, Turin, Italy, in 2013, 2015, and 2019, respectively.

In 2017, she was a Visiting Researcher with the Centre for High Frequency Engineering, Cardiff University, Cardiff, U.K. She is currently an Assistant Professor with the Department of Electronics and Telecommunications, Politecnico di Torino. Her research interests include the design and characterization of microwave and millimeter-wave electronic circuits, mainly focusing on broadband and highly efficient power amplifiers.

She has been an Affiliate Member of the IEEE MTT-S Technical Committee TC-12 on Microwave High-Power Techniques since 2022. She was a recipient of the 2018 Young Engineer Prize awarded by the European Microwave Association.

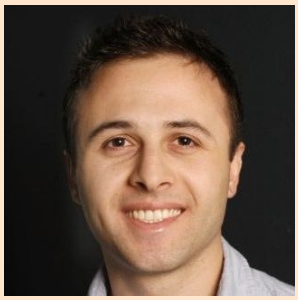
Abstract:

This talk will give an overview of the characterization flow for MMIC Doherty PAs, from the initial wafer screening to the performance assessment at system level. Doherty PAs require specific procedures to test the correct operation of its Main and Auxiliary branches, which are biased in different classes and therefore respond differently to signal excitations. This reflects in the way in which DC, small signal and large signal measurements are devised and carried out during the characterization flow. Finally, a short overview of the different metrics that can be used to estimate the PA linearity in different scenarios will be given.

14:30

15:40

High Efficiency CMOS Power Amplifiers: Design Challenges and Outlook



Lecturer: Narek Rostomyan, Waveye, Inc.

Narek Rostomyan earned his M.Sc. in electrical engineering from the Technical University of Munich, Germany, in 2014, and completed his Ph.D. in electrical engineering, specializing in RF/mm-wave transceivers and high-efficiency CMOS SOI power amplifiers, at the University of California, San Diego (UCSD), in 2018.

During his early career, from 2013 to 2014, he contributed to RF front-end design of mm-wave signal generators at Rohde & Schwarz in Munich, Germany. Later, from 2018 to 2020, he played a pivotal role in developing the first generation of 76-81 GHz automotive radar transmitter and receiver chipsets at Metawave in Carlsbad, USA. From 2020 to 2022, he served as a senior principal engineer at IQ-Analog in San Diego, focusing on mm-wave, broadband front-ends, and high-speed mixed-signal IPs for RF sampling, high-speed ADCs/DACs in FinFET CMOS. Currently, Narek serves as the co-founder and Chief Innovation Officer (CIO) at Waveye, Inc. (Palo Alto, CA), leading efforts in next-generation mm-wave radar imaging and perception. His research interests encompass high power and efficiency CMOS integrated circuits and systems for wireless communication, radar, and sensing applications.

Abstract:

Power consumption of mm-wave communication and radar systems is a significant bottleneck for many applications due to size, cost, battery, and heatsinking constrains. Depending on the application, the RF front-end, and in particular the power amplifier, can be one of the main contributors to the overall power consumption. Additionally, both in communication and radar systems, the choice of the transmit waveform poses design constrains on the RF front-end architecture and achievable specifications.

It is well known that achieving high efficiency with on-chip silicon power amplifiers at mm-wave frequencies is quite challenging. Furthermore, in order to attain high linearity without resource-hungry digital predistortion, a significant amount of back-off from Psat/P1dB is usually necessary, which penalizes the average efficiency even more. On the other hand, the choice of the transmit waveform has even more impact on the overall system architecture and ultimately the power consumption for modern mm-wave radars.

In this short course, we will review various challenges and techniques that affect the efficiency and linearity of mm-wave PAs in silicon technologies. We will also review various commonly used efficiency improvement techniques. Practical design challenges will be emphasized. Finally, we will conclude with a step-by-step case study of a single stage Ka-band Doherty amplifier design.

16:40

RWS Session We4A

Advancements in Wireless Sensing and Communication

Chair: Davi Rodrigues, University of Texas at El Paso

Room: Texas A

WiSNet Session We4B

Emerging Concepts for Wireless Sensors

Chair: Thomas Ussmueller, University of Innsbruck
Co-Chair: Vaclav Valenta, European Space Agency

Room: Texas B

15:40

We4A-1: Energy Constraints in Wireless Technologies - how to improve efficiency

Authors: Nuno Carvalho, Instituto De Telecomunicacoes

We4B-2: Robust Doppler Displacement Measurement Resolving the Uncertainty During Target Stationary Moment

Authors: Luigi Ferro, University of Messina; Graziella Scandurra, University of Messina; Changzhi Li, Texas Tech University; Emanuele Cardillo, University of Messina

16:00

We4A-2: Direct Sampling Receiver with an Adjustable Bandpass Filter for Use in Passive Radar with FM Radio

Authors: Marie Horlbeck, Friedrich-Alexander-Universität Erlangen-Nürnberg; Jonathan Fiedelak, Friedrich-Alexander-Universität Erlangen-Nürnberg; Benedict Scheiner, FAU; Robert Weigel, University Erlangen-Nuremberg; Fabian Lurz, Hamburg University of Technology

We4B-3: Investigation of a Simple and Versatile Concept for OFDM Radar Target Simulator Enhancement

Authors: Christoph Birkenhauer, Friedrich-Alexander-Universität Erlangen-Nürnberg; Georg Körner, Friedrich-Alexander-Universität Erlangen-Nürnberg; Patrick Stief, Friedrich-Alexander-Universität Erlangen-Nürnberg; Gerhard Hamberger, Rohde & Schwarz GmbH & Co. KG; Matthias Beer, Rohde & Schwarz GmbH & Co. KG; Christian Carlowitz, Friedrich-Alexander-Universität Erlangen-Nürnberg; Martin Vossiek, Friedrich-Alexander-Universität Erlangen-Nürnberg

16:20

We4A-3: Gesture Recognition to Control a Moving Robot With FMCW Radar

Authors: Timo Maiwald, Friedrich-Alexander-Universität Erlangen-Nürnberg; Jasmin Gabsteiger, Friedrich-Alexander-Universität Erlangen-Nürnberg; Robert Weigel, Friedrich-Alexander-Universität Erlangen-Nürnberg; Fabian Lurz, Otto von Guericke University

We4B-4: Phase Modulation Based TX Channel Calibration for MIMO Radar Systems

Authors: Simon Heining, Johannes Kepler University Linz; Reinhard Feger, Johannes Kepler University Linz; Thomas Faseth, Infineon Technologies Austria; Christoph Wagner, Silicon Austria Labs; Andreas Stelzer, Johannes Kepler University Linz

16:40

We4A-4: Parametric Classification of Recoverable Radar-Assessed Respiratory Rate Data

Authors: Mohammad Shadman Ishrak, University of Hawaii at Manoa; Jannatun Noor Sameera, University of Hawaii at Manoa; Olga Boric-Lubecke, University of Hawaii at Manoa; Victor M Lubecke, University of Hawaii Manoa

We4B-5: Passive Broadband Harmonic Sensor-Tag using Circular Disk Dipole Antenna

Authors: Nobuhiro Kuga, Yokohama National University; Iori Serizawa, Yokohama National University; Kun Xiao, Yokohama National University

17:00

We4A-5: Angular Dependency of Human Speech Recognition using Interferometry Radar

Authors: Christopher Williams, Texas Tech University; Changzhi Li, Texas Tech University

17:20

ARFTG Abbreviated Program

102nd ARFTG Microwave Measurement Conference

Software Architectures and Automation of Microwave Measurement Methods and Systems
Grand Hyatt San Antonio
San Antonio, TX, US, January 21-24, 2024

Monday January 22nd

13:30-13:40	Welcome to the 102nd ARFTG Conference – Introduction Conference Co-Chairs: Andrej Rumiantsev, Joe Gering TPC Co-Chairs: Dennis Lewis and Jeffrey Jargon
13:40-15:00	Session A: Advances in Measurements I Session Chair: Jeffrey Jargon
15:00-15:50	Break & Exhibits
15:50-17:00	Session B: On-Wafer measurements and Calibration Session Chair: Rusty Myers

Tuesday January 23nd

08:20-09:30	Session C: Advances in Measurements II Session Chair: Joe Gering
9:30-10:10	Break – Exhibits
10:10-12:00	Plenary Session
12:00-13:30	Lunch
13:30-15:00	Session D: On-Wafer and EVM Measurements Session Chair: Joel Dunsmore
15:00-15:50	Break – Exhibits
15:50-17:00	Session E: Generalized Network Analysis and Load-Pull Session Chair: Dennis Lewis

Wednesday January 24nd

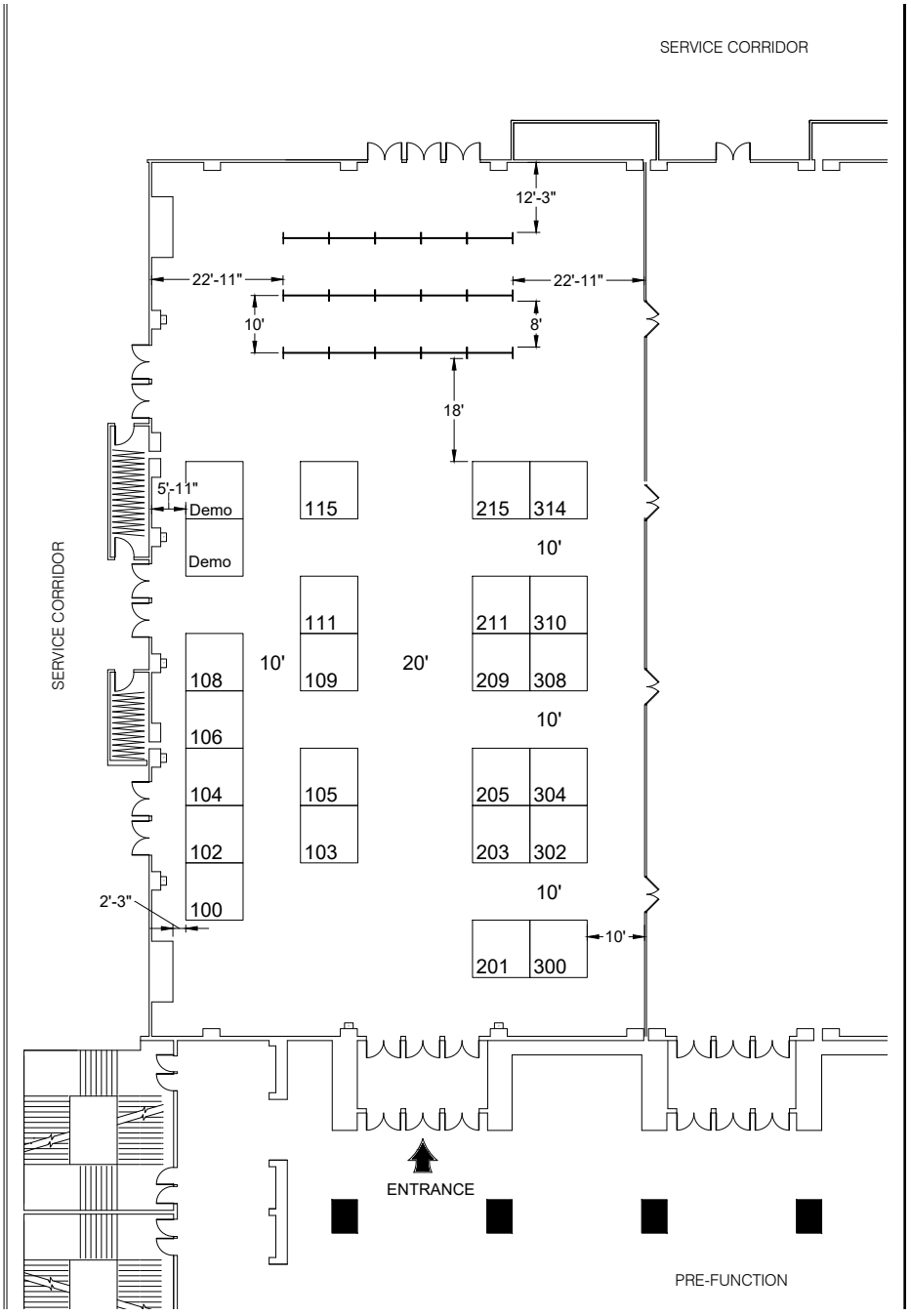
8:00- 12:00	ARFTG Workshop

Industry Exhibits

Exhibitors

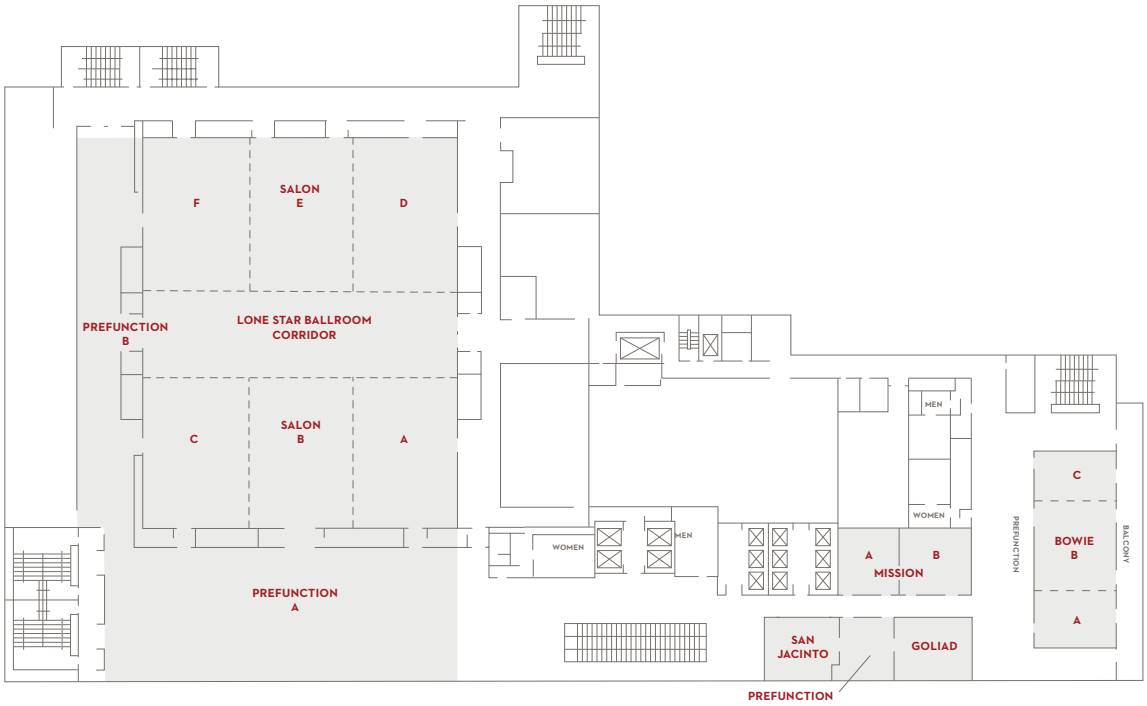
Booth	Exhibitor
215	Accurate Circuit Engineering
302	Advanced Test Equipment Corp.
308	AMCAD Engineering
106	Anritsu
108	Antennex B.V.
103	Berkeley Nucleonics Corporation
104	Boston Micro Fabrication (BMF)
211	Eravant
209	Junkosha, Inc.
102	Keysight Technologies

Booth	Exhibitor
115	Maury Microwave Corp.
100	Microsanj
310	Microwave Theory and Technology Society (MTT-S)
105	Mitsubishi Electric US
201	MPI Corporation
111	Rohde & Schwarz USA Inc.
205	SPINNER GmbH
203	TMY Technology Inc.
109	Virginia Diodes, Inc.

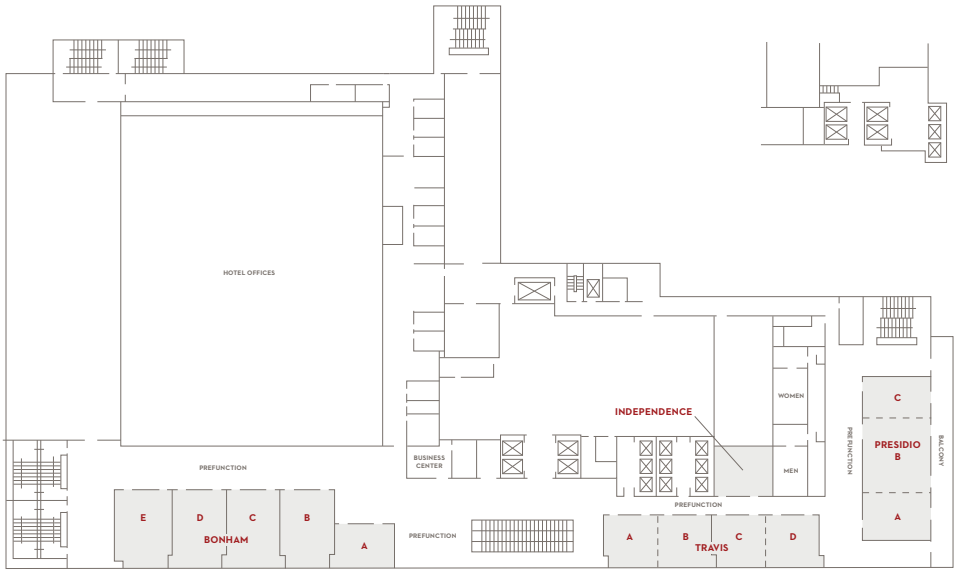


Hotel Map

Second Floor

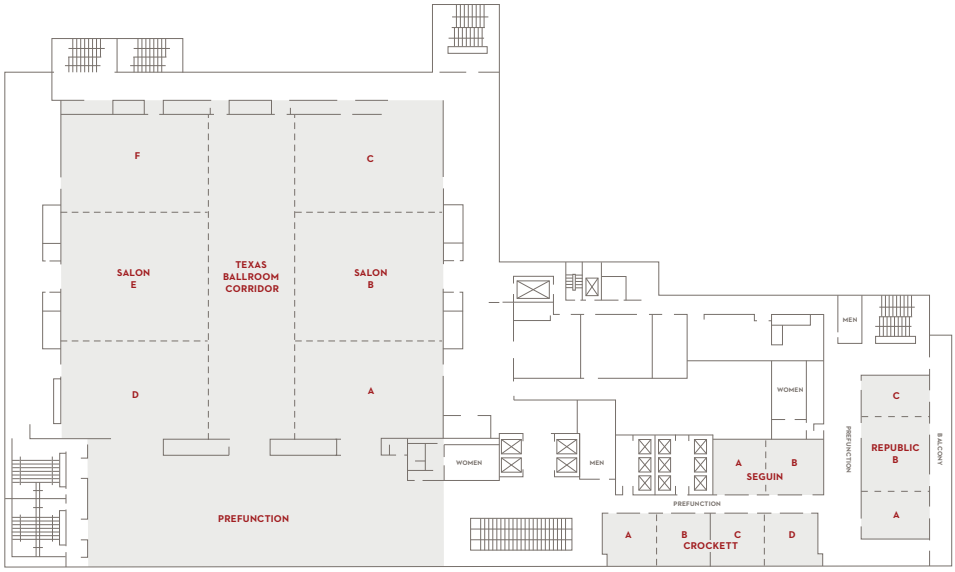


Third Floor

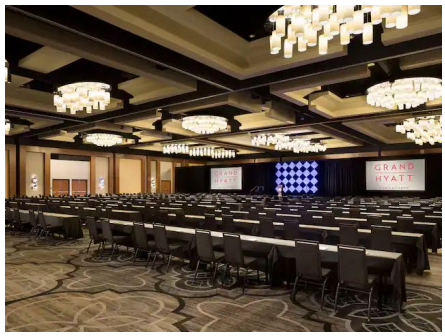


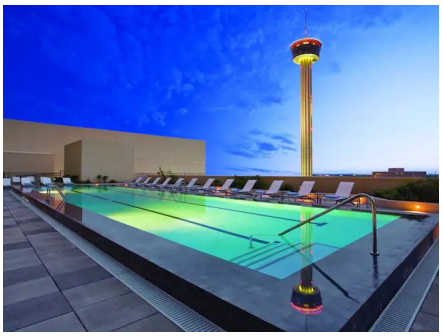
Hotel Map

Fourth Floor



Hotel Impressions





Notes