Anaheim, CA USA
Hyatt Regency Orange County
14-17 January, 2018

RWW & RWS
General Chair:
Rashaunda Henderson,
University of Texas at Dallas

RWW & RWS
General Co-Chair:
Charlie Jackson,
Northrop Grumman

RWS, PAWR, WISNet,
TWiSoS Technical
Program Chair:
Robert Caverly,
Villanova University

RWW Finance Chair:
Nuno Borges Carvalho,
Universidade de Aveiro

TWiSoS Conference
Co-Chairs:
Charlie Jackson,
Northrop Grumman
Thomas Ussmueller,
University of Innsbruck

PAWR
Conference Co-Chairs:
Gayle Collins,
Obsidian Microwave
Neil Braithwaite,
Tarana Wireless

SIRF
Conference Chair:
Nils Pohl,
Ruhr-Universität Bochum

SIRF Technical
Program Co-Chairs:
Monte Miller, NXP Semiconductors
Ahmet Cagri Ulusoy,
Michigan State University

WiSNet
Conference Co-Chairs:
Rahul Khanna,
Intel
Luca Roselli,
University of Perugia

RWW Publications Co-Chairs:
Spyridon Pavlidis,
North Carolina State University
Wasif Khan,
Lahore University of Management Sciences
Aida Vera, Intel

2018 Radio & Wireless Week Sponsor:
IEEE Microwave Theory and Techniques Society (MTT-S)
IEEE Aerospace and Electronic Systems Society (AESS)

http://www.radiowirelessweek.org
I have the great honor and pleasure to invite you to the 2018 IEEE Radio and Wireless Week (RWW2018). This will be the 12th anniversary of RWW and the first time in Anaheim, California.

RWW2018 will be held at the Hyatt Regency Orange County in Anaheim on 14-17 January, 2018. The venue is located in scenic Garden Grove near Anaheim and Disneyland Resort with numerous culinary and entertainment options. With many wireless semiconductor companies, a plethora of startups, as well as excellent universities nearby in Southern California, Anaheim will be a great location for all the attendees.

RWW2018 consists of five related conferences that focus on the intersection between wireless communication theory, systems, circuits, and device technologies, creating a unique forum for engineers to discuss various technologies for state-of-the-art wireless systems and their end-use applications. The conference bridges the gaps between digital, RF, hardware, and software, which all need to be seamlessly combined to keep the wireless industry and mobile applications growing.

RWW’s multidisciplinary events bring together innovations that are happening across the broad wireless spectrum. It is our hope that RWW is a place where you will not only find discussions of present problems, but you will also be inspired by the diverse technical contents that might spark ideas for future research and product development.

In addition to traditional podium presentations and poster sessions, there will be a track for IEEE Distinguished Lectures, Sunday half-day workshops, Monday panels (PAWR and Young Professionals), and a demo session on Tuesday. We have the pleasure of hosting a 1.5-day IoT Summit that will bring together the research community, industry and the public sector around Connectivity and Communications. TWIOS is hosting a full-day workshop on Monday titled Microwaves, CubeSats and Small Satellites. A highlight on Tuesday will be the plenary talk given by Mehmet Yavuz from Qualcomm. Also on Tuesday afternoon, in its sixth year, there will be a demo session where presenters can bring in a demonstration of their latest wireless experiments for a hands-on interactive forum. Demo sessions are particularly in keeping with the spirit of RWW because we get to see and feel how people are tackling real-world problems to address the next wireless innovations.

Please take time to visit each exhibitor on Monday and Tuesday afternoon because his or her participation helps to make this event possible and highlight how our technology is impacting our world.

To support and encourage students pursuing a career in a wireless area, we will one student paper competition with awards that will be presented at the Tuesday plenary session. On Monday morning, all student paper competition finalists will give an oral 4-5 minute elevator pitch and then again present their work in a traditional poster session that afternoon. I encourage you to check out what the next generation of wireless engineers are pursuing.

I would also like to personally thank all of the committee members who have spent countless hours working to bring this program together. In conclusion, I invite you to join us for four days of great technical presentations, discussions, networking, and some fun in warm Anaheim, Southern California, 14-17 January 2018.

RWW2018 General Chair
Rashaunda Henderson
Message from the SiRF General Chair:
Welcome to SiRF 2018!

The IEEE Topical Meeting on Silicon Monolithic Integrated Circuits in RF Systems (SiRF) celebrates its 18th year in Anaheim, California, as one of five parallel topical conferences that make up IEEE Radio & Wireless Week 2018, which take place 14–17 January 2018.

In most countries around the world, one’s 18th birthday represents the age of majority, the threshold of adulthood as recognized or declared by law. It is a funny coincidence, because the technologies, circuits, and systems SiRF will focus on in its 18th year have clearly reached an important level of maturity. After a wild childhood, which revolutionized mobile communications, silicon RF reached puberty, the typical age to begin exploring limits. Pushing against limits brought silicon RF to millimeter-waves and terahertz frequencies, casualty conquered radar applications, and moved radar from being a widely understood but specialized technique into the mass market of automotive sensors.

After these wild years, we now have an almost adult technology, recognized for its performance and reliability in realizing even complex circuits and RF systems. Based on its solid foundation, this adult technology is now on the cutting edge in the exploration of new directions and is helping to support several big trends in research, science, and technology. In fact, 5G mobile communications—with its highly demanding millimeter-wave phased arrays—would be impossible without the mature technology of silicon RF. Additionally, the Internet of Things clearly demands highly optimized low-power silicon RF transceivers.

Ultimately, right now we can only guess about the full potential of cheap millimeter-wave and terahertz transceivers for radar sensors, but it is clear that autonomous driving would not be possible without silicon RF. Working in this ever-changing branch of the industry may be more interesting than ever before, because all these new applications demand intelligent engineers with brilliant ideas, ideas that this maturing technology can allow to move toward fruition.

SiRF 2018 take place in Anaheim, which is not only a good place to go in January due to its moderate winter temperatures, but also close to many hot spots of RF and wireless industry and research. Additionally, Disneyland is in the direct vicinity of the conference and will offer special rates for attendees of the conference. Amusingly, that is a good place to go for a conference which is transitioning to a adult conference. Maybe the 18th birthday of SiRF 2018 will be the last children’s birthday party celebrated in the direct vicinity of Disneyland.

We worked hard for making SiRF 2018 an exciting and informative event for you. For the latest information on SiRF 2018, visit us at www.silicon-rf.org. Looking forward to seeing you in Anaheim!

Welcome to SiRF 2018!

Nils Pohl
SiRF 2018 Conference Chair
### Power Amplifiers for Radio and Wireless Applications (PAWR)

A power amplifier within a base station transmitter is considered important because it tends to be the most expensive component in the transmitter consuming the majority of the power supplied to the base station. Considerable research has focused on maximizing power amplifier efficiency while applying external linearization techniques to ensure compliance with regulations limiting out-of-band spectral emissions. The topical conference of Power Amplifiers for Wireless Radio Applications (PAWR) features power amplifier focused sessions, including the latest advances on power amplifier technology, efficiency enhancement techniques, system analysis, modeling, and distortion reduction. An interactive workshop is included on using digital predistortion and post-correction to compensate for distortion generated by nonlinear devices. Another PAWR highlight is a panel session on the role of the device in power amplifier design featuring expert panelists from companies leading the industry.

**Technical Program Committee:**

**Distortion Reduction Techniques in RF Power Amplifiers**
- Chair: Joe Staudinger
- Jinsung Choi
- Armando Cova
- Kiki I roses
- Allen Katz
- Peter Kenington
- Neil Braithwaite

**High Efficiency RF Power Amplifiers**
- Chair: Dave Runton
- Wolfgang Heinrich
- James Komiak
- Song Lin
- Chao Lu
- Stephen Maas
- Frederick Raab
- Mury Thian
- Ali Tombak

**RF Power Amplifier Technology**
- Chair: Donald I re
- Marc Franco
- Murat Eron
- Bumman Kim
- Chao-Ho Lee
- Zoya Popovic

**Power Amplifier Modeling and System Analysis**
- Chair: Patrick Roblin
- Paolo Colantonio
- Marc Franco
- Richard Caverly
- Ming Ji
- Linus Maurer

**Invited Papers**
- Chair: Robert Caverly
- Kevin Chuang
- Late News
- Florins Balteanu
- Neil Braithwaite
- Jinsung Choi
- Gayle Collins
- Stephen Maas
- Joe Staudinger

### Topical Workshop on The Internet of Space (TWIoS)

The IEEE Internet of Space (IoS) Conference addresses the wild west of space applications, often called New Space, Entrepreneurial Space, or Commercial Space. It is the emerging private spaceflight industry, with a special emphasis on microwave hardware. There has been a renaissance of interest and investment in space- and sub-orbital-based high-data-rate communications networks and other applications. This conference focuses on the hardware technology that will make New Space possible.

**Technical Program Committee:**

**Ground Station Hardware and Systems**
- Chair: Rick Sturdivant
- Charlie Jackson
- Thomas Royster
- Thomas Ussmueller

**Satellite Configurations, Hardware & Systems**
- Chair: Steven Rosenu
- Alaa Abujalihe
- Nuno Borges Carvalho
- Martin Gawecki

**CubeSats and Antennas**
- Chair: Vaclav Valenta
- Arne Jacob
- Jeffrey Pawian
- Steven Reising
- Volker Ziegler

**Miniature Electronics**
- Chair: James McSpadden
- Supreetha Aroor
- Tim Lee
- Stephen Maas

**Non Satellite-Based Solutions**
- Chair: Robert Weigel
- Holger Maune
- Marcus Pan
- Daniel Schlieter

**Invited Papers**
- Chair: Charlie Jackson
- Thomas Ussmueller
- Late News
- Arne Jacob
- Steven Reising
- Vaclav Valenta

### Wireless Sensors and Sensor Networks (WiSNet)

WiSNet is dedicated to the advancement of wireless sensors for commercial and industrial applications and will be held to specifically focus on the latest developments in these areas of RF Sensors and Sensor Networks. Wireless sensors and sensor networks are critical system components for applications such as: manufacturing, monitoring, safety, positioning, tracking and many others; more generally, they are key elements in the physical layer of Internet of Things eco-system. This year, WiSnet2018 will be a full day topical conference focused on the latest developments in these areas including sensors and smart sensor networks ranging from UHF, RFID applications to millimeter-wave radar systems and six-port technology. A special session will focus on sensing technologies and applications specifically devoted to IoT.

**Technical Program Committee:**

**Wireless Sensors for Imaging Applications Including Radar Sensors**
- Chair: Martin Vossiek
- Federico Alimenti
- Mario Pauli
- Champa Li
- Kamal Samanta

**Wireless Sensors for Localization, Tracking, and RFID Technologies**
- Chair: Monos M. Tentzeris
- Reinhard Feger
- Diego Masotti
- Jianming Qing
- Hao Xin

**Wireless Integrated Sensors, Front-Ends, and Building Blocks**
- Chair: Thomas Ussmueller
- Daniela Dragomirescu
- Holger Maune
- Linus Maurer
- Nils Pohl
- Huel Wang

**Wireless Sensors Applications: Environments, Health, Home, Wearable, and Body Area Networks**
- Chair: Alexander Koelpin
- Maurizio Bozzi
- Jue-Chi Chiao
- Xun Gong
- Arne Jacob

**Ultra Low Power Systems and Sub-Systems for Wireless Sensor Networks**
- Chair: Rahul Khanna
- Doug Boyce
- Hazem Hajj
- Jennifer Williams

**Wireless Sensor Network Topologies and Communication Architecture for Industrial Applications**
- Chair: Luca Roselli
- Amr Fahim
- Hendrik Rogier

**Six Port and Multi-port Technology**
- Chair: Alexander Koelpin
- Tuami Lasri
- Adriana Serban
- Serioja Tatu

**Wireless Sensors for Internet of Things**
- Chair: Nuno Borges Carvalho
- Ana Collado
- Alessandra Costanzo
- Giulia Orecchini
- Small Tedjini

**Invited Papers**
- Chair: Rahul Khanna
- Luca Roselli
- Late News
- Aly Fathy
- Holger Maune
- Linus Maurer
- Giulia Orecchini
Technical Program for 2018 Radio & Wireless Week (RWW)

SUNDAY, 14 JANUARY (13:30-17:30)

Workshop

Digital Pre-Distortion and Post-Correction from DC to RF and mm-Wave towards Optical Spectrum

Room: Garden 3

Organizers:
Harmann Boss, Rohde & Schwarz
SungWon Chung, University of Southern California

Abstract:
This workshop overviews recent advancements in digital pre-distortion (DPD) and digital post-correction (DPC) techniques for a wide range of applications including 4G/5G base stations, portable devices, ADC/DAC based next-generation wireless transceivers, and advanced optical communication systems. DPD techniques are essential to 4G/5G wireless communication systems, which demand a greater bandwidth and a higher energy efficiency. For DPD on wireless communication, there are growing interests on nonlinearity modeling and characterization, adaptive pre-distorters, and observation receivers for RF and mm-Wave power amplifiers employed in massive MIMO arrays, intra-band and inter-band carrier aggregation, envelope tracking, outphasing, and load modulation. With wireless communication, to advance the data rate limit, designers are leveraging a high-order modulation, which requires a digital-to-analog converter (DAC) based transmitter along with an analog-to-digital converter (ADC) based receiver. Recent work in ADC design shows that dynamic nonlinearities become a critical challenge in realizing ADCs and DACs with unprecedentedly high performance well beyond the conventional limits. To enable next-generation high performance data converters, DPC and DPD techniques to mitigate the impact of such dynamic nonlinearities thus become essential. The recent trend of using a high-order modulation continues with optical communication with Tb/s data rate, a reliable and low-power implementation of DPC and DPD is important now more than ever.

Talks and Speakers:

Distortion and Linearization in Massive MIMO Transmitter Systems
Christian Fager, Chalmers University of Technology

Digital Predistortion of a RF Power Amplifier Using a Reduced Order Volterra Series Model
R. Neil Braithwaite, Tarana Wireless

Digital Predistortion Linearization for Envelope Tracking and Outphasing Power Amplifiers for Highly Efficient Wideband Communication Systems
Pere L. Gilabert, Universitat Politècnica de Catalunya

Digital Post-Correction of Dynamic Nonlinearity in GaN HEMT Track-and-Hold Circuits for High Performance ADCs
SungWon Chung, University of Southern California; Puneet Srivastava, Analog Devices

Digital Predistortion and Post Equalization Techniques in Optical Communications
Noriaki Kaneda, Nokia Bell Labs

Workshop

Solid State Power Amplifiers for Space

Room: Garden 2

Organizers:
Václav Valenta, Iain Davies and Natanael Aylon, European Space Agency

Abstract:
This workshop will provide a general overview of solid-state power amplifiers (SSPAs) and their use in space applications. The main SSPA building blocks will be discussed in detail together with the key semiconductor technologies that are used in space-borne SSPAs today. Examples of SSPAs in use and in development for key missions will be shown. The space environmental challenges in which the RF equipment operates will be presented as well as the practical measures that need to be taken to assure high level of reliability. Reliability, derating principles for space components and qualification procedures will be discussed. Moreover, in the frame of the workshop, introduction to MMIC high power amplifier design will be given. The latter will address the whole MMIC HPA design chain: beginning with typical MMIC HPA specifications, selection of transistor cells, corporate power combining and matching networks and stability analysis.

Talks and Speakers:

General Introduction to HPAs for Space Applications
Václav Valenta, European Space Agency

SSPA Architecture, Key Building Blocks and Technologies
Václav Valenta, European Space Agency

Introduction to MMIC Power Amplifier Design
Charles Campbell, Qorvo

Design Considerations for Space-borne SSPAs
Václav Valenta, European Space Agency

SUNDAY, 14 January & MONDAY, 15 January

1st IoT Vertical and Topical Summit

Connectivity and Communications

Time: Sunday 13:00-17:00
Monday 09:00-17:30
Room: Royal Ballroom E-F

The Summit is a call to action for those interested in the science, engineering, and deployment of wireless system, components, products, and services. The theme for the Summit is “Indispensable Wireless Connectivity” and characterizes the essential role that Wireless Systems play in making IoT a reality. The goal of the IEEE Initiative is to advance and nurture the adoption of IoT for the benefit of society. The Summit is an opportunity to participate with your colleagues in sharing experiences and knowledge about IoT and where wireless systems, components, and technologies can solve some of the challenges posed by the wide range of IoT application and requirements. It is also a chance to chart the future evolution of the technology that will enable effective radio transmitter and receiver performance and wireless systems to support the diverse demands of IoT.

We look forward to a balanced participation from industry, the public sector, and the research community at the event. Join with recognized pioneers, leaders and experts in Wireless Technologies and IoT from the Commercial World, Academia, and Government, for the exiting program of presentations, panels, and working group discussions.

The Summit will address:

• What IoT is about and the role of IEEE and the IEEE IoT Initiative.
• Why wireless systems are crucial for IoT.
• Examples of IoT applications and the diversity of uses and requirements.
• Important trends in Wireless Technologies and Platforms.
• What future steps the community can take, by convening the IoT Topical Working Group on “Connectivity and Communications.”

(Courtesy of LylePhotos, Atlanta)
Within just an hour or two described. Receivers and antenna technology. In early testing of concepts on orbit. This opportunities and chances to perform satellites are the leading edge for many subsystems. CubeSats and other small and millimeter-wave components and fundamental technology of microwave and millimeter-wave components and subsystems. CubeSats and other small satellites are the leading edge for many new applications, providing low cost opportunities and chances to perform early testing of concepts on orbit. This workshop will discuss the required circuits, subsystems, microwave receivers and antenna technology. In addition, several applications will be described.

Abstract:
CubeSats and small satellites are on the front line of the NewSpace revolution that has been emerging in recent years. A recent report by BIS Research projects the global nanosatellite market to be $6.35B by 2021 with a compound annual growth rate approaching 40%. Although the market and growth rate for this technology are promising, these goals will not be achieved without the fundamental technology of microwave and millimeter-wave components and subsystems. CubeSats and other small satellites are the leading edge for many new applications, providing low cost opportunities and chances to perform early testing of concepts on orbit. This workshop will discuss the required circuits, subsystems, microwave receivers and antenna technology. In addition, several applications will be described.

Abstract:
The IEEE Young Professionals is an international community of innovative members and volunteers. Members of this community are interested in elevating their professional image, expanding their global network, connecting with peers locally and giving back to the community. At Radio & Wireless Week 2018, the IEEE Young Professionals will host an interactive forum and networking event for professionals in microwave with four panel speakers from industry and government research. The discussion will be focused on the growing trends in microwave technology (5G wireless technology, IoT and government research) and how microwave professionals and graduates can position themselves to excel in the current job market. The presentations will be focused on the growing technologies trends at their respective organizations and what qualifications they look for in hiring engineers, followed by an interactive discussion for the audience to field questions to the panel.

The panel session will be followed by food, drinks and opportunity for networking.

Panel: Ain’t Misbehaving? The Role of the Device in Power Amplifier Design
Moderator: Gayle Collins, Obsidian Microwave
Panelists: HBT modeling for RFPAs Pete Zampardi, Qorvo
High-Power High-Efficiency Broadband GaN HEMT Amplifiers Chuck Campbell, Qorvo
MillimeterWave Technology and IC Design Chip Moyer, HRL
Power Amplifier Modeling & System Analysis John Wood, Obsidian Microwave LLC
Abstract:
Power amplifier designers contend with large signal behavior of the semiconductor device that is at the heart of a PA design. Measurement-based approaches such as “waveform engineering” that are often employed in design approaches will only take the design so far and how the device behaves and how that behavior is accommodated in the design has a large impact on the end-performance of the design. Trapping leads to memory effects, parametric and odd-mode oscillations must be avoided all the while pushing the PA to the edge of stability in order to achieve the maximum efficiency. How to best harness the large signal and non-linear behavior of the device during the PA design phase in order to achieve the goals of power, efficiency, linearity and bandwidth will be debated at this panel session.

Things to Do near Disneyland:
- Discover magic, adventure, relaxation in our Hyatt Regency hotel located only minutes from the Disneyland® Resort. Anaheim and Orange County are home to internationally acclaimed theme parks and attractions. From breaking ground on the highly anticipated Star Wars™-themed land to bringing back its Main Street Electrical Parade. The Disneyland® Resort has plenty of new adventures in store for guests this year.
- Explore Center City Anaheim: This district in downtown Anaheim has undergone massive revitalization, showcasing a new vibe inspired by the city’s historical roots. The Anaheim Packing District is a walkable enclave, housing the Anaheim Packing House (Pictured Right), a two-story foodie paradise. A short walk away you’ll land in the historical Center St. Promenade, a local gem known for artisan shops, chef-driven eateries and innovative vendors. Across the street from the Packing House is the newly renovated MAKE building, which houses the comic-themed Unsung Brewing Co.
- Rock Out: From intimate venues to a stadium attracting big names and everything in between, Anaheim, California features a diverse roster of musical venues for everyone’s taste. In particular, the new House of Blues at Anaheim GardenWalk is the go-to place to enjoy world-class live music while immersed in a Southern-inspired atmosphere.

Attractions in Anaheim, California

Day Trips: Within just an hour or two from Orange County you can visit the mountains or the desert, taste your way through SoCal wine country, catch a glimpse of the legendary Hollywood sign and experience the Entertainment Capital of L.A., take a short ferry over to Catalina Island, Universal Studios Hollywood™ or visit Shamu® during a day trip to SeaWorld® San Diego. Shopping: Orange County is home to nearly 1,000 retailers, from haute couture to vintage treasures. South Coast Plaza in Costa Mesa and Fashion Island in Newport Beach are the luxury shopping anchors of the Orange County shopping scene. These popular shopping locations also enjoy international appeal due to their high-end boutiques, prestigious department stores, award-winning dining options and events that take place throughout the year. For savvy shoppers, the Outlets at Orange County’s only outlet center.
Plenary Session

Private 4G/5G networks create new opportunities for industrial IoT

Time: 10:10 - 12:00
Room: Grand Ballroom E-G

Abstract: With the recent confluence of new spectrum sharing innovations and the genesis of "Industry 4.0"—the digital transformation of industrial processes and the fourth industrial revolution—the potential for private 4G/5G networks is substantial. New technologies, such as MulteFire and LTE-based CBRS, makes it possible to deploy private LTE networks without access to licensed spectrum. This lowers the barrier for companies to start to enjoy the benefits of LTE and its roadmap to 5G, which grows the market for private IoT networks in segments ranging from manufacturing automation, shipping ports, oil & gas to power generation plants. The talk will cover industrial IoT market including key communication requirements and then go into salient features of 4G and 5G NR technologies that make them perfect fit for mission critical industrial applications with local private network deployments.

Mehmet Yavuz
VP of Engineering, Qualcomm Technologies, Inc.

Mehmet joined Qualcomm Corporate Research and Development (CR&D) department in 2003 as a senior engineer. His contributions include system design, development, standardization and implementation for projects including such as 1xEV-DO Rev-A, VoIP over wireless, UMTS, HSPA, LTE and 5G. From 2010 to 2016 Mehmet has led LTE small cells group and 1000x initiative in Qualcomm Research including areas such as UltraSON Self Organizing Networks, Neutral Host services, 3.5GHz US Citizens Broadband Radio Services (CBRS), LTE in Unlicensed Bands. Many of these technologies are either commercially deployed or in the process of commercialization. Most recently, Mehmet has been leading the work on private Internet of Things (IoT) networks and industrial IoT applications with 4G LTE and 5G NR in Qualcomm Research Center.

Prior to Qualcomm, during 1997-1999, Mehmet worked on signal processing and inverse problems at General Electric Global Research Center. From 1999 to 2003 he worked on many aspects of cellular system design as part of CDMA System Research and Development group at Nortel Networks. He holds B.Sc. in Electrical Engineering from Middle East Technical University, Turkey; and holds M.S. and Ph.D. degrees in Electrical Engineering from the University of Michigan, Ann Arbor.

Demo Track Presentations

Time: 15:40 - 17:00
Room: Grand Ballroom A-D

In its seventh year of RWW, there will be a demo session where presenters bring in demonstrations of their latest wireless experiments for a hands-on interactive forum. Come, see and feel how people are tackling real-world problems to address the next wireless innovation!

1. Ultra-Low-Power Monostatic Short Range Radar System for High Resolution Target Detection
   B. Scheiner1, F. Michler1, F. Lurz1, R. Weigel1, A. Koelpin2
   1Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany, 2Brandenburg University of Technology, Cottbus, Germany

   We present an extremely compact ultra-low-power six-port based continuous radar system for motion detection, integrated on a two-layer printed circuit board. The radar system will be presented with a live Matlab-GUI on a Notebook, where distance variations and movements of short-range targets will be illustrated.

2. Inductive Power Transfer (IPT) and Communication System
   B. Sanftl, M. Trautmann, R. Weigel, A. Koelpin
   Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany

   We demonstrate an embedded system capable of fully functional simultaneous inductive power and data transfer. The used IPT System works at a switching frequency of 500 kHz with a power transfer of 20W. The jointly used data link futures a transfer rate of up to 0.5 Mbit/s with a bit error rate smaller 10^{-6}. These figures point to a very robust system. Possible applications include e.g. robotic systems, electric vehicle charging, roulette tables, (underwater) unmanned vehicles and electric engines.
The student paper contest finalists will give their elevator pitches 09:00-09:40 and 10:10-11:50 in Room ‘Royal A’
**MONDAY, 15 JANUARY 2018**

| Time  | Session | Title | Speaker(s) | Location |
|-------|---------|-------|------------|----------|
| 10:10 | RWW Session: MO2A | Wireless Above 100GHz | Mark Rodwell, University of California, Santa Barbara | Garden 1 |
| 10:30 | MO2A-1 Advanced RF Front-End and Transceiver Systems Design Overview for Carrier Aggregation based 4G/5G Radios | Walid Ali-Ahmad, Qualcomm Inc | Room: Garden 4 |
| 10:50 | MO2A-2 Wireless Above 100GHz | Mark Rodwell, University of California, Santa Barbara | Room: Garden 4 |
| 11:10 | MO2A-3 Microstrip-to-Waveguide Transition in Planar Form Using a Substrate Integrated Waveguide | B. Scheiner, S. Mann, F. Lurz, F. Michier, S. Erhardt, S. Lindner, R. Weigel, A. Koelpin, Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany, Siemens AG, Munich, Germany, Brandenburg University of Technology, Cottbus, Germany | Room: Garden 4 |
| 11:30 | MO2A-4 Single Antenna Full Duplex Cancellation Network for ISM Band | G.T. Watkins, W. Thompson, D. Halls, Toshiba Research Europe Limited, Bristol, United Kingdom | Room: Garden 4 |
| 11:50 | MO2A-5 Enhancing the Quality Factor of Thin Film Printed Coils for Efficient Wireless Power Transfer | Y. Nishizawa, Y. Narusue, Y. Kawahara, The University of Tokyo, Tokyo, Japan | Room: Garden 4 |
| Time       | Session               | Title                                                                                     | Authors                                                                                                           | Location          |
|------------|-----------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------|
| 13:30-13:50| RWS Session: MO3A    | Passive Devices I                                                                         | Chair: Dimitra Psychogiu, University of Colorado Boulder                                                    | Room: Garden 1     |
|            |                       | MIMO and Multi-Antennas Communications I                                                  | Co-Chair: Abbas Omar, University of Magdeburg                                                                  |                   |
| 13:50-14:10| RWS Session: MO3B    | SiRF Amplifiers and Frequency Conversion                                                   | Chair: A. Cagri Ulusoy, Michigan State University                                                              | Room: Garden 2     |
|            |                       | Internally Matched FETs for Compact Power Amplifiers                                       | Co-Chair: Chienan Kuo, National Chiao Tung University                                                          |                   |
| 14:10-14:30| RWS Session: MO3C    | Passive Devices I                                                                          | Chair: Kevin Chuang, NanoSemi, Inc.                                                                           | Room: Garden 4     |
|            |                       | MIMO and Multi-Antennas Communications I                                                  | Co-Chair: Debabani Choudhury, Intel Corp.                                                                      |                   |
| 14:30-14:50| PAWR Session: MO3D   | Scotch Tape Interconnect for High Power Amplifiers                                         | Chair: Christian Fager, Chalmers University of Technology                                                      | Room: Garden 3     |
|            |                       | Internally Matched FETs for Compact Power Amplifiers                                       | Co-Chair: Gayle Collins, Obsidian Microwave                                                                   |                   |

**MONDAY, 15 JANUARY 2018**

| Time       | Session               | Title                                                                                     | Authors                                                                                                           | Location          |
|------------|-----------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------|
| 13:30-13:50| MO3A-1                | Design and Characterization of a Differential Microstrip Patch Antenna Array at 122 GHz  | R. Hasan1, W. Ahmad1, J. Lu1, D. Kissinger1, H. Jali Ng1, IHP GmbH, Frankfurt (Oder), Germany                 |                   |
|            |                       | Internationally Matched FETs for Compact Power Amplifiers                                 | 1National Chungbuk National University, Hsinchu, Taiwan, 2Technische Universitaet Berlin, Berlin, Germany    |                   |
| 13:50-14:10| MO3A-2                | A Compact Hertzian Dipoles Multiprot Model forNear-Field MIMO System Assessment           | J. Russer1, M. Irlac1, M. Haider1, S. Wang1, D. Bajon1, J. Nosse1, 1Technische Universitaet Munchen, Germany, |                   |
|            |                       | Internationally Matched FETs for Compact Power Amplifiers                                 | 2NXP-Semiconductors, Caein, France, 3ISAE-Universite de Toulouse, France, 4Federal University of Ceara, Fortaleza, Brazil |                   |
| 14:10-14:30| MO3A-3                | Antenna Synthesis for SIMO and MISO Systems with Optimality to Arbitrary Quantiles of the Channel Capacity | T. Mahler, C. Richt, L. Bell, M. Pauli, J. Kowalewski, T. Zwick, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany |                   |
| 14:30-14:50| MO3A-4                | Millimeter-wave 2×2 MIMO SC-FDE for an 8K Wireless Camera                                 | Y. Matsusaki, H. Kamoda, K. Imamura, H. Hamazumi, NHP Science & Technology Research Laboratories, Tokyo, Japan |                   |
| 14:50-15:10| MO3A-5                | 60-GHz Low-Profile, Wide-band, and High-Gain E-shaped Patch Array with Parasitic Patches   | T. Jang1, H. Kim1, H. Son1, C. Lee1, D. Kang1, H. Lee1, S. Kim1, C. Beyeon2, C. Park3, 1Korea Advanced Institute of Science and Technology, Daejeon City, Republic of Korea, 2Won-Kwang University, Iksan, Republic of Korea |                   |
|            |                       | Internationally Matched FETs for Compact Power Amplifiers                                 | 3Technische Universitaet Berlin, Berlin, Germany                                                                   |                   |
|            |                       | Internationally Matched FETs for Compact Power Amplifiers                                 |                                                                         |                   |
| 13:50-13:55| MO3B-1                | Dual-Band SHF Reconfigurable Bandpass Filter Using A4 Microstrip Resonators and Chip Inductor Coupling | Y. Kada, Y. Yamao, University of Electro-Communications, Tokyo, Japan                                            |                   |
| 13:55-14:10| MO3B-2                | Tunable Reflectionless Microstrip Bandpass Filters                                         | D. Psychogiu1, R. Gomez-Garcia2, 1University of Colorado - Boulder, Boulder, United States, 2University of Alcalá, Madrid, Spain |                   |
| 14:10-14:25| MO3B-3                | Cross-Coupled Open-Loop Resonator Bandpass Filter with Independently Tunable Center Frequency and Bandwidth | C. Schuster, R. Hu, A. Wiens, M. Maasch, R. Jakoby, H. Maune, Technische Universitaet Darmstadt, Darmstadt, Germany |                   |
| 14:25-14:40| MO3B-4                | A Monolithic Stereolithography 3-D Printed Ka-Band Spherical Resonator Bandpass Filter     | Y. Li1, J. Li2, M. Zhang1, H. Wang2, J. Xu1, S. Xiao1, 1University of Electronic Science and Technology of China, Sichuan, China, 2Shenzhen University, Chengdu, China, 3Kunshan Bomei Chemical Co., Ltd., Kunshan, China |                   |
| 14:40-14:55| MO3C-1                | Broadband Variable Gain Amplifier with Low Group Delay-Variation                          | C.V. Vangerow1, B. Goettelt1, A. Aymy2, D. Kissinger1, T. Zwick1, 1Institute of Radio Frequency Engineering and Electronics, KIT, Karlsruhe, Germany, 2IHP GmbH, Frankfurt (Oder), Germany |                   |
| 14:55-15:10| MO3C-2                | Low-Power Wideband D-Band LNA in a 130 nm BiCMOS Technology for Imaging Applications      | E. Aguilar1, A. Hagelaar1, D. Kissinger2, R. Weigel3, 1Friedrich-Alexander University Erlangen, Germany, 2IHP GmbH, Frankfurt (Oder), Germany |                   |
| 15:10-15:25| MO3C-3                | 30 % Frequency-Tuning-Range 60 GHz Push-PushVCO in 28 nm Bulk CMOS Technology             | J. Rimmelspacher1, R. Weigel1, A. Hagelaar1, V. Issakov1, 1Friedrich-Alexander University Erlangen-Nuremberg (FAU), Erlangen, Germany, 2Infineon Technologies AG, Neubiberg, Germany |                   |
| 15:25-15:40| MO3D-1                | Characterization of Linear Power Amplifiers for LTE Applications (Invited)                | W. Hallberg1, P. de Falco2, M. Ozen3, C. Fager1, Z. Popovic1, T. Barton, 1Chalmers University of Technology, Gothenburg, Sweden, 2University of Bristol, Bristol, United Kingdom, 3University of California, San Diego, United States |                   |
| 15:40-15:55| MO3D-2                | A D-band CMOS Power Amplifier for Wireless Chip-to-Chip Communications with 22.3 dB Gain and 12.2 dBm P1dB in 65-nm CMOS Technology | H. Son1, C. Lee1, D. Kang1, T. Jang1, H. Lee1, S. Kim1, C. Beyeon1, C. Park1, 1Korea Advanced Institute of Science and Technology, Daejeon, Republic of Korea, 2Wonkwang University, Iksan, Republic of Korea |                   |
| 15:55-16:10| MO3D-3                | A Study for Achieving High Power and Efficiency based on High Bias Operation in C- and X-band GaN Power Amplifiers | G. Formicone, J. Burger, J. Custer, R. Keshishian, W. Veitschegger, Integra Technologies, El Segundo, United States |                   |
MONDAY, 15 JANUARY 2018

SiRF Session: MO4C
Circuits and Applications II
Chair: Paul Hurwitz, TowerJazz
Co-Chair: Maciej Kucharski, IHP GmbH
Room: Garden 2

15:40
MO4C-1 RF Silicon Photonics for Wideband, High Dynamic Range Microwave and Millimeter-wave Signal Processing (Invited)
N. Hosseinzadeh, A. Jain, R. Helkey, J. Buckwalter, University of California - Santa Barbara, Santa Barbara, United States

16:00
MO4C-2 A Low-Power VCSEL Driver in a Complementary SiGe:CBiCMOS Technology
M. Koč, A. C. Ulusoy², D. Kissinger³, ¹IHP GmbH, Frankfurt (Oder), Germany, ²Michigan State University, East Lansing, United States, ³Technische Universität Berlin, Berlin, Germany

16:20
MO4C-3 High Voltage LDMOS Inverter for On-chip RF-MEMS Actuation
C. Wipf¹, R. Sorge¹, A. Goritz¹, S. Tolu-ray Wipf¹, A. Scheid³, D. Kissinger⁴, M. Kaynak², ¹IHP GmbH, Frankfurt (Oder), Germany, ²Technische Universität Berlin, Berlin, Germany, ³Sabanci University, Istanbul, Turkey

16:40
MO4C-4 A 65nm CMOS 6-18 GHz Full 360° 6-bit Phase Shifter
J. Hu, W. Li, L. He, S. Liu, Y. Xu, J. Gong, Fudan University, Shanghai, China

PAWR Session: MO4D
Distortion Reduction Techniques in RF Power Amplifiers
Chair: Pere Gilabert, University Politècnica de Catalunya
Co-Chair: Neil Braithwaite, Consulting Engineer
Room: Garden 3

15:40
MO4D-1 Model Order Reduction Techniques for Digital Predistortion in High Efficient Power Amplification Architectures (Invited)
P. Gilabert, Universitat Politècnica de Catalunya, Barcelona, Spain

16:00
MO4D-2 Multi-Dimensional LUT-based Digital Predistorter for Concurrent Dual-Band Envelope Tracking Power Amplifier Linearization
Q. Pham¹, D. López-Bueno¹, T. Wang⁴, G. Montoro³, P. Gilabert¹, ¹Universitat Politècnica de Catalunya (UPC), Castelldefels, Spain, ²Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Castelldefels, Spain

16:20
MO4D-3 Compensation of Delay within an Analog Predistortion Module Used to Linearize a Dual-Band RF Transmitter
R. Braithwaite, Tarana Wireless, Santa Clara, United States

16:40
MO4D-4 Digital Predistortion of Phased Array Transmitters with Multi-Channel Time Delay
Q. Luo, C. Yu, X. Zhu, Southeast University, Nanjing, China

Take a moment to relax at the Hyatt Regency Orange County
Take a stroll through the Anaheim Packing House (Courtesy of VisitAnaheim)
Elevator Pitches: 09:00-09:40 and 10:10-11:50
Interactive Poster Session: 15:40 – 17:00

Platinum Sponsors:

MONDAY, 15 JANUARY 2018

Room: Royal A
Room: Grand Ballroom A-D

Chair: Holger Maune, TU Darmstadt

Each of the Student Paper Finalists for RWW2018 is required to prepare a five-minute elevator pitch and a poster for the competition. The two overall winners will be announced at the Plenary Session on Tuesday.

[MO1B-3] 5.8-GHz ISM Band Intermodulation Radar for High-Sensitivity Motion-Sensing Applications
A. Mishra, C. Li, Texas Tech University, Lubbock, United States

[MO1B-4] Indoor Localization Based on a Single-tone SIMO-structured Doppler Radar system
A. Zhu, T. Fan, Z. Gu, Q. Li, C. Li, L. Ran, "Laboratory of Applied Researcher on Electromagnetics, Zhejiang University, Hangzhou, China, Department of Electrical and Computer Engineering, Texas Tech University, Lubbock, United States"

[MO2B-3] Microstrip-to-Waveguide Transition in Planar Form Using a Substrate Integrated Waveguide B. Scheiner, S. Mann, F. Lurz, F. Michler, S. Erhardt, S. Lindner, R. Weigel, A. Koelpin, Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany, "Brandenburg University of Technology, Cottbus, Germany"

[MO3C-5] A Low-Power K-Band Colpitts VCO with 30% Tuning Range in a 130 nm SiGe BiCMOS Technology
M. Shen, M. Polushkin, M. Mehrotra, M. Hashemi, E. McCune, M. S. Alavi, L.C.N. de Vreede, Delft University of Technology, Delft, Netherlands

[MO2C-2] A Universal Monolithic E-band Transceiver for Automotive Radar Applications and V2V Communication
M. Kucharski, D. Kissinger, H. Jalli Nag, "IHP GmbH, Frankfurt (Oder), Germany, "Technische Universität Berlin, Berlin, Germany"

[MO2C-3] A Low Power CMOS Temperature Sensor Frontend for RFID Tags
H. Shan, J. Peterson III, M.-S. Tsai, Y. Tang, N.J. Conrad, S. Mohammad, Purdue University, West Lafayette, United States

[MO3C-2] A Low-Power K-Band Colpitts VCO with 30% Tuning Range in a 130 nm SiGe BiCMOS Technology
F. I. Jamal, J. Wessel, D. Kissinger, "IHP GmbH, Frankfurt (Oder), Germany, "Technische Universität Berlin, Berlin, Germany"

[MO1C-4] A Wideband IQ RFDAC-Based Phase Modulator
Y. Shen, M. Polushkin, M. Mehrotra, M. Hashemi, E. McCune, M. S. Alavi, L.C.N. de Vreede, Delft University of Technology, Delft, Netherlands

[WE1D-3] An Inductive Through-The-Head OOK Communication Platform for Assistive Listening Devices
J-C. Edelmann, R. Stojakovic, C. Baur, T. Ussmueller, University of Innsbruck, Innsbruck, Austria

[WE1D-4] A New Heat-Warning-System Based on a Wireless Body Area Network for Protecting Firefighters in Indoor Operations
M. Dietz, M. Striegel, R. Weigel, A. Högelsauer, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany

[WE2D-1] Integrated Planar 122 GHz FMCW Radar with Frequency Scanning Antenna
J. Schäfer, B. Goettel, H. Gulan, T. Zwick, Karlsruhe Institute of Technology, Karlsruhe, Germany

[WE3D-1] A 94-GHz Five-Port Reflectometer for Measuring Complex Reflection Coefficient using 0.13-µm SiGe HBT Detectors
J. A. Gayaajil, A. A. Nawaz, M. Ko, A. Malignaggi, D. Kissinger, A. C. Ulusoy, "Michigan State University, East Lansing, United States, "IHP GmbH, Frankfurt (Oder), Germany, "Technische Universität Berlin, Berlin, Germany"

[WE3D-4] Accurate FMCW Frequency Synthesis Using Six-port Interferometry
H. Arab, C. Ayyel, S. Tatur, "INRS-EMT, University of Quebec, Quebec, Canada, "Ecole Polytechnique de Montreal, Quebec, Canada"

[WE4D-2] Battery-less UHF RFID Controlled Transistor Switch for Internet of Things Applications - A Feasibility Study
M. Ferdik, G. Saxl, T. Ussmueller, University of Innsbruck, Innsbruck, Austria

[WE1D-2] Multi-Dimensional LUT-based Digital Predistorter for Concurrent Dual-Band Envelope Tracking Power Amplifier Linearization
Q. Pham, D. Lopez-Bueno1, T. Wang, G. Montoro, P. Gilabert, "Universitat Politècnica de Catalunya (UPC), Castelldefels, Spain, "Centre Tecnologic de Telecomunicacions de Catalunya (CTTC), Castelldefels, Spain"

[WE3D-4] 5.8-GHz ISM Band Intermodulation Radar for High-Sensitivity Motion-Sensing Applications
A. Mishra, C. Li, Texas Tech University, Lubbock, United States

Newport Beach is just a stone's throw away! (Courtesy of VisitAnaheim)

Cycling can be a practical way to see the sights! (Courtesy of VisitAnaheim)
| Session | Title                                                                 | Authors                                                                 | Location |
|---------|----------------------------------------------------------------------|------------------------------------------------------------------------|----------|
| TU1A-1  | Waveform Multiplexing using Chirp Rate Diversity for Chirp-Sequence based MIMO Radar Systems | F. Roos, N. Appenrodt, J. Dickmann, C. Waldschmidt, Ulm University, Ulm, Germany, Daimler AG, Ulm, Germany | Lincon Laboratory, Lexington, United States |
| TU1A-2  | Wideband Vector Modulator for RF Cancellers in STAR Systems           | K. Kolodziej, B. Perry, MIT Lincoln Laboratory, Lexington, United States | Room: Garden 1 |
| TU1A-3  | Truly Aliasing-Free Digital RF-PWM Power Coding Scheme for Switched-Mode Power Amplifiers | O. Tanovic, R. Mali, Mitsubishi Electric Corp., Cambridge, United States, Massachusetts Institute of Technology, Cambridge, United States | Room: Garden 2 |
| TU1A-4  | A New Turbo Coded Modulation Approach Exploiting Non-Binary Field     | T. Matsumine, H. Ochiai, Yokohama National University, Yokohama, Japan   | Room: Garden 3 |
| TU1A-5  | Improvement of SNR using Cross-Correlation for Clustered Incoherent Sensor Networks | J. Merritt IV, J. Chisum, University of Notre Dame, Notre Dame, United States | Room: Garden 4 |
| TU1B-1  | Integrated Time-Varying Electromagnetic Devices for Ultra-Wide Band Nonreciprocity (Invited) | M. Biedka, Q. Wu, X. Zou, S. Qin, Y. E. Wang, University of California, Los Angeles, United States | Room: Garden 1 |
| TU1B-2  | 2-GHz 1.35-dB NF pHEMT Single-Voltage-Supply Process-Independent Low-Noise Amplifier | J. Syu, C. Meng, C. Yang, G. Huang, National Chiao Tung University, Hsinchu, Taiwan, National Nano Device Laboratories, Hsinchu, Taiwan | Room: Garden 2 |
| TU1B-3  | Multistandard, Triple Band Wireless Transceiver in a 130 nm CMOS Technology with Integrated PAs for IoT Applications | M. Scholl, T. Saafeld, J. Mueller, Y. Zhang, V. Bonehi, C. Beyerstedt, F. Spercher, M. Schrey, R. Wunderlich, S. Heinen, RWTH Aachen University, Aachen, Germany | Room: Garden 3 |
| TU1B-4  | The Prototypes of X-Band Active Integrated Antenna Array for a Satellite On-Board Tracking System | S. Kawasaki, R. Kato, T. Suda, Y. Nakano, K. Fujimoto, J. Matsutomo, H. Kato, O. Mori, J. Kawaguchi, Japan Aerospace Exploration Agency, Sagamihara, Japan, Japan Radio Co., Ltd., Saitama, Japan, Okayama University, Okayama, Japan | Room: Garden 4 |
| TU1C-1  | Sub-Thz Interconnect for Planar Chip-to-Chip Communications (Invited) | B. Yu, Y. Ye, X. Ding, C. Neher, X. Liu, Z. Xu, Q. Gu, University of California, Davis, United States, Zhejiang University, China | Room: Garden 1 |
| TU1C-2  | SiGe BiCMOS Technology for mm-Wave Applications - an Overview (Invited) | K. Aufinger, Infinion Technologies, Neubiberg, Germany | Room: Garden 2 |
| TU1C-3  | A Differential Vertical Hybrid Coupler and Low Capacitance RF Pads for Millimeter-Wave Applications in 28 nm CMOS FDSOI | F. Voineau, B. Martineau, M. Sié, A. Ghidotti, E. Kerhervè, STMicroelectronics, Crolles, France, University of Grenoble, Grenoble, France, University of Bordeaux, Talence, France | Room: Garden 3 |
| TU1C-4  | A New Turbo Coded Modulation Approach Exploiting Non-Binary Field | T. Matsumine, H. Ochiai, Yokohama National University, Yokohama, Japan | Room: Garden 4 |
| TU1D-1  | Systems Engineering of IoT Connectivity in Commercial Airliners Using Satellite Backhaul Links | R. Sturdivant, J. Lee, Azusa Pacific University, Azusa, United States, Boeing, Seal Beach, United States | Room: Garden 1 |
| TU1D-2  | IoT Enabled Pico-Hydro Electric Power With Satellite Backhaul for Remote Himalayan Villages | R. Sturdivant, J. Yeh, M. Stambaugh, A. Zalend, N. Villareal, C. Vetter, J. Rohweller, J. Martinez, J. Ishii, R. Brown, A. Arkie, Azusa Pacific University, Azusa, United States, RIDS-USA/RIDS, Switzerland | Room: Garden 2 |
| TU1D-3  | Design challenges of a highly integrated SDR platform for multi-band spacecraft applications in radiation environments | J. Budrowell, A. Koelpin, German Aerospace Center, Bremen, Germany, Brandenburg University of Technology, Cottbus, Germany | Room: Garden 3 |
| TU1D-4  | Machine-to-Machine Communication by Networks of Small Satellites (Invited) | K. Schilling, University Wuerzburg, Wuerzburg, Germany | Room: Garden 4 |
TU3P: Joint RWW Interactive Poster Session
13:30-14:50

Chair: Kevin Chuang, NanoSemi Inc.
Co-Chair: Spyridon Pavlidis, North Carolina State University

Room: Grand Ballroom A-D

[TU3P-1] A Consideration on Influence of Interference Waves at Security Gate Using Monopulse System at UHF Band
Takayuki Sakagawa, K. Kuroki, M. Eguchi, T. Yamakawa, National Institute of Technology, Kure College, Kure, Japan
Fuzzy Logic Systems Institute, Kitakyushu, Japan

[TU3P-2] Time and Frame Synchronization of IEEE 802.15.6 IR-UWB Physical Layer with Strong Narrowband Interferences
X. Zuo, H. Nie, University of Electronic Science and Technology of China, Chengdu, China
University of Northern Iowa, Cedar Falls, United States

[TU3P-3] Design of a Low Complexity SMILE Antenna for Future 5G Applications
Y. Lin, K. Lan, H. Lin, Y. Lin, National Chi Nan University, Puli, Taiwan

[TU3P-4] Measurements of the Influence of Antenna Pattern on Radio Frequency Propagation in a Concrete Tunnel
R. Jacksha, C. Zhou, S. Sunderland, National Institute of Safety and Health, Spokane, United States
National Institute of Safety and Health, Pittsburgh, United States

[TU3P-5] Broadband Printed-Dipole Antenna for Future 5G Applications and Wireless Communication
A. Abd El-Hameed, A. Barakat, A. Abdel-Rahman, A. Allam, R. Pokharel, Y. Kuniaki, Egypt-Japan University of Science and Technology, Alexandria, Egypt
Kyushu University, Fukuoka, Japan
Electronic Research Institute, Giza, Egypt

[TU3P-6] Consideration of Security for PLNC with Untrusted Relay in Game Theoretic Perspective
Y. Shirasaki, T. Takyu, T. Fujii, T. Ohtsuki, F. Sasamori, Shinshu University, Nagano, Japan
The University of Electro-Communications, Chofu, Japan
Keio University, Yokohama, Japan

[TU3P-7] 3 mW W-band CMOS Injection-Locked Frequency Divider with 23.5-GHz Locking Range
Y. Lin, K. Lan, H. Lin, Y. Lin, National Chi Nan University, Puli, Taiwan

[TU3P-8] 200 GHz Chip-to-Chip Wireless Power Transfer
P. Testa, R. Vieitez, C. Carta, F. Eltinger, Technische University Dresden, Dresden, Germany

[TU3P-9] Experimental Implementation of Real-Time Non-Orthogonal Multi-Carrier Systems in a Realistic Fading Channel
W. Ozan, H. Ghanam, P. Haign, I. Darwazeh, University College London, London, United Kingdom

[TU3P-10] High Gain and High PAE 68-94 GHz CMOS Power Amplifier Using Miniature Zero-Degree Four-Way Current Combiner
Y. Lin, Y. Lin, J. Gao, K. Lan, National Chi Nan University, Puli, Taiwan

[TU3P-11] Experimental Demonstration of Digital Pre-Distortion for Millimeter Wave Power Amplifiers with GHz Bandwidth
Q. Tang, H. Zhou, A. Tiwari, J. Stewart, Q. Qi, D. Zhang, H. Hemmati, Facebook, Menlo Park, United States

[TU3P-12] Identification of Low Order Cascaded Digital Predistortion with Different-structure Stages for Linearization of Power Amplifiers
S. Wang, M. Abi Hussein, O. Venard, G. Baudoin, University Paris-Est, Noisy le grand, France
ESIEE Paris, Noisy le grand, France

[TU3P-13] Design of High-Performances CMOS Power-Stage for Handset Applications Based on MAMOS Cells
J. Loraine, S. Doucet, M. Arnaudo, C. Duperrier, ACCO Semiconductors, Inc, Louveciennes, France
Paris-Seine University/Cergy-Pontoise University, Cergy, France

[TU3P-14] Incorporating RF Test Measurements for Efficient Design Flow of GaN-Based Power Amplifiers
R. Welker, S. Ozev, J. Kitchen, Arizona State University, Tempe, United States

[TU3P-15] Design of a 70 W Wideband GaN HEMT Power Amplifier with 60% Efficiency over 100-1000 MHz Bandwidth
A. Raza, J. Gengler, QORVO, Inc., Richardson, United States

[TU3P-16] Evaluation for Wireless Sensor Networks with LT Codes Considering Probabilities of Transmission Failure
Y. Chang, K. Fukawa, Tokyo Institute of Technology, Tokyo, Japan

[TU3P-17] Highly Accurate Radio Environment Mapping Method based on Transmitter Localization and Spatial Interpolation in Urban LoS/NLoS Scenario
K. Tsukamoto, M. Kitsunezuka, K. Kunihoro, NEC Corp., Fuchu, Japan
NEC Corp., Kawasaki, Japan

[TU3P-18] Design of Stable Wireless Sensor Network for Slope Monitoring
Y. Nishikawa, T. Sasanuma, Y. Ishizuka, S. Sugimoto, S. Iwasaki, H. Wang, T. Fujishima, T. Fujimoto, K. Yamashita, T. Suzuki, K. Kurita, Nagasaki University, Nagasaki, Japan
Fujitsu Labs Ltd., Kawasaki, Japan

[TU3P-19] Transmit Control and Data Separation in Physical Wireless Parameter Conversion Sensor Networks with Event Driven Sensors
K. Fukuda, T. Takyu, K. Shirai, M. Ohta, T. Fujii, F. Sasamori, S. Handsa, Shinshu University, Nagano, Japan
Fukuoka University, Fukuoka, Japan
The University of Electro-Communications, Chofu, Japan

[TU3P-20] Performance of Quadrature Phase Shift Frequency Selective Receiver in Presence of Blockers
A. Hasan, M. Helouei, F. Ghanouchi, University of Calgary, Calgary, Canada

[TU3P-21] Submillimeter Wave Multifold Diplexer Designed in 65 nm CMOS
N.M. Vijayakumar, M. Gomez, K. K. O, R. Henderson, University of Texas at Dallas, Richardson, United States

---

Demo Track (15:10-17:00)

Room: Grand Ballroom A-D

RWW has a tradition of hosting a “Demo Track”, with the purpose of providing an interactive venue for you to demonstrate the results of your research in a different form than the usual paper or poster formats. The demonstrations should include real operating hardware and/or software. See Page 7 for more details.

RWW2017 Student Paper Competition Finalists and Judges
(Courtesy of LylePhotos, Atlanta)

RWW2017 Demo Session
(Courtesy of LylePhotos, Atlanta)
WEDNESDAY, 17 JANUARY 2018

RWS Session: WE1A
Antenna Technologies II
Chair: Robert Caverly, Villanova University
Co-Chair: Jennifer Kitchen, Arizona State University
Room: Garden 4

WE1A-1 A Small Wearable Antennas for Wireless Communication and Medical Systems (Invited)
A. Sabban, Ort Braude College, Karmiel, Israel

WE1A-2 Smart Sticker Including Split Square Rings for Adapting Mobile Phone Radiation Pattern to Lower SAR
H. Zhou\(^1\), A. Pal\(^1\), A. Mehta\(^1\), D. Mirshekar-Syahkal\(^2\), H. Nakano\(^1\),
\(^1\)Swansea University, Swansea, United Kingdom, \(^2\)Essex University, Colchester, United Kingdom

WE1A-3 Microstrip Patch Antenna for 24 GHz Application Using Slotted Ground Structure
G. Upadhyay\(^1\), P. Ranjan\(^1\), N. Kishore\(^1\), V.S. Tripathi\(^2\), S. Tripathi\(^2\),
\(^1\)Motilal Nehru National Institute of Technology, Allahabad, Allahabad, India, \(^2\)Indian Institute of Technology Roorkee, Roorkee, India

WE1A-4 An Improved Indoor Localization Solution Using a Hybrid UWB Doppler System with Kalman Filter
J. Wang\(^1\), Y. Tang\(^1\), J-M. Muñoz-Ferreras\(^2\), R. Gómez-García\(^2\), C. Li\(^1\),
\(^1\)Texas Tech University, Lubbock, United States, \(^2\)University of Alcalá, Alcalá de Henares, Spain

WE1A-5 Examination of OFDM for Wireless Train-Onboard Communication
J. Lichtblau\(^1\), B. Sanftl\(^1\), F. Lurz\(^1\), R. Weigel\(^1\), A. Koelpin\(^2\),
\(^1\)Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany, \(^2\)Brandenburg University of Technology, Cottbus, Germany

RWS Session: WE1B
Emerging Wireless Technologies and Applications
Chair: Nuno Borges Carvalho, University of Aveiro
Co-Chair: Roberto Gomez-García, University of Alcalá
Room: Garden 1

WE1B-1 Directly Modulated Spinning Magnet Arrays for ULF Communications
S. Mysore Nagaraja, S. Selvin, R. U. Tok, Y. Huang, Y. Wang, University of California, Los Angeles, United States

WE1B-2 Fully Integrated Remote Radio Head and Improved Data Transmission for Inductive Power Transfer Systems
B. Sanftl\(^1\), M. Trautmann\(^1\), R. Weigel\(^1\), A. Koelpin\(^2\),
\(^1\)Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany, \(^2\)Brandenburg University of Technology, Cottbus, Germany

WE1B-3 Interaction of High-Power Microwaves with Low-Temperature Plasma in a Gas-Discharge-Tube-Loaded SIW Structure
Z. Vander Missen\(^1\), A. Semnani\(^1\), E. Viveiros\(^2\), D. Peroulis\(^2\),
\(^1\)Purdue University, West Lafayette, United States, \(^2\)U.S. Army Research Laboratory, Adelphi, United States

WE1B-4 An Improved Indoor Localization Solution Using a Hybrid UWB Doppler System with Kalman Filter
J. Wang\(^1\), Y. Tang\(^1\), J-M. Muñoz-Ferreras\(^2\), R. Gómez-García\(^2\), C. Li\(^1\),
\(^1\)Texas Tech University, Lubbock, United States, \(^2\)University of Alcalá, Alcalá de Henares, Spain

WE1B-5 Examination of OFDM for Wireless Train-Onboard Communication
J. Lichtblau\(^1\), B. Sanftl\(^1\), F. Lurz\(^1\), R. Weigel\(^1\), A. Koelpin\(^2\),
\(^1\)Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany, \(^2\)Brandenburg University of Technology, Cottbus, Germany

WISNET Session: WE1D
Wireless Sensor Applications: Environments, Health, Home, Wearable, and Body Area Networks
Chair: Rahul Khanna, Intel Corp.
Co-Chair: Thomas Ussmueller, University of Innsbruck
Room: Garden 3

WE1D-1 A High Frequency (HF) Inductive Power Transfer Circuit for High Temperature Applications Using SiC Schottky Diodes
J. Jordan, G. Ponchak, D. Spry, P. Neudeck, NASA Glenn Research Center, Cleveland, United States

WE1D-2 Self-Injection-Locked Radar Sensor with Active-Integrated-Antenna and Differentiator-Based Demodulator for Noncontact Vital Sign Detection
C.-H. Tseng, J.-T. Yu, National Taiwan University of Science and Technology, Taipei, Taiwan

WE1D-3 An Inductive Through-The-Head OOK Communication Platform for Assistive Listening Devices
J-C. Edelmann, R. Stojakovic, C. Bauer, T. Ussmueller, University of Innsbruck, Innsbruck, Austria

WE1D-4 A New Heat-Warning-System Based on a Wireless Body Area Network for Protecting Firefighters in Indoor Operations
M. Dietz, M. Striegel, R. Weigel, A. Hagelauer, Friedrich-Alexander-University Erlangen-Nuremberg, Erlangen, Germany

WE1D-5 Device-Free Human Activity Microwave Detection
K. Haddadi, C. Loyez, University of Lille, CNRS, UMR 8520 - IEMN, Lille, France
WEDNESDAY, 17 JANUARY 2018

RWW Session: WE2A
3D & Novel Engineered Materials
Chair: Benjamin Cook, Texas Instruments, Inc.
Co-Chair: Robert Caverly, Villanova University
Room: Garden 4
WE2A-1 3D Heterogeneous Integration Enabling Future RF ICs (Invited)
Q. Chen, C. Wang, F. Zhang, C. Li, A. Wang, University of California, Riverside, Riverside, United States
WE2A-2 Full 3D RF Structures Enabled by Additive Manufacturing (Invited)
V. Radisic¹, J. Hester², E. Nguyen², J. Tice², Northrop Grumman Aerospace Systems, Redondo Beach, United States, Northrop Grumman Corporation, Redondo Beach, United States
WE2A-3 Evaluating Conductive Paint Performance on 3-D Printed Horn Antennas
H. Yao, L. Fang, R. Henderson, University of Texas at Dallas, Richardson, United States
WE2A-4 Reconfigurable Composite Right/Left-Handed Metamaterial
S. Larouche, X. Lan, E. Kaneshiro, A. Gutierrez-Aitken, V. Radisic, Northrop Grumman Corporation, Redondo Beach, United States

RWS hSession: WE2B
MIMO and Multi-Antenna Communications II
Chair: Roberto Gomez-Garcia, University of Alcala
Co-Chair: Abbas Omar, University of Magdeburg
Room: Garden 1
WE2B-1 A Novel Planar UWB Magneto-Electric Dipole
A. Yalouskikh, Y. Huang, Y. E. Wang, University of California, Los Angeles, Los Angeles, United States
WE2B-2 Design and Performance of OAM Modes Generated Using Dipole Arrays with Different Feeds
L. Fang, H. Yao, R. Henderson, University of Texas at Dallas, Richardson, United States
WE2B-3 Secure Information Sharing with Mirroring Null Steering through Untrusted Relay with Two Antennas
T. Noguchi¹, O. Takyu¹, T. Fujii², T. Ohtsuki³, F. Sasamoto¹, S. Handa¹, Shinshu University, Nagano, Japan, The University of Electro-Communications, Chofu, Japan, Keio University, Yokohama, Japan
WE2B-4 Millimeter-Wave to Microwave MIMO Relays (M4R) for 5G Building Penetration Communications
R. Zhu¹, Y. E. Wang¹, Q. Xu², Y. Liu², Y. D. Li², University of California, Los Angeles, United States, Ax-End Corporation, Playa Vista, United States
WE2B-5 A Series Fed Planar Microstrip Patch Array Antenna with 1D Beam Steering for 5G Spectrum Massive MIMO Applications
S. Krishna, G. Mishra, S. Sharma, San Diego State University, San Diego, United States

WISNET Session: WE2D
Wireless Sensors for Communication, Radar, Positioning & Imaging Applications
Chair: Holger Maune, Technische Universität Darmstadt
Co-Chair: Luca Roselli, University of Perugia
Room: Garden 3
WE2D-1 Integrated Planar 122 GHz FMCW Radar with Frequency Scanning Antenna
J. Schäfer, B. Goettel, H. Gulun, T. Zwick, Karlsruhe Institute of Technology, Karlsruhe, Germany
WE2D-2 High Order Modulation Backscatter Systems Characterization
M. Jordao, R. Correia, N. Carvalho, University of Aveiro, Aveiro, Portugal
WE2D-3 Simultaneous Multi-Object Micro-Displacement Measurement by Multi-Spectral-Peak Radar Interferometry
D. Matsuo, S. Yamanouchi, K. Ogura, M. Ariyoshi, NEC Corp., Kawasaki, Japan
WE2D-4 2D High resolution of stepped-FM radar based on MUSIC scheme
K. Ogawa, A. Kajiwara, University of Kitakyushu, Kitakyushu, Japan
WE2D-5 Real-Time GSM Broadcast Receiver on a Cortex-M4 Microcontroller
S. Erhardt¹, F. Pflaum¹, R. Weigel¹, S. Koelpin², Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany, Brandenburg University of Technology, Cottbus, Germany
WE3P-1 Wide-Passband Filters With In-Band Tunable Notches for Agile Multi-Interference Suppression in Broad-Band Antenna Systems
D. Psychogiou¹, R. Gomez-Garcia², D. Peroulis², ¹University of Colorado-Boulder, Boulder, United States, ²Georgia Institute of Technology, Atlanta, United States

WE3P-2 Evaluation of Cellular Standards for Low Data Rate Applications Regarding Power Consumption and Timing Parameters
M. Hertlein, S. Breun, G. Cappel, A. Schwarzmüller, F. Lurz, R. Weigel, G. Fischer, Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany

WE3P-3 77 GHz Phase-Locked Loop for Automobile Radar System in 90 nm CMOS Technology
Y-S. Lin, K-S. Lan, H-C. Lin, Y-W. Lin, National Chiao Tung University, Hsinchu, Taiwan

WE3P-4 Matching Improvement of an Asymmetric Biomimetic Antenna Array for Source Locating
R. de Amorim Jr¹, G. Fontgalland², J. R. Zacarias³, T. M. Silveira⁴, I. Fontgalland², H. Dinnison¹, ¹Applied Electromagnetics and Microwave Lab-Federal University of Campina Grande, Campina Grande, Brazil, ²Economic Center-Federal University of Campina Grande, Campina Grande, Brazil, ³Federal University of Semiarid Region, Mossoró, Brazil

WE3P-5 Using Polar Transformation to Design a Dissimilant Antenna Array Inspired on Four-Leaf Clover
M. de Oliveira¹, A. da Costa, G.S. Forte, P.P. de Melo, G. Fontgalland, P.H.F. Silva, I. Fontgalland, ¹Federal University of Campina Grande, Campina Grande, Brazil

WE3P-6 Phase-change RF switches with Robust Switching Cycle Endurance
J-S. Moon¹, H-C. Seo, K-A. Son, K. Lee, D. Zehnder, H. Tai, D. Le, HRL Laboratories, Malibu, United States

WE3P-7 Miniaturized Evanescent-Mode Cavity SIW Bandpass Filter with Spurious Suppression
S. Saeeidi, H. Sigmarsson, University of Oklahoma, Norman, United States

WE3P-8 Design and Characterization of a 180-GHz On-Chip Integrated Broadband Balun
H. Ghaleb, D. Frische, C. Carta, F. El-linger, Technische Universität Dresden, Dresden, Germany

WE3P-9 Design of Self-Biased Coplanar Circulator with Ferromagnetic Nanowires
W. Zhou, J. Um, B. Stancler, R. Franklin, University of Minnesota, Minneapolis, United States

WE3P-10 Broadband Antenna for Passive Self-Interference Suppression in Full-Duplex Communications
P. Deo¹, D. Mirshekar-Syahkal², G. Zheng³, A. Pal⁴, A. Mehta⁵, ¹University of Essex, Colchester, United Kingdom, ²Loughborough University, Loughborough, United Kingdom, ³Swansea University, Swansea, United Kingdom

WE3P-11 A Landslide Pre-event Detection System Based on Bistatic Radar Technology Using AM Radio Waves
K. Kumahara¹, F. Kuroki², M. Eguchi³, T. Yamakawa⁴, ¹Kuro College, Kure, Japan, ²Fuzzy Logic Systems Institute, Kitakyushu, Japan

WE3P-12 A 12 Gb/s 64QAM and OFDM Compatible Millimeter-Wave Communication Link Using a Novel Plastic Waveguide Design
F. Voineau¹, ¹STMicroelectronics, Crolles, France, ²University Grenoble Alpes-CEA, Grenoble, France, ³University Bordeaux-IMS Laboratory, Talence, France, ⁴Aquitaine Science Transfert, Talence, France

WE3P-13 Using Platform Motion for Improved Spatial Filtering in Distributed Antenna Arrays
P. Chatterjee, J. Nanzer, Michigan State University, East Lansing, United States

WE3P-14 Fast Impedance Matching Using Interval Halving of Resonator Position Numbers for a High-Power Evanescent-Mode Cavity Tuner
Z. Hays¹, ¹C. Kappelmann¹, L. Lammers¹, C. Baylis¹, M.A. Khater¹, A. Semnani², D. Peroulis², E. Viveros², J. Penn³, ¹Baylor University, Waco, United States, ²Purdue University, West Lafayette, United States, ³Army Research Laboratory, Adelphi, United States

WE3P-15 Micro and Mini Drone Classification Based on Coherent Radar Imaging
E. Chang¹, R. Sturdivant², B. Quillc³, E. Patiglie, ¹Dept. of Math and Physics- Azusa Pacific University, Azusa, United States, ²Dept. of Engineering and Computer Science-Azusa Pacific University, Azusa, United States

WE3P-16 A 3.5/5.3-GHz Dual-Band Output Matching Network for an Efficiency-Optimized Multiband Power Amplifier
A. Duh, S. Rahimizadeh, T. Barton, Z. Popovic, University of Colorado, Boulder, United States

WE3P-17 On the Lower I/Q Imbalance Sensitivity Using Real-valued Feedback of Digital Predistortion
T. Gotthans, R. Marsalek, M. Pospisil, T. Urbanec, J. Kral, J. Blumenstein, Brno University of Technology, Brno, Czech Republic

WE3P-18 Rectangular Waveguide Resonator for Gas Permittivity Measurement at X-Band
J. Jordan, G. Ponchak, NASA Glenn Research Center, Cleveland, United States

WE3P-19 Use of Balloons and Blimps to Improve Coverage Range in Low Power Wireless Area Networks
P. Cielo, G.P. Colucci, M. Poletti, R. Stefanelli, D. Trinchero, Politecnico di Torino, Turin, Italy

WE3P-20 SILPLL Based Forced Opto-electronic Oscillator Using a Phase Modulator in a Sagnac Loop
F. T. Pantano, K. Wei, T. Sun, A.S. Daryush, Drexel University, Philadelphia, United States

WE3P-21 A Simultaneous Wideband Impedance Matching and Bandpass Filtering Technique using NUTL Segments at 15 GHz
R. Shaheen, A. Sethi, R. Akbar, J. Alkio, T. Tuovinen, T. Rahkonen, A. Parsinen, University of Oulu, Oulu, Finland

WE3P-22 A New Figure-of-Merit for CMOS Gate Delay Estimation
A.A. Nawaz¹, J.A. Qayyum¹, A.C. Ulusoy², J.D. Cressler³, ¹Baylor College of Medicine, Houston, Texas, ²Michigan State University, East Lansing, United States, ³Georgia Institute of Technology, Atlanta, United States

WE3P-23 E-Band Reflection-Type Phase Shifter with Uniform Insertion Loss
R. Ben Yishay, D. Elad, ON Semiconductor, Haifa, Israel

WE3P-24 High Power (>15 W) Fractional RF MEMS Switched Capacitors Using RF/DC Actuators
H. Zareie, G. Rebeiz, University of California, San Diego, La Jolla, United States

The interactive poster sessions are a great opportunity to ask questions and discuss new research findings.
(Courtesy of LylePhotos, Atlanta)
**WEDNESDAY, 17 JANUARY 2018**

**RWS Session: WE3A**
Passives II

Chair: Robert Caverly, Villanova University
Co-Chair: Rashaunda Henderson, University of Texas at Dallas
Room: Garden 4

**RWS Session: WE3B**
RWS Late News: Active Circuits

Chair: Charlie Jackson, Northrop Grumman Corporation
Co-Chair: Abbas Omar, University of Magdeburg
Room: Garden 1

**WisNet Session: WE3D**
Six Port & Multi-port Technology

Chair: Alexander Koelpin, Brandenburg Univ. of Technology
Co-Chair: Alessandra Costanzo, University of Bologna
Room: Garden 3

---

**WE3A-1 A Filter with Equal-Ripple Negative Group Delay**
L-F. Qiu¹, L-S. Wu, W-Y. Yin¹, J-F. Mao¹, Jiao Tong University, Shanghai, China, ²Zhejiang University, Hangzhou, China

**WE3A-2 Concentric Distributed Resonators and Filters**
S. Bulja, E. Doumanis, D. Kozlov, Nokia Bell Labs, Dublin, Ireland

**WE3A-3 A Stereolithography 3-D Printed Ka-Band H-Plane Quasi-Planar Waveguide Magic-T Using Slow-Wave Corrugations**
M. Zhang¹, J. Li, C. Guo¹, H. Wang², J. Xu¹, H. Yang¹, University of Electronic Science and Technology of China, Chengdu, China, ²Kunshan Bomei Chemical Co., Ltd., Kunshan, China

**WE3A-4 Experimental Evaluation of 61 GHz Differential Compensated Chip-on-Board Interconnect for FMCW Radar**
W. Ahmad, D. Kissinger, H. Ng, IHP GmbH, Frankfurt (Oder), Germany

---

**WE3B-1 A Low Phase Noise Wide-Tuning Range Class-F VCO Based on a Dual-Mode Resonator in 65nm CMOS**
N. Dhamani, P. Sepidband, K. Entesar, Texas A&M University, College Station, United States

**WE3B-2 Investigation of Unique Broadband Nonlinear RF Response of Electronic Devices**
A. Mishra¹, C. Song², W. Xu², C. Li², ¹Texas Tech University, Lubbock, United States, ²State University of New York, Buffalo, United States

**WE3B-3 Compact Low-Cost Five-Band RF Energy Harvester Using System-in-Package Integration**
Y-W. Chang, M-C. Yu, H-J. Lin, C-H. Li, National Central University, Jhongli, Taiwan

**WE3B-4 Double-Uniform Schottky Diode Nonlinear Transmission Line Generating Sub-Picosecond Transients**
M. Dwyer, H. Kim, L. Mawst, D. van der Weide, University of Wisconsin–Madison, Madison, United States

---

**WE3B-5 3-D Printed X-Band Yagi-Uda Antenna**
Y. Jin¹, W. Jiang¹, T. Wang¹, Y. Huang¹, G. Wang¹, ¹University of Florida, Gainesville, United States, ²University of South Carolina, Columbia, United States

---

**WE3B-6 Six-Port Reflectometer in WR15 Metallic Waveguide for Free-Space Sensing Applications**
K. Haddadi¹, C. Loyez¹, L. Clavier¹, D. Pomorski², S. Lallemand³, ¹University of Lille, CNRS, UMR 8520-IEMN, Lille, France, ²University of Lille, CNRS, UMR 9189-CRIStAL, Lille, France, ³Groupe Segula Technologies, Valenciennes, France

---

**WE3C-1 A 94-GHz Five-Port Reflectometer for Measuring Complex Reflection Coefficient using 0.13-µm SiGe HBT Detectors**
J.A. Qayyum¹, A.A. Nawaz¹, M. Ko², A. Malignaggi¹, A.C. Ulusoy¹, ¹Michigan State University, East Lansing, United States, ²IHP GmbH, Frankfurt (Oder), Germany, ³Technische Universität Berlin, Berlin, Germany

---

**WE3C-2 Accurate FMCW Frequency Synthesis Using Six-port Interferometry**
H. Arab¹, C. Akyel², S. Tatu³, ¹INRS-EMT, University of Quebec, Quebec, Canada, ²Ecole Polytechnique of Montreal, Quebec, Canada

---

**WE3C-3 Low-Power Frequency Synthesizer for Multi-Tone Six-Port Radar**
F. Lurz¹, P. Hofstetter², S. Lindner³, S. Lurz¹, F. Michler¹, R. Weigel¹, A. Koelpin³, ¹Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany, ²University of Bayreuth, Bayreuth, Germany, ³Brandenburg University of Technology, Cottbus, Germany
Enjoy the wonderful Hyatt Regency Hotel's Amenities!

WISNET Session: WE4D
Sensors for IoT Applications

Chair: Luca Roselli, University of Perugia
Co-Chair: Kamal Samanta, Zuken
Room: Garden 3

15:40
WE4D-1 Analysis of a Multi-Node System for Crack Monitoring Based on Zero-Power Wireless Harmonic Transponders on Paper
V. Palazzi, F. Alimenti, P. Mezzanotte, G. Orecchini, L. Roselli, University of Perugia, Perugia, Italy

16:00
WE4D-2 Battery-less UHF RFID Controlled Transistor Switch for Internet of Things Applications - A Feasibility Study
M. Ferdik, G. Saxl, T. Ussmueller, University of Innsbruck, Innsbruck, Austria

16:20
WE4D-3 Ultra-Low-Power Ring Oscillator based True Random Number Generator for Passive UHF RFID Tags
G. Saxl, M. Ferdik, T. Ussmueller, University of Innsbruck, Innsbruck, Austria

16:40
WE4D-4 Measurement Results of Vehicular RCS Characteristics for 79 GHz Millimeter Band
T. Motomura, K. Uchiyama, A. Kajiwara, University of Kitakyushu, Kitakyushu, Japan

17:00
WE4D-5 Ultra-Low-Power Sensor-Node with Wake-Up-Functionality for Smart-Sensor-Applications
F. Pflaum1, R. Weigel1, A. Koelpin2,
1Friedrich-Alexander-University of Erlangen-Nuremberg, Erlangen, Germany;
2Brandenburg University of Technology, Cottbus, Germany

Platinum Sponsors:

Virginia Diodes, Inc. | NATIONAL INSTRUMENTS
## Industry Exhibits

**Room: Grand Ballroom A-D**

**Monday, 15 January**
13:00 – 19:30

**Tuesday, 16 January**
13:00 – 17:00

| Exhibitor                                | Booth |
|------------------------------------------|-------|
| Maury Microwave Corporation             | 101   |
| Marki Microwave, Inc.                    | 103   |
| NPI Services                             | 105   |
| MOSIS                                    | 200   |
| Mitsubishi Electric US                   | 201/300 |
| CST America                              | 202   |
| IHP GmbH                                 | 203   |
| Advanced Test Equipment Rentals          | 204   |
| National Instruments                     | 205   |
| Itelite Antennas, Inc                    | 302   |
| Virginia Diodes, Inc.                    | 304   |

---

**Exhibition/Poster Presentation Floor Map (Grand Ballroom):**
**Hotel Maps**

**First Floor**

**Directions to the Hyatt Regency Orange County**

**Address:**
11999 Harbor Blvd.
Garden Grove, CA 92840

**Telephone:**
+1 714 750 1234

**From Los Angeles Int’l Airport (LAX):**
I-105 East to I-605 South to CA-91 East to I-5 South

Exit Harbor Boulevard South (Exit 110A)

Our Orange County hotel is 1.8 miles on right, at Chapman and Harbor

**From Orange County/John Wayne Airport (SNA):**
I-405 North to CA-55 North to I-5 North

Exit Chapman Avenue

Turn left on Chapman Avenue
Our Orange County hotel is 1.5 miles on right, at Chapman and Harbor

**From Hyatt Regency Orange County to Disneyland® Resort Anaheim:**
Head south on Harbor Boulevard

U-turn at W. Manchester Avenue

Entrance to Disneyland Resort will be on immediate right
| Activity               | Location            | Sunday          | Monday          | Tuesday         | Wednesday       |
|-----------------------|---------------------|-----------------|-----------------|-----------------|-----------------|
| RWW Workshops         | Garden 2            | 13:30-17:30     |                 |                 |                 |
|                       | Garden 3            |                 |                 |                 |                 |
|                       | Royal Ballroom C-D  |                 |                 |                 | 13:30-17:30     |
| Young Professionals   | Grand Ballroom E-G  |                 |                 |                 | 16:40-18:40     |
| PaWR Panel            | Grand Ballroom E-G  | 19:00-20:30     |                 |                 |                 |
| IoT Summit            | Royal Ballroom E-F  | 13:00-17:00     | 09:00-17:30     |                 |                 |
| RWW Plenary           | Grand Ballroom E-G  | 10:10-12:00     |                 |                 |                 |
| RWS Sessions          | Garden 1,4          | 8:00-9:40       | 10:10-11:30     | 13:30-15:10     | 8:00-9:40       |
|                       |                     | 15:10-16:50     | 10:10-11:50     |                 | 13:30-15:10     |
| SIRF Sessions         | Garden 2, 4         | 8:00-9:20       | 10:10-11:10     | 13:30-15:10     | 8:00-9:20       |
|                       |                     | 15:40-17:20     | 10:10-11:10     |                 | 15:40-17:20     |
| PaWR Sessions         | Garden 3            | 8:00-9:40       | 10:10-11:50     | 13:30-15:10     | 8:00-9:40       |
|                       |                     | 15:40-17:20     | 10:10-11:50     |                 | 15:40-17:20     |
| TWIoS Sessions        | Garden 3            | 8:00-9:40       |                 | 15:10-16:50     | 8:00-9:40       |
|                       |                     |                 | 15:10-16:50     |                 |                 |
| WiSNet Sessions       | Garden 3            | 8:00-9:40       |                 |                 | 8:00-9:40       |
|                       |                     |                 |                 |                 | 10:10-11:50     |
|                       |                     |                 |                 |                 | 13:30-15:10     |
|                       |                     |                 |                 |                 | 16:40-17:20     |
| Distinguished Lectures | Garden 4            | 9:00-9:20       | 10:10-11:30     |                 |                 |
| I & II                |                     |                 |                 |                 |                 |
| Student Paper Contest | Royal A             | 09:00-09:40     | 10:10-11:30     | 15:40-17:00     |                 |
| Oral Session          |                     |                 |                 |                 |                 |
| Student Paper Poster  | Grand Ballroom A-D  |                 |                 | 13:30-14:50     | 12:55-14:30     |
| Contest               |                     |                 |                 |                 |                 |
| Interactive Poster    |                     |                 |                 |                 |                 |
| Sessions              |                     |                 |                 |                 |                 |
| Exhibits              | Grand Ballroom A-D  | 13:00-19:30     | 13:00-17:00     |                 |                 |
| Demo Track            |                     | 15:40-17:00     |                 |                 |                 |
| RWW Reception         | Grand Ballroom A-D  |                 | 18:00-19:00     |                 |                 |
|                        |                     |                 |                 | 17:00-18:00     |                 |
| Closing the Show/     | Grand Ballroom A-D  |                 |                 |                 |                 |
| Networking Event      |                     |                 |                 | 17:00-18:00     |                 |
| Breakfast             | Grand Ballroom Foyer|                 |                 |                 |                 |
| AM Coffee Break       | Exhibit Area (Main | 9:40-10:10      |                 |                 |                 |
|                       | Tues.,) & Grand     |                 |                 |                 |                 |
|                       | Ballroom Foyer      | 9:40-10:10      |                 |                 |                 |
|                       | (Wed.)              |                 |                 |                 |                 |
| PM Coffee Break       |                     | 15:10-15:40     |                 |                 | 15:10-15:40     |
|                       |                     |                 |                 |                 | 15:10-15:40     |
|                       |                     |                 |                 |                 | 15:10-15:40     |