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**Pages 1-563**



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## Tu1A: Integrated Millimeter-Wave Radar Systems

Chair: Jacquelyn Vitaz, Raytheon Technologies, USA — Co-Chair: Suresh Venkatesh, North Carolina State University, USA  
Room 201, 08:00–09:40, Tuesday 17 June 2025

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- (MWTL)  **C** **A Fully Integrated Ka-Band FMCW Radar SoC with Baseband Accelerator for Vital Signs Monitoring in 40-nm CMOS**  
Pengfei Diao<sup>1</sup>, Chenyu Xu<sup>1</sup>, Ning Jiang<sup>1</sup>, Xiaofei Liao<sup>1</sup>, Bo Wang<sup>2</sup>, Peng Zhang<sup>1</sup>,  
Ning Zhang<sup>2</sup>, Yang Li<sup>2</sup>, Qisong Wu<sup>1</sup>, Dixian Zhao<sup>1</sup>  
<sup>1</sup>Southeast University, China  ; <sup>2</sup>Purple Mountain Laboratories, China 
- PAGE 1  **C** **A D-Band 1Tx 4Rx Mid-Range Automotive CMOS FMCW Radar**  
Seuk-Won Kang<sup>1</sup>, Dong-Yeol Yang<sup>1</sup>, Jeong-Bae Yoon<sup>1</sup>, Jae-Hyun Park<sup>1</sup>, Ye-Ju Han<sup>1</sup>,  
Seung-Yeon Kim<sup>1</sup>, Reem Song<sup>1</sup>, Kang-In Lee<sup>2</sup>, Byung-Sung Kim<sup>1</sup>  
<sup>1</sup>Sungkyunkwan University, Korea  ; <sup>2</sup>Hyundai Motor Group, Korea 
- PAGE 5  **C** **An 120GHz 8×8 FMCW MIMO Radar System With 90° Biaxial FOV for Autonomous Navigation of UAVs in 3-D Space**  
Tobias Welling<sup>1</sup>, David Starke<sup>2</sup>, Christian Bredendiek<sup>3</sup>, Valentina Palazzi<sup>4</sup>,  
Tobias T. Braun<sup>1</sup>, Nils Pohl<sup>1</sup>  
<sup>1</sup>Ruhr-Universität Bochum, Germany  ; <sup>2</sup>Fraunhofer IMS, Germany  ; <sup>3</sup>Fraunhofer FHR, Germany  ; <sup>4</sup>Università di Perugia, Italy 
- PAGE 9  **C** **A 94GHz 8Tx-16Rx Direct Center-Fed Active Array TD-MIMO FMCW Radar in 28-nm CMOS**  
Dong-Yeol Yang, Seuk-Won Kang, Jae-Hyun Park, Jeong-Bae Yoon, Seung-Yeon Kim,  
Jae-Won Lee, Hyun-Hwan Choi, Byung-Sung Kim, Sungkyunkwan University, Korea 
- PAGE 13  **C** **Radar-Based Measurement of Image Rejection Ratio in Sub-THz Hartley Receivers with its Impact on Doppler Detection Accuracy**  
Chinmaya Tripathy, Hsiang-En Wang, Yun-Tang Li, Tzzy-Sheng Horng, Wei-Chih Su,  
National Sun Yat-sen University, Taiwan 

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## Tu1B: Innovative High-Speed Communication Links

Chair: Shreyas Sen, Purdue University, USA — Co-Chair: Edward Niehenke, Niehenke Consulting, USA  
Room 208, 08:00–09:40, Tuesday 17 June 2025

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- (MWTL)  **C** **Double HOOK: A 140GHz 15Gb/s Reconfigurable 3-Level ASK Modulator with Constant Input Impedance for High-Speed Connectivity**  
Haoling Li<sup>1</sup>, Kyle Richard<sup>2</sup>, Duschia Bodet<sup>1</sup>, Najme Ebrahimi<sup>1</sup>  
<sup>1</sup>Northeastern University, USA  ; <sup>2</sup>Keysight Technologies, USA 
- PAGE 17  **C** **A V-Band OOK Transmitter with 14.5Gbps Data Rate and 11.1% DC-to-RF Efficiency in 65nm CMOS**  
Yi Wu<sup>1</sup>, Junhong Liu<sup>1</sup>, Guangyin Feng<sup>1</sup>, Zhe Yang<sup>1</sup>, Rongbin Liu<sup>1</sup>, Shaoxian Li<sup>1</sup>,  
Chuang Hu<sup>2</sup>, Xiuyin Zhang<sup>1</sup>  
<sup>1</sup>SCUT, China  ; <sup>2</sup>CAS, China 
- PAGE 21  **C** **A Receiver-Assisted Joint Linearization Scheme for U6G Uplink Coverage Enhancement**  
Qirui Ma, Yuyang Xiong, Mengyao Zhang, Xiaozheng Wei, Ying Liu, UESTC, China 
- PAGE 25  **C** **Hardware-Software Platform Enabling Joint Communication and Radar Sensing at 25GHz with 1GHz Bandwidth**  
Sandra George<sup>1</sup>, Padmanava Sen<sup>1</sup>, Mehrab Ramzan<sup>1</sup>, Muhammad Umar<sup>1</sup>,  
Yash Richhariya<sup>1</sup>, Jan Adler<sup>1</sup>, Corrado Carta<sup>2</sup>  
<sup>1</sup>Barkhausen Institut, Germany  ; <sup>2</sup>IHP, Germany 

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## Tu1C: Microwave Photonics Radars, Signal Generators, Radio-Over-Fiber Transmitters, and Integrated Circuits

Chair: Siva Yegnanarayanan, MIT Lincoln Laboratory, USA — Co-Chair: Jonathan Comeau, BAE Systems, USA

Room 210, 08:00–09:40, Tuesday 17 June 2025

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- PAGE 29  
Tu1C-1  
8:00  **Field Trial of a Coastal Surveillance System Exploiting a Multistatic Multiband Photonics-Based Radar in Coherent Sparse MIMO Configuration**  
*Mirco Scaffardi<sup>1</sup>, Filippo Scotti<sup>1</sup>, Antonio Malacarne<sup>1</sup>, Malik Muhammad Haris Amir<sup>2</sup>, Salvatore Maresca<sup>3</sup>, Paolo Ghelfi<sup>1</sup>, Antonella Bogoni<sup>1</sup>*  
<sup>1</sup>CNIT, Italy  ; <sup>2</sup>Scuola Superiore Sant'Anna, Italy  ; <sup>3</sup>CNR-IEIT, Italy 
- PAGE 33  
Tu1C-2  
8:20  **Ultra-Low Phase Noise Frequency Synthesis Using Electro-Optic Detector-Based Comb-Microwave Synchronization**  
*Vijayalakshmi Surendranath-Shroff, Meysam Bahmanian, J. Christoph Scheytt, Universität Paderborn, Germany *
- PAGE 37  
Tu1C-3  
8:40  **Multi-Channel Integrated Microwave Photonic Transmitter for Radio-over-Fiber Systems**  
*Valentina Gemmato<sup>1</sup>, Filippo Scotti<sup>2</sup>, Luca Rinaldi<sup>2</sup>, Paolo Ghelfi<sup>2</sup>, Antonella Bogoni<sup>1</sup>*  
<sup>1</sup>Scuola Superiore Sant'Anna, Italy  ; <sup>2</sup>CNIT, Italy 
- PAGE 41  
Tu1C-4  
9:00  **A 22nm CMOS 15–25GHz Dual-Differential Driver for RF Silicon Photonic Front-End**  
*Yu-Lun Luo, Dharma Paladugu, Christi Madsen, Kamran Entesari, Samuel Palermo, Texas A&M University, USA *
- N/A  
Tu1C-5  
9:20  **Programmable Microwave Photonic Processor in the Thin-Film Lithium Niobate Platform**  
*Chuangchuang Wei, Kaixuan Ye, David Marpaung, Universiteit Twente, The Netherlands *

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## Tu1D: High-Power and High-Frequency Doherty Power Amplifiers

Chair: Gayle Collins, Obsidian Microwave, USA — Co-Chair: Yulong Zhao, Skyworks, Canada

Room 211, 08:00–09:40, Tuesday 17 June 2025

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- N/A  
Tu1D-1  
8:00  **Load Modulated Power Amplifiers for Wireless Infrastructure**  
*Rui Hou, Ericsson, Sweden *
- PAGE 49  
Tu1D-2  
8:20  **A 7GHz High Efficiency GaN Doherty Power Amplifier Module for 5G Massive MIMO Base-Station**  
*Shuichi Sakata, Kento Saiki, Yuta Fuchibe, Katsuya Kato, Hitoshi Kurusu, Yoshinobu Sasaki, Shintaro Shinjo, Mitsubishi Electric, Japan *
- PAGE 53  
Tu1D-3  
8:40  **A 90W High-Efficiency Four-Way Doherty Power Amplifier with 37.8% Fractional Bandwidth Over a 15dB Power Back-Off Range**  
*Lei Zhou, Lianbo Liu, Marco Pelk, Abdul Raheem Qureshi, Leo C.N. de Vreede, Technische Universiteit Delft, The Netherlands *
- PAGE 57  
Tu1D-4  
9:00  **A 400W Symmetric Doherty Power Amplifier Covering 1.8–2.7GHz**  
*Paul Saad, Mats Helgöstm, Rui Hou, Ericsson, Sweden *

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## Tu1E: Quantum Computing Technologies

Chair: Joseph C. Bardin, Google, USA — Co-Chair: Abbas Omar, OvG Universität Magdeburg, Germany

Room 215, 08:00–09:40, Tuesday 17 June 2025

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- PAGE 61  
Tu1E-1  
8:00  **C** **A Cryogenic Front-End Module Applied to Readout Two-Qubits with FDM Technology in Superconducting Quantum Computing System**  
*Che-Hao Li<sup>1</sup>, Chien-Nan Kuo<sup>2</sup>, Chang-Sheng Chen<sup>1</sup>, Shyh-Shyuan Sheu<sup>1</sup>, Chii-Dong Chen<sup>3</sup>, Po-Yuan Hsu<sup>1</sup>, Li-Chieh Hsiao<sup>3</sup>, Li-Wei Chang<sup>3</sup>*  
<sup>1</sup>ITRI, Taiwan  ; <sup>2</sup>NYCU, Taiwan  ; <sup>3</sup>Academia Sinica, Taiwan 
- PAGE 65  
Tu1E-2  
8:20  **C** **Modeling Josephson Traveling-Wave Parametric Amplifiers with Electromagnetic and Circuit Co-Simulation**  
*Likai Yang<sup>1</sup>, Jennifer Wang<sup>2</sup>, Mohamed Awida Hassan<sup>1</sup>, Philip Krantz<sup>1</sup>, Kevin P. O'Brien<sup>2</sup>*  
<sup>1</sup>Keysight Technologies, USA  ; <sup>2</sup>MIT, USA 
- PAGE 69  
Tu1E-3  
8:40  **C** **A Cryogenic Push-Pull Class-C Dual-Mode VCO with 72%-Tuning Range for Quantum Applications**  
*Teng-Shen Yang, Yi-Chieh Chou, Liang-Hung Lu, National Taiwan University, Taiwan*  

- PAGE 73  
Tu1E-4  
9:00  **C** **A Photonic Link at 4.7K with >1GHz Bandwidth Towards an Optical Quantum Computing Interface**  
*Santosh Mutum, Patrick Vliex, Jonas Bühler, Dennis Nielinger, Mario Schlösser, Stefan van Waasen, Forschungszentrum Jülich, Germany* 
- (MWTL)  
Tu1E-5  
9:20  **C** **A Demonstration of Multifloating Superconducting Qubits on a 3-D Flip-Chip Platform with TLS Loss Mitigation via Apertures**  
*Zhen Luo<sup>1</sup>, Thomas Mayer<sup>2</sup>, Daniela Zahn<sup>2</sup>, Carla Moran Guizan<sup>2</sup>, Johannes Weber<sup>2</sup>, Simon Lang<sup>2</sup>, Hannes Bender<sup>2</sup>, Luis Schwarzenbach<sup>2</sup>, Lars Nebrich<sup>2</sup>, Rui Pereira<sup>2</sup>, Amelie Hagelauer<sup>1</sup>*  
<sup>1</sup>Technische Universität München, Germany  ; <sup>2</sup>Fraunhofer EMFT, Germany 

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## Tu1F: Transformative Innovations in Wireless Power Transfer for Smart Cities and Biomedical Applications

Chair: Ifana Mahbub, University of Texas at Dallas, USA — Co-Chair: Dieff Vital, University of Illinois at Chicago, USA

Room 216, 08:00–09:40, Tuesday 17 June 2025

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- (MWTL)  
Tu1F-1  
8:00  **C** **Toward 5G Wireless Power Harvesting: A Promising Broadbeam Equiconvex Lens-Integrated mmWave Harvester for Smart City Environments**  
*Marvin Joshi, Kexin Hu, Charles A. Lynch III, Manos M. Tentzeris, Georgia Tech, USA* 
- (MWTL)  
Tu1F-2  
8:20  **C** **Time-Multiplexed Beam-Steering Antenna Arrays for Extended-Coverage RF Powering of Multiple CMOS Brain Implants**  
*Mohammad Abdolrazzagli, Roman Genov, George V. Eleftheriades, University of Toronto, Canada* 
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Tu1F-3  
8:40  **C** **A Highly Efficient Design of Triple-Band Flexible Rectenna for Ambient RF Energy Harvesting in Passive IoT Applications**  
*Dunyu Chang, Jinling Zhang, BUPT, China* 
- PAGE 81  
Tu1F-4  
9:00  **C** **Power Receiving Circuit Design of Single-Ended Biological Capacitive WPT for Artificial Retina System**  
*Koyuki Makabe, Ryubi Aoyama, Yasumasa Naka, Masaya Tamura, Toyohashi University of Technology, Japan* 
- PAGE 85  
Tu1F-5  
9:20  **C** **Overcoming Efficiency Degradation in Wireless Power Transfer Systems: A Supply Voltage Modulation Method Empowered by 5.64-GHz 256-Element Antenna Array Receiving 10.6-Watt**  
*Taeyeong Yoon<sup>1</sup>, Young-Seok Lee<sup>1</sup>, Minje Kim<sup>1</sup>, Sanghun Lee<sup>1</sup>, Jaesup Lee<sup>2</sup>, Sangwook Nam<sup>1</sup>, Jungsuek Oh<sup>1</sup>*  
<sup>1</sup>Seoul National University, Korea  ; <sup>2</sup>SAIT, Korea 

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## Tu2A: Advanced System Concepts and Signal Processing for Radar and Imaging

Chair: Nils Pohl, Ruhr-Universität Bochum, Germany — Co-Chair: Fabian Lurz, OVG Universität Magdeburg, Germany  
Room 201, 10:10–11:50, Tuesday 17 June 2025

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- (MWTL)  
Tu2A-1  
10:10  **C** **Frequency-Spatial Adaptive Digital Beamforming Technique for Range-Angle Decoupling with High-Resolution MIMO Radar**  
*Jiayu Zhang, Yuchen Li, Zhiwei Zhang, Changzhan Gu, Junfa Mao, SJTU, China* 
- PAGE 89  
Tu2A-2  
10:30  **C** **High-Resolution 3D Radar Imaging with Silicon-Micromachined Sub-THz Frequency-Diverse Antennas**  
*M. Reza Seidi, Joachim Oberhammer, KTH, Sweden* 
- PAGE 93  
Tu2A-3  
10:50  **C** **Clutter-Based Wireless Localization in Distributed Radar Networks with Repeaters**  
*Shivani Sharma, Tasin Nusrat, Stavros Vakalis, University of South Florida, USA* 
- PAGE 97  
Tu2A-4  
11:10  **C** **Joint 4D Radar and Communication System Enabled by Virtual Transceiver Matrix Architecture for Advanced Automotive Sensing and Connectivity**  
*Seyed Ali Keivaan, Pascal Burasa, Ke Wu, Polytechnique Montréal, Canada* 
- PAGE 101  
Tu2A-5  
11:30  **C** **Three-Dimensional Fourier Domain Millimeter-Wave Imaging Using Incoherent Active Illumination and Pulse Compression**  
*Jorge R. Colon-Berrios, Jason M. Merlo, Jeffrey A. Nanzer, Michigan State University, USA* 
- PAGE 105  
Tu2A-6  
11:40  **C** **Repeater-Aided Millimeter-Wave MIMO Radar for Improved Detection of Specular Targets**  
*Tasin Nusrat, Stavros Vakalis, University of South Florida, USA* 

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## Tu2B: MHz-to-THz Systems for Communication and Sensing

Chair: Dieff Vital, University of Illinois at Chicago, USA  
Co-Chair: Rashaunda Henderson, University of Texas at Dallas, USA  
Room 208, 10:10–11:50, Tuesday 17 June 2025

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- N/A  
Tu2B-1  
10:10  **C** **Interaction of EM-Fields with Human Body for Efficient Communication: Body as a Wire and Body as a Transmission-Line**  
*Shreyas Sen, Ixana, USA* 
- PAGE 110  
Tu2B-2  
10:30  **C** **60 Mbps Time-Domain Video Transfer Using Body Communication**  
*Gourab Barik, Samyadip Sarkar, Shreyas Sen, Purdue University, USA* 
- PAGE 114  
Tu2B-3  
10:50  **C** **Body-Resonance Human Body Powering**  
*Samyadip Sarkar, Lingke Ding, Shreyas Sen, Purdue University, USA* 
- PAGE 118  
Tu2B-4  
11:10  **C** **Enhanced Channel Capacity Underwater Multi-Diver Communication with Dual-Resonant Magnetoquasistatic Coupling**  
*Sukriti Shaw, David Yang, Gourab Barik, Shreyas Sen, Purdue University, USA* 
- PAGE 122  
Tu2B-5  
11:30  **C** **Intelligent Smoke Detection: State Recognition and Monitoring of Heating Processes Using FMCW Radar and Data-Driven Algorithms**  
*Francesca Schenkel, Robin Schmitz, Christoph Baer, Jan Barowski, Ilona Rolfes, Christian Schulz, Ruhr-Universität Bochum, Germany* 

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## Tu2C: THz Photonics: Components and Systems

Chair: Mona Jarrahi, University of California, Los Angeles, USA — Co-Chair: Steven M. Bowers, University of Virginia, USA  
Room 210, 10:10-11:50, Tuesday 17 June 2025

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- PAGE 126  
Tu2C-1  
10:10  **C** **Monolithically Integrated Optoelectronic Terahertz Sources and Detectors on Quantum Well PIN Substrates**  
*Yifan Zhao, Shahed-E- Zumrat, Mona Jarrahi, University of California, Los Angeles, USA* 
- N/A  
Tu2C-2  
10:30  **C** **On-Chip Photonic THz Emitter with Integrated InGaAs UTC-PD and 2×2 MPA Array on SiC Substrate**  
*Ming Che, Yoshiki Kamiura, Ryo Doi, Kazutoshi Kato, Kyushu University, Japan* 
- PAGE 134  
Tu2C-3  
10:50  **C** **An Ultra-Low-Noise 600–700GHz Heterodyne Terahertz Receiver for Ground-Based Astronomy Observations**  
*Joseph J. Hwang, Szu-An Tsao, Mona Jarrahi, University of California, Los Angeles, USA* 
- PAGE 138  
Tu2C-4  
11:10  **C** **High Sensitivity W-Band LEKID-Based On-Chip Polarimeter**  
*M.C. de Ory<sup>1</sup>, V. Rollano<sup>1</sup>, M. Calvo<sup>2</sup>, D. Rodriguez<sup>1</sup>, A. Pascual Laguna<sup>1</sup>, U. Chowdhury<sup>2</sup>, F. Levy-Bertrand<sup>2</sup>, M.T. Magaz<sup>1</sup>, B. Aja<sup>3</sup>, L.M. de la Fuente<sup>3</sup>, D. Granados<sup>4</sup>, J. Martin-Pintado<sup>1</sup>, A. Monfardini<sup>2</sup>, A. Gomez<sup>1</sup>*  
<sup>1</sup>Centro de Astrobiología, Spain  ; <sup>2</sup>Institut Néel (UPR 2940), France  ; <sup>3</sup>Universidad de Cantabria, Spain  ; <sup>4</sup>IMDEA Nanociencia, Spain 
- PAGE 142  
Tu2C-5  
11:30  **C** **100-Gbps Fiber-Terahertz System in 330-GHz Band Using Stable Transmitter and Simple Photonics-Enabled Receiver**  
*Pham Tien Dat, Yuya Yamaguchi, Keizo Inagaki, Naokatsu Yamamoto, Norihiko Sekine, Kouichi Akahane, NICT, Japan* 

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## Tu2D: High-Power GaN Transmit Components

Chair: Charles F. Campbell, Qorvo, USA — Co-Chair: Anna Piacibello, Politecnico di Torino, Italy  
Room 211, 10:10-11:50, Tuesday 17 June 2025

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- (MWTL)  
Tu2D-1  
10:10  **C** **RF-Input Doherty-Like Load-Modulated Balanced Amplifier with Decade Bandwidth Enabled by Novel Broadband 180° Power Divider**  
*Pingzhu Gong, Niteesh Bharadwaj Vangipurapu, Jiachen Guo, Kenle Chen, University of Central Florida, USA* 
- (MWTL)  
Tu2D-2  
10:30  **C** **An Integrated Doherty Power Amplifier Module Based on an Advanced GaN-on-Si HEMT Technology and a Wideband Power Combiner**  
*Mustazar Iqbal<sup>1</sup>, Ioannis Peppas<sup>2</sup>, Marco Pitton<sup>1</sup>, Peter Singer<sup>1</sup>*  
<sup>1</sup>Infineon Technologies, Austria  ; <sup>2</sup>Technische Universität Graz, Austria 
- PAGE 146  
Tu2D-3  
10:50  **C** **System-in-Package Doherty Power Amplifier Using Hybrid LDMOS/GaN Line-Up for 5G Macro Driver Applications**  
*Alexis Courty, Kaisseh Houssein, Walid Rili, Christophe Quindroit, Mariano Ercoli, Stephan Maroldt, Ampleon, France* 
- PAGE 150  
Tu2D-4  
11:10  **C** **10 Watt CW Power Handling SPDT RF Switch Using E-Mode p-GaN Dual-Gate HEMT Technology**  
*Hsien-Chin Chiu<sup>1</sup>, Chia-Han Lin<sup>1</sup>, Chia-Hao Yu<sup>1</sup>, Chong-Rong Huang<sup>1</sup>, Hsuan-Ling Kao<sup>1</sup>, Hsiang-Chun Wang<sup>2</sup>, Po-Tsung Tu<sup>2</sup>, Barry Lin<sup>3</sup>*  
<sup>1</sup>Chang Gung University, Taiwan  ; <sup>2</sup>ITRI, Taiwan  ; <sup>3</sup>Wavetek Microelectronics, Taiwan 

## Tu2E: AI for Device, DPD and RF System Design

Chair: Arnaldo S.R. Oliveira, Universidade de Aveiro, Portugal — Co-Chair: Sensen Li, University of Texas at Austin, USA  
Room 215, 10:10–11:50, Tuesday 17 June 2025

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- PAGE 154  
Tu2E-1  
10:10  **C** **An Embedded-Structured Convolutional Neural Network for Efficient RF Device Behavior Model Extraction**  
*Jiahao Wang, Jiangtao Su, Haode Li, Tangyu Fu, Yuxiu Tong, Kuiwen Xu, Wenjun Li, Hangzhou Dianzi University, China* 
- (MWTL)  
Tu2E-2  
10:30  **C** **DeltaDPD: Exploiting Dynamic Temporal Sparsity in Recurrent Neural Networks for Energy-Efficient Wideband Digital Predistortion**  
*Yizhuo Wu<sup>1</sup>, Yi Zhu<sup>2</sup>, Kun Qian<sup>1</sup>, Qinyu Chen<sup>3</sup>, Anding Zhu<sup>4</sup>, John Gajadharsing<sup>2</sup>, Leo C.N. de Vreede<sup>1</sup>, Chang Gao<sup>1</sup>*  
<sup>1</sup>Technische Universiteit Delft, The Netherlands  ; <sup>2</sup>Ampleon, The Netherlands  ;  
<sup>3</sup>Universiteit Leiden, The Netherlands  ; <sup>4</sup>University College Dublin, Ireland 
- PAGE 158  
Tu2E-3  
10:50  **C** **Enhancing Digital Predistortion Performance Under Load Mismatch Using a VSWR Generative Neural Network Simulator**  
*Erez Loeb<sup>1</sup>, Nimrod Ginzberg<sup>2</sup>, Emanuel Cohen<sup>1</sup>*  
<sup>1</sup>Technion, Israel  ; <sup>2</sup>Tel Aviv University, Israel 
- PAGE 162  
Tu2E-4  
11:10  **C** **Recurrent Neural Network Modeling of Radio Frequency Amplifiers for System-Level Simulation and Design**  
*Joshua Corsello, Alan Preciado-Grijalva, Sergey Shaboyan, Kevin Wray, Lavanya Rau, Daniel Kultran, Epirus, USA* 

Tu2E continues next page ...

Tu2E continued ...

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Tu2E-5  
11:20  **C** **Calibration of Wideband Multiport Junction Receivers Using Memory-Polynomial-Informed Neural Network**  
*Lojain Syed<sup>1</sup>, Khurram Khan<sup>1</sup>, Saad Qayyum<sup>1</sup>, Mohsin Tarar<sup>2</sup>, Renato Negra<sup>3</sup>*  
<sup>1</sup>PAF IAST, Pakistan  ; <sup>2</sup>University of Chakwal, Pakistan  ; <sup>3</sup>RWTH Aachen University, Germany 
- PAGE 170  
Tu2E-6  
11:30  **C** **AdaAFE-CIM: A Hardware Implementation of Subspace Tracking for Adaptive Radar Data Compression**  
*Alex Saad-Falcon, Wei-Chun Wang, Laith Shamieh, Jinhyeok Park, Xiangyu Mao, Saibal Mukhopadhyay, Justin Romberg, Georgia Tech, USA* 

## Tu2F: Advances in RF Rectification and Efficiency Optimization for Wireless Power Transfer Applications

Chair: Jasmin Grosinger, Technische Universität Graz, Austria

Co-Chair: Nuno Carvalho, Universidade de Aveiro, Portugal

Room 216, 10:10–11:50, Tuesday 17 June 2025

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Tu2F-1  
10:10  **C** **A Differential Rectifier Design Based on Impedance Splitting and Compression Technique for Achieving > 70%  $\eta_{\text{RF-DC}}$  Over 13dBm Input Dynamic Power Range**  
*Rafsan Mahin, Ifana Mahbub, University of Texas at Dallas, USA* 
- PAGE 178  
Tu2F-2  
10:30  **C** **High-Power Quasi-Vertical GaN Schottky Barrier Diode RF Rectifier Based on Impedance Compression Network for WPT Applications**  
*Xiaochen Yu<sup>1</sup>, Ya-Xun Lin<sup>1</sup>, Jiafeng Zhou<sup>1</sup>, Ta-Jen Yen<sup>2</sup>, Ivona Z. Mitrovic<sup>1</sup>, Yi Huang<sup>1</sup>, Yejun He<sup>3</sup>, Chaoyun Song<sup>3</sup>*  
<sup>1</sup>University of Liverpool, UK ; <sup>2</sup>National Tsing Hua University, Taiwan ; <sup>3</sup>Shenzhen University, China 
- PAGE 182  
Tu2F-3  
10:50  **C** **1.9GHz–4.1GHz CMOS Rectifier with Over 48% Efficiency Using Inductive Feedback and CRT Reduction for Beamforming WPT**  
*Babita Gyawali<sup>1</sup>, Willy Jordan<sup>1</sup>, Ramesh K. Pokharel<sup>2</sup>, Adel Barakat<sup>1</sup>*  
<sup>1</sup>Kyushu University, Japan ; <sup>2</sup>Binghamton University, USA 
- PAGE 186  
Tu2F-4  
11:10  **C** **27-GHz Silicon-Integrated Rectenna Based on Novel Multilayer Substrate**  
*S. Trovarelo<sup>1</sup>, M. Aldrigo<sup>2</sup>, D. Vasilache<sup>2</sup>, C. Parvulescu<sup>2</sup>, D. Masotti<sup>2</sup>, M. Dragoman<sup>2</sup>, A. Costanzo<sup>1</sup>*  
<sup>1</sup>Università di Bologna, Italy ; <sup>2</sup>IMT Bucharest, Romania 
- N/A  
Tu2F-5  
11:30  **C** **Compact Design of Highly-Efficient Dual-Band Voltage Doubler Rectifier by Using Second-Harmonics Suppression for Wireless Power Transfer**  
*Gia Thang Bui<sup>1</sup>, Hieu Trung Vu<sup>1</sup>, Dang-An Nguyen<sup>1</sup>, Kyusik Woo<sup>1</sup>, Won Ho Jang<sup>2</sup>, Chulhun Seo<sup>1</sup>*  
<sup>1</sup>Soongsil University, Korea ; <sup>2</sup>Korea Radio Promotion Association, Korea 

## Tu3A: Innovations in Biomedical Devices: Exploring Advanced Systems, Devices and Concepts

Chair: Jan Wessel, Fraunhofer FHR, Germany — Co-Chair: Christian Damm, Universität Ulm, Germany

Room 201, 13:30–15:10, Tuesday 17 June 2025

- (MWTL)  
Tu3A-1  
13:30  **C** **Passive Subcutaneous Microwave Thermometry with Spatial Pattern Diversity**  
*Jooeun Lee, Zoya Popović, University of Colorado Boulder, USA* 
- PAGE 194  
Tu3A-2  
13:50  **C** **Advanced Immunoassay Detection Using Microwave Whispering Gallery Mode Resonators**  
*S. Gigoyan<sup>1</sup>, M.R. Nezhad-Ahmadi<sup>1</sup>, A. Charchoglyan<sup>2</sup>, A. Abrahamyan<sup>2</sup>*  
<sup>1</sup>mmSense Technologies, Canada ; <sup>2</sup>ImmunoCeutica, Canada 
- PAGE 198  
Tu3A-3  
14:10  **C** **Numerical Testbench for a priori Uncertainty Estimation of Dielectric Spectroscopy in Organ-on-Chip Devices**  
*T.B. Hosman, E. Shokrolahzade, M. Mastrangeli, Marco Spirito, Technische Universiteit Delft, The Netherlands* 
- PAGE 202  
Tu3A-4  
14:30  **C** **A 0.3dB-NF SiGe LNA Array for 10.5T Multi-Channel MRI Receivers**  
*Alireza Rouhafza, Russell L. Lagore, Gregor Adriany, Kamil Ugurbil, Yahya Tousei, University of Minnesota, USA* 
- PAGE 206  
Tu3A-5  
14:50  **C** **Resonance Frequency Retuning System for Flexible MRI Coils**  
*Folk Narongrit, Thejas Vishnu Ramesh, Joseph V. Rispoli, Purdue University, USA* 
- PAGE 210  
Tu3A-6  
15:00  **C** **Fano-Resonance-Based THz Metasurface for Psoriasis Skin Detection**  
*Haiying Lu<sup>1</sup>, Chenxi Liu<sup>1</sup>, Xian Zhang<sup>2</sup>, Fei Yang<sup>1</sup>, Yanting Wen<sup>2</sup>*  
<sup>1</sup>Southeast University, China ; <sup>2</sup>Nanjing University, China 

## Tu3B: Advances in Sub-THz and mm-Wave Phased Array Systems

Chair: Negar Reiskarimian, MIT, USA — Co-Chair: Nizar Messaoudi, Keysight Technologies, Canada

Room 208, 13:30-15:10, Tuesday 17 June 2025

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- (MWTL)  
Tu3B-1  
13:30  **C** **150GHz-Band Compact Phased-Array AiP Module for XR Applications Toward 6G**  
*Yohei Morishita<sup>1</sup>, Ken Takahashi<sup>1</sup>, Ryosuke Hasaba<sup>1</sup>, Akihiro Egami<sup>1</sup>, Tomoki Abe<sup>1</sup>, Masatoshi Suzuki<sup>1</sup>, Tomohiro Murata<sup>1</sup>, Yoichi Nakagawa<sup>1</sup>, Yudai Yamazaki<sup>2</sup>, Sunghwan Park<sup>2</sup>, Takaya Uchino<sup>2</sup>, Chenxin Liu<sup>2</sup>, Jun Sakamaki<sup>2</sup>, Takashi Tomura<sup>2</sup>, Hiroyuki Sakai<sup>2</sup>, Hiroshi Taneda<sup>3</sup>, Kei Murayama<sup>3</sup>, Yoko Nakabayashi<sup>3</sup>, Shinsuke Hara<sup>4</sup>, Issei Watanabe<sup>4</sup>, Akifumi Kasamatsu<sup>4</sup>, Kenichi Okada<sup>2</sup>, Koji Takinami<sup>1</sup>*  
<sup>1</sup>Panasonic, Japan **A** ; <sup>2</sup>Science Tokyo, Japan **A** ; <sup>3</sup>Shinko Electric Industries, Japan **A** ; <sup>4</sup>NICT, Japan **A**
- PAGE 214  
Tu3B-2  
13:50  **C** **A 28GHz Beamformer Element Demonstration Using Monolithically Integrated GaN and Si Transistors in 300mm GaN-on-Si Technology**  
*Qiang Yu, Ibukunoluwa Momson, Ali Farid, Georgios Dogiamis, Samuel Bader, Sing-Wai Tang, Jeffrey Garrett, Derek Thomson, Linli Xie, Marko Radosavljevic, Heli Vora, Michael Beumer, Marc Tiebout, Gerhard Knoblinger, Said Rami, Han Wui Then, Intel, USA **A***
- PAGE 218  
Tu3B-3  
14:10  **C** **Ka-Band 4×4 Butler Matrix-Based Switched Beamformer Supporting Uniform EIRP Beams in Single-/Dual-Port Excitations**  
*Youngjoo Lee, Hongseok Choi, Dohoon Chun, Byung-Wook Min, Yonsei University, Korea **A***
- PAGE 222  
Tu3B-4  
14:30  **C** **Body Proximity Detection Based on Reflections of Multi-Antenna Uplink Transmission from a 5G Mobile Handset**  
*Viduneth Ariyaratna, Oren Eliezer, Gennady Feygin, Wan Jong Kim, Pranav Dayal, Bhupinder Singh, Hou-Shin Chen, Samsung, USA **A***

*Tu3B continues next page ...*

*Tu3B continued ...*

- PAGE 226  
Tu3B-5  
14:50  **C** **Dual-Band Near-Field Probing Antenna for Enhancing the Performance of Dual-Band Shared-Aperture Linear-Polarized Phased Antenna Arrays**  
*Huixin Jin, Ahmed Ben Ayed, Slim Boumaiza, University of Waterloo, Canada **A***

## Tu3C: Memorial Session: Al Katz and the Development of Analog Linearization

Chair: Frederick H. Raab, Green Mountain Radio Research, USA — Co-Chair: Marc Franco, MACOM, USA

Room 210, 13:30–15:10, Tuesday 17 June 2025

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- Tu3C-1  
13:30  **Recollections of Al Katz**  
*Sally Katz, Linearizer Technology, USA *
- Tu3C-2  
13:50  **Al Katz and Amateur Radio**  
*Marc Franco, MACOM, USA *
- Tu3C-3  
14:10  **History of Linearizer Technology, Inc.**  
*Roger Dorval, MACOM, USA *
- Tu3C-4  
14:30  **Predistortion Linearization: Concepts, the State of the Art, and the Future**  
*Christopher Tenev, MACOM, USA *
- Tu3C-5  
14:50  **Recollections of Al Katz**

## Tu3D: Sub-Terahertz and Terahertz Signal Sources

Chair: Hamed Rahmani, New York University, USA — Co-Chair: Richard Al Hadi, ÉTS Montréal, Canada

Room 211, 13:30–15:10, Tuesday 17 June 2025

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- PAGE 230  
Tu3D-1  
13:30  **A 4–240-GHz InP Variable-Gain Amplifier Using an Analog-Controlled Input Attenuation Network**  
*Phat T. Nguyen<sup>1</sup>, Viet-Anh Ngo<sup>1</sup>, Nhat Tran<sup>1</sup>, Natalie S. Wagner<sup>2</sup>, Alexander N. Stameroff<sup>2</sup>, Anh-Vu Pham<sup>1</sup>*  
*<sup>1</sup>University of California, Davis, USA  ; <sup>2</sup>Keysight Technologies, USA *
- (MWTL)  
Tu3D-2  
13:50  **A 4–420-GHz Distributed Amplifier MMIC in a 20-nm InGaAs-on-Si HEMT Technology with 11±2dB Gain**  
*Fabian Thome, Arnulf Leuther, Fraunhofer IAF, Germany *
- PAGE 234  
Tu3D-3  
14:10  **A 280GHz Sub-Harmonic Injection Locked Oscillator in 45nm CMOS PD SOI**  
*Mehmet Aylar, Alexandre Siligaris, José-Luis Gonzalez Jimenez, Benjamin Blampey, CEA-Leti, France *
- PAGE 238  
Tu3D-4  
14:30  **300-GHz-Band Single-Balanced Resistive Mixer Module in 60-nm InP HEMT Technology with LO Leakage Suppressing Function**  
*Teruo Jyo<sup>1</sup>, Hiroshi Hamada<sup>1</sup>, Takuya Tsutsumi<sup>2</sup>, Daisuke Kitayama<sup>1</sup>, Ibrahim Abdo<sup>1</sup>, Munehiko Nagatani<sup>1</sup>, Hiroyuki Takahashi<sup>1</sup>*  
*<sup>1</sup>NTT, Japan  ; <sup>2</sup>Osaka Metropolitan University, Japan *

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## Tu3E: Analog Linearization Techniques for Power Amplifiers

Chair: John Wood, Obsidian Microwave, USA — Co-Chair: Arvind Keerti, Qualcomm, USA

Room 215, 13:30–15:10, Tuesday 17 June 2025

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- (MWTL) Tu3E-1 13:30  **C** **Experimental Demonstration of E-Band Tunable Analog Predistortion**  
*Dhecha Nopchinda<sup>1</sup>, Herbert Zirath<sup>2</sup>, Marcus Gavell<sup>1</sup>*  
<sup>1</sup>Gotmic, Sweden  ; <sup>2</sup>Chalmers University of Technology, Sweden 
- PAGE 242 Tu3E-2 13:50  **C** **An Integrable Analog Domain Linearization Architecture for the Power Amplifiers in MIMO Systems**  
*Xiaozheng Wei, Ying Liu, Wensheng Pan, Wanzhi Ma, Qiang Xu, Shihai Shao, UESTC, China *
- PAGE 246 Tu3E-3 14:10  **C** **Simple Analog Pre-Distorter Design with Controllable AM/AM and AM/PM Distortion**  
*Tsz-Wai Wendy Wong, Kwok-Keung Michael Cheng, CUHK, China *
- PAGE 250 Tu3E-4 14:30  **C** **A GaAs HBT Doherty Power Amplifier with 31dBm Linear Output Power and 43% Efficiency by Using Dynamic IM3 Cancellation**  
*Shihai He<sup>1</sup>, Linjian Xu<sup>1</sup>, Xuan Ding<sup>2</sup>, Huan Chen<sup>1</sup>, Hao Meng<sup>1</sup>, Yongxue Qian<sup>1</sup>*  
<sup>1</sup>Beijing Onmicro Electronics, China  ; <sup>2</sup>University of California, Davis, USA 
- PAGE 254 Tu3E-5 14:50  **C** **A High-Linearity Quasi-Darlington Amplifier with Sub-Degree AM-PM for WLAN Applications**  
*Yudan Zhang, Kaixue Ma, Pengfei Li, Kejie Hu, Tianjin University, China *

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## Tu3F: Advanced Techniques in Microwave and Wireless Sensors

Chair: Thomas Ussmueller, B&E antec, Germany — Co-Chair: Kazuya Yamamoto, Mitsubishi Electric, Japan

Room 216, 13:30–15:10, Tuesday 17 June 2025

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- N/A Tu3F-1 13:30  **C** **Driving Innovation in the RF and Microwave Industry Through Radio Astronomy**  
*Sara Salem Hesari, NRC, Canada *
- PAGE 259 Tu3F-2 13:50  **C** **A Self-Sustaining Regenerative Amplifier Sensor Using Perfect Metamaterial Absorber for Liquid Concentration Prediction**  
*Nazli Kazemi, Gunes Karabulut Kurt, Elham Baladi, Polytechnique Montréal, Canada *
- PAGE 263 Tu3F-3 14:10  **C** **Analysis and Design of a New Material Sensor Utilizing an Oscillator with a Self-Injection Loop**  
*Camilo Moncada, Franco Ramírez, Almudena Suárez, Universidad de Cantabria, Spain *
- PAGE 267 Tu3F-4 14:30  **C** **Differential Frequency Selective Surface Sensor for Polymeric Coating Damage Detection Using Electromagnetically Shielded Reference Resonator**  
*Vishal Balasubramanian, Mohammad H. Zarifi, University of British Columbia, Canada *
- PAGE 271 Tu3F-5 14:50  **C** **AoA Sensing Enabled Reconfigurable Intelligent Surface**  
*Wei-Lun Hsu, Jia-Fang Deng, Shih-Kai Luo, Shih-Cheng Lin, Chia-Chan Chang, Sheng-Fuh Chang, National Chung Cheng University, Taiwan *
- (MWTL) Tu3F-6 15:00  **C** **A Hybrid CMOS-Polyimide Adaptive Force Radiometric Array with 3–5-GHz Wireless Connectivity**  
*Amin Montazar, Xuyang Liu, Zhengyang Zhang, Hamidreza Aghasi, University of California, Irvine, USA *

## Tu4A: Advancing Biomedical Radar Technology

Chair: Davi V.Q. Rodrigues, University of Texas at El Paso, USA — Co-Chair: Chung-Tse Michael Wu, Rutgers University, USA  
Room 201, 15:40–17:20, Tuesday 17 June 2025

- PAGE 275  
Tu4A-1  
15:40  **C** **Through-the-Wall Concurrent Vital Signs Monitoring of Three Subjects Using Single-Channel CW Radar and Independent Component Analysis**  
*Shafkat Hossain<sup>1</sup>, Sourav K. Pramanik<sup>2</sup>, Oluwaseun Adekola<sup>1</sup>, Shekh Md.M. Islam<sup>2</sup>, Dieff Vital<sup>1</sup>*  
<sup>1</sup>University of Illinois Chicago, USA  ; <sup>2</sup>University of Dhaka, Bangladesh 
- (MWTL)  
Tu4A-2  
16:00  **C** **Asynchronous Space-Time-Coding Direct Antenna Modulation-Enabled Automated Beam-Scanning Multi-Target Vital Sign Radar Sensing**  
*Shuping Li<sup>1</sup>, Donglin Gao<sup>1</sup>, Shaghayegh Vosoughitabar<sup>2</sup>, Chung-Tse Michael Wu<sup>1</sup>*  
<sup>1</sup>Rutgers University, USA  ; <sup>2</sup>Apple, USA 
- PAGE 279  
Tu4A-3  
16:20  **C** **Accurate Doppler Cardiogram Sensing with Frequency-Domain Digital Beamforming Technique Based on a K-Band Biomedical Radar**  
*Jiayu Zhang, Shuqin Dong, Yuchen Li, Yiyao Cao, Zhiwei Zhang, Changzhan Gu, Junfa Mao, SJTU, China *
- PAGE 283  
Tu4A-4  
16:40  **C** **Highly Sensitive Frequency- and Self-Injection-Locked Radar for Precise Vital Sign Detection**  
*K.-C. Peng<sup>1</sup>, C.-C. Mai You<sup>2</sup>, S.-H. Lin<sup>2</sup>, Tzyy-Sheng Horng<sup>2</sup>*  
<sup>1</sup>NKUST, Taiwan  ; <sup>2</sup>National Sun Yat-sen University, Taiwan 
- PAGE 287  
Tu4A-5  
17:00  **C** **Moving Person Vital Sign Detection Using Four-Channel Phase- and Quadrature Self-Injection-Locked Radar and MPCA Method for Dynamic Clutter Immunity**  
*Iou-Heng Chen, Ji-Xun Zhong, Ju-Yin Shih, Bo-You Lai, Fu-Kang Wang, National Sun Yat-sen University, Taiwan *

## Tu4B: Advances in Reconfigurable Surface and Antenna Technologies for Next-Generation Wireless and Sensing Systems

Chair: Najme Ebrahimi, Northeastern University, USA — Co-Chair: Tzu-Yuan Huang, ETH Zürich, Switzerland  
Room 208, 15:40–17:20, Tuesday 17 June 2025

- (MWTL)  
Tu4B-1  
15:40  **C** **Shape Estimation and Pattern Correction of Flexible Phased Arrays Using Local Curvature Measurements**  
*Yair Dashevsky, Matan Gal-Katziri, Ben-Gurion University of the Negev, Israel *
- PAGE 291  
Tu4B-2  
16:00  **C** **A 2:1 Bandwidth 3–6GHz Dual-Polarized True-Time-Delay Based Reconfigurable Intelligent Surface (RIS)**  
*Jurui Qi, Jacob Drewniak, Tian Liang, Gabriel M. Rebeiz, University of California, San Diego, USA *
- PAGE 295  
Tu4B-3  
16:20  **C** **Chirp Sequence-Based Beamwidth Control in a Reconfigurable Intelligent Surface**  
*Akira Ebihara<sup>1</sup>, Akira Kumagai<sup>2</sup>, Osamu Kagaya<sup>2</sup>, Hiroyuki Morikawa<sup>1</sup>, Yoshiaki Narusue<sup>1</sup>*  
<sup>1</sup>University of Tokyo, Japan  ; <sup>2</sup>AGC, Japan 
- PAGE 299  
Tu4B-4  
16:40  **C** **Enhanced EIRP and Reconfigurable Polarization Multi-Feed Active Antenna Module for Millimeter-Wave Beamforming Phased Arrays**  
*Bernard Tung, Mohammad Abdollah Chalaki, Ahmed Ben Ayed, Huixin Jin, Slim Boumaiza, University of Waterloo, Canada *
- PAGE 303  
Tu4B-5  
17:00  **C** **Integrated Sensing and Communication Using Reconfigurable Intelligent Surface: Hardware, Ray-Tracing Demonstration, and Channel Measurement in the 6G Mid Band**  
*Hogyom Kim, Hyunjun Yang, Hooyoung Kim, Jungsuek Oh, Seoul National University, Korea *

Tu4B continued ...

- PAGE 307  
Tu4B-6  
17:10
-  **C** **Low Power Consumption and Beam-Sustainable Reconfigurable Intelligent Surface for Fixed Wireless Communication at Millimeter-Wave 5G Band**  
*Hogyeom Kim<sup>1</sup>, Seongwoog Oh<sup>2</sup>, Jeongtaek Oh<sup>1</sup>, Jungsuek Oh<sup>1</sup>*  
<sup>1</sup>Seoul National University, Korea **A** ; <sup>2</sup>Kwangwoon University, Korea **A**

## Tu4C: RF Power at HF, VHF and UHF

*Chair: Robert H. Caverly, Villanova University, USA — Co-Chair: Frederick Raab, Green Mountain Radio Research, USA*  
*Room 210, 15:40-17:20, Tuesday 17 June 2025*

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- N/A  
Tu4C-1  
15:40
-  **C** **Advancements in RF High Power Supply Chain and Ecosystem Enabling Transition from Vacuum Electron Devices to Multi-kW RF Solid-State Solutions and Systems**  
*Thomas Kole, Integra Technologies, USA **A***
- PAGE 312  
Tu4C-2  
16:00
-  **C** **Planar Low-Loss Ultra-Wideband Coaxial-Less Balun and 4-Way Combiner for High-Power Applications**  
*Victor Bregeon<sup>1</sup>, Anthony Ghiotto<sup>2</sup>, Jose De Oliveira<sup>1</sup>, Christophe Goujon<sup>3</sup>, Guillaume Mougnot<sup>3</sup>*  
<sup>1</sup>Thales, France **A** ; <sup>2</sup>IMS (UMR 5218), France **A** ; <sup>3</sup>DGA, France **A**
- PAGE 316  
Tu4C-3  
16:20
-  **C** **Continuous Current Mode Class-F Power Amplifier: A Solution for Bandwidth Extension in Low Breakdown Voltage Applications**  
*Daniel Alonso-Tejera<sup>1</sup>, J. Apolinar Reynoso-Hernández<sup>1</sup>, José Raúl Loo-Yau<sup>2</sup>, Manuel Alejandro Pulido-Gaytán<sup>1</sup>, María del Carmen Maya-Sánchez<sup>1</sup>, Jaime Sánchez-García<sup>1</sup>, Eduardo A. Murillo-Bracamontes<sup>3</sup>*  
<sup>1</sup>CICESE, Mexico **A** ; <sup>2</sup>Cinvestav, Mexico **A** ; <sup>3</sup>CNyN-UNAM, Mexico **A**
- PAGE 320  
Tu4C-4  
16:40
-  **C** **A Highly-Efficient 4.3GBaud Push-Pull LDMOS Based Pre-Driver with 6V Signal-Swing for GaN HEMTs in 22nm FDSOI**  
*Frowin Buballa<sup>1</sup>, Sebastian Linnhoff<sup>1</sup>, Andreas Wentzel<sup>2</sup>, Enne Wittenhagen<sup>1</sup>, Thomas Hoffmann<sup>2</sup>, Wolfgang Heinrich<sup>2</sup>, Friedel Gerfers<sup>1</sup>*  
<sup>1</sup>Technische Universität Berlin, Germany **A** ; <sup>2</sup>FBH, Germany **A**
- PAGE 324  
Tu4C-5  
16:50
-  **C** **High-Efficiency VHF Polar and Doherty Amplifiers for Satellite Transponder Applications**  
*Diego Madueño-Pulido, Moises Patiño-Gomez, Francisco Javier Ortega-Gonzalez, Universidad Politécnica de Madrid, Spain **A***

Tu4C continues next page ...

*Tu4C continued ...*

- PAGE 328  
Tu4C-6  
17:10
-  **C** **Highly-Efficient and Low-Power Class-E Amplifier for Miniaturization Using a Small Antenna**  
*Ferry Pascal Lanter, Adrian Teguh Sutinjo, Curtin University, Australia* **A**

## Tu4D: Sub-Terahertz and Terahertz Signal Modulation

*Chair: Lei Liu, University of Notre Dame, USA — Co-Chair: Wooram Lee, Pennsylvania State University, USA*  
*Room 211, 15:40-17:20, Tuesday 17 June 2025*

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- PAGE 331  
Tu4D-1  
15:40
-  **C** **Ultrawideband Vector Modulators for Next-Gen Wireless Networks in the 200-480GHz Range**  
*Konstantin Kuliabin<sup>1</sup>, Bersant Gashi<sup>2</sup>, Sébastien Chartier<sup>2</sup>, Cristina Maurette Blasini<sup>1</sup>, Roger Lozar<sup>2</sup>, Arnulf Leuther<sup>2</sup>, Rüdiger Quay<sup>2</sup>*  
*<sup>1</sup>Albert-Ludwigs-Universität Freiburg, Germany **A** ; <sup>2</sup>Fraunhofer IAF, Germany **A***
- PAGE 335  
Tu4D-2  
16:00
-  **C** **Sub-THz Phase Shifter Using a Photoconductive Solid-State Plasma Evanescent-Mode Waveguide Switched Stub**  
*Eric T. Der<sup>1</sup>, Thomas R. Jones<sup>1</sup>, Nahid Vahabisani<sup>1</sup>, Daniel Mildenberger<sup>1</sup>, Dimitrios Peroulis<sup>2</sup>*  
*<sup>1</sup>Jones Microwave, Canada **A** ; <sup>2</sup>Purdue University, USA **A***
- PAGE 339  
Tu4D-3  
16:20
-  **C** **A Compact 8.2mW Complementary Current-Reusing D-Band Frequency Quadrupler in 22nm FDSOI CMOS**  
*Thorben Schmidt, Finn-Niclas Stapelfeldt, Vadim Issakov, Technische Universität Braunschweig, Germany **A***
- PAGE 343  
Tu4D-4  
16:40
-  **C** **Comparison of Wideband Low-Power H-Band Frequency Doublers with and without a Driving Stage in 22nm FDSOI CMOS**  
*Finn-Niclas Stapelfeldt<sup>1</sup>, Benjamin Schoch<sup>2</sup>, Dominik Wrana<sup>2</sup>, Vadim Issakov<sup>1</sup>*  
*<sup>1</sup>Technische Universität Braunschweig, Germany **A** ; <sup>2</sup>Universität Stuttgart, Germany **A***

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## Tu4E: Digital Linearization Techniques for Power Amplifiers

Chair: Luis C. Nunes, Universidade de Aveiro, Portugal

Co-Chair: Pere L. Gilibert, Universitat Politècnica de Catalunya, Spain

Room 215, 15:40–17:20, Tuesday 17 June 2025

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- N/A  
Tu4E-1  
15:40  **C** **Efficiency Enhancements Using Digital Predistortion and Advanced Transmitters**  
*Paul J. Draxler, Eridan Communications, USA* 
- (MWTL)  
Tu4E-2  
16:00  **C** **Predistortion of GaN Power Amplifier Transient Responses in Time-Division Duplex Using Machine Learning**  
*Arne Fischer-Bühner<sup>1</sup>, Lauri Anttila<sup>2</sup>, Alberto Brihuega<sup>3</sup>, Manil Dev Gomony<sup>1</sup>, Mikko Valkama<sup>2</sup>*  
<sup>1</sup>Nokia Bell Labs, Belgium  ; <sup>2</sup>Tampere University, Finland  ; <sup>3</sup>Nokia, Finland 
- PAGE 348  
Tu4E-3  
16:20  **C** **Reference Phase Adjustment Technique with Cross-Polarization Cancellation for Enhanced Digital Predistortion in Mobile Dual-Polarized Arrays**  
*Uichan Park, Jungsuek Oh, Seoul National University, Korea* 
- PAGE 352  
Tu4E-4  
16:40  **C** **Phase Derivative Approach for Nonlinear Power Amplifier Forward Modeling with 2-D LUTs**  
*Vesa Lampu, Lauri Anttila, Mikko Valkama, Tampere University, Finland* 
- PAGE 356  
Tu4E-5  
17:00  **C** **Neural Network Based Nonlinear Forward Model Identification for Digital MIMO Arrays Under Load Modulation**  
*Joel Fernandez<sup>1</sup>, Lauri Anttila<sup>1</sup>, Koen Buisman<sup>2</sup>, Vesa Lampu<sup>1</sup>, Christian Fager<sup>3</sup>, Thomas Eriksson<sup>3</sup>, Mikko Valkama<sup>1</sup>*  
<sup>1</sup>Tampere University, Finland  ; <sup>2</sup>University of Surrey, UK  ; <sup>3</sup>Chalmers University of Technology, Sweden 

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## Tu4F: Recent Advances in Space Systems for SATCOM and Remote Sensing

Chair: Jan Budroweit, DLR, Germany — Co-Chair: Rudy Emrick, Northrop Grumman, USA

Room 216, 15:40–17:20, Tuesday 17 June 2025

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- N/A  
Tu4F-1  
15:40  **C** **Recent Data Downlink Antenna Developments for Small Satellites with Focus on NewSpace and CubeSat Applications**  
*Nelson J.G. Fonseca, Anywaves, France* 
- PAGE 361  
Tu4F-2  
16:00  **C** **Simultaneous Multibeam Operation in 19.5GHz SATCOM Receive Phased Arrays Using Orthogonally-Coded Nested Subarrays**  
*Jacob Drewniak, Gabriel M. Rebeiz, University of California, San Diego, USA* 
- PAGE 365  
Tu4F-3  
16:20  **C** **A Heterogeneous Transceiver in 0.1 $\mu$ m D-Mode GaAs and 65nm CMOS for SATCOM Phased Arrays**  
*Jill Mayeda, Xiaolin Wang, Sena Kato, Dongwon You, Xi Fu, Takashi Tomura, Hero Sakai, Kazuaki Kunihiro, Kenichi Okada, Atsushi Shirane, Science Tokyo, Japan* 
- PAGE 369  
Tu4F-4  
16:40  **C** **Polarimetric Spectrometer Receivers for Remote Sensing of Ionospheric Currents**  
*Oliver Montes, Isaac Ramos, Seth Sin, Andy Fung, Sharmila Padmanabhan, Sidharth Misra, Pekka Kangaslahti, Jet Propulsion Laboratory, USA* 
- (MWTL)  
Tu4F-5  
17:00  **C** **An Interleaved 1 $\times$ 8 Dual-Polarized L-Band Phased Array with Digital Transmit/Receive Beamforming Using RFSoc**  
*Peizhuo Yang, Alessio Tornese, Gong Chen, Koen Mouthaan, NUS, Singapore* 

## We1B: Next Generation Front-End Components and Architectures For RF Applications

Chair: Kenneth Mays, Boeing, USA — Co-Chair: Aly E. Fathy, University of Tennessee Knoxville, USA

Room 203, 08:00-09:40, Wednesday 18 June 2025

- N/A  
We1B-1  
8:00  **C** **A MIMO Perspective of Phased Arrays and its Applications**  
*John Cowles, Analog Devices, USA* 
- (MWTL)  
We1B-2  
8:20  **C** **A 1.53-mm<sup>2</sup> Fully Integrated Wi-Fi 7 Front-End Module with 1.65-dB NF and 41.9% FBW in 0.25- $\mu$ m GaAs p-HEMT Technology**  
*Pengfei Li, Kaixue Ma, Yudan Zhang, Jiaming Zhao, Hao Shi, Tianjin University, China* 
- PAGE 374  
We1B-3  
8:40  **C** **A 5-7.1GHz 4-Channel CMOS Wi-Fi 7 Transceiver Front-End for Fiber-to-the-Room with Analog Beamforming and Digital Predistortion**  
*Bowei Feng, Kun Fu, Xinke Huang, Xin Lei, Xiaoyan Gui, XJTU, China* 
- PAGE 378  
We1B-4  
9:00  **C** **A 9.4-11.4GHz Low-IF Linear Transmitter Front-End with 47.2dB Dynamic Range and 0.5dB Gain Resolution in 40-nm CMOS**  
*Jiahao Li, Bingzheng Yang, Qingxian Li, Yiyang Shu, Xun Luo, UESTC, China* 
- PAGE 382  
We1B-5  
9:20  **C** **A C-Band High-Precision Amplitude-Phase Control Multi-Functional Chip with Symmetric Polyphase Filter and X-Type Attenuator**  
*Guangyin Shi<sup>1</sup>, Zhiqiang Li<sup>1</sup>, Lu Liu<sup>1</sup>, Pufeng Chen<sup>2</sup>, Zhiwei Dai<sup>1</sup>, Shilong Chen<sup>1</sup>, Yanhui Geng<sup>2</sup>*  
<sup>1</sup>CAS, China  ; <sup>2</sup>Tianjin HiGaAs Microwave Technology, China 
- PAGE 386  
We1B-6  
9:30  **C** **A 10-GHz Localized-LO-Phase-Shifting Phased-Array Transmitter**  
*Francesco Tesolin, Simone M. Dartizio, Francesco Faillace, Andrea L. Lacaita, Michele D'Amico, Salvatore Levantino, Politecnico di Milano, Italy* 

## We1C: Advances in Multi-Functional Planar Filter Technologies

Chair: Laila Salman, Ansys, USA — Co-Chair: Dimitra Psychogiou, University College Cork, Ireland

Room 205, 08:00-09:40, Wednesday 18 June 2025

- PAGE 390  
We1C-1  
8:00  **C** **Multi-Functional Ultrawideband BPFs with Reconfigurable Absorptive and Tunable Attenuation Characteristics**  
*Adnan Nadeem<sup>1</sup>, Noshewan Shoaib<sup>2</sup>, Symeon Nikolaou<sup>1</sup>, Dimitra Psychogiou<sup>3</sup>, Photos Vryonides<sup>1</sup>*  
<sup>1</sup>Frederick University, Cyprus  ; <sup>2</sup>NUST, Pakistan  ; <sup>3</sup>University College Cork, Ireland 
- PAGE 394  
We1C-2  
8:20  **C** **A Compact Planar Quad-Channel SIW Filtering Crossover with Flexibly Allocated Channel Frequencies and Bandwidths**  
*Zhenghai Luo<sup>1</sup>, Kang Zhou<sup>2</sup>, Ke Wu<sup>3</sup>*  
<sup>1</sup>SJTU, China  ; <sup>2</sup>Eastern Institute of Technology, China  ; <sup>3</sup>Polytechnique Montréal, Canada 
- PAGE 398  
We1C-3  
8:40  **C** **A New Folded Coupling Reflectionless Bandpass Filter with Broadband Ultra-Low Reflection Property and Very High Frequency Selectivity**  
*Masataka Ohira<sup>1</sup>, Koya Hirota<sup>2</sup>, Zhewang Ma<sup>2</sup>, Hiroyuki Deguchi<sup>1</sup>*  
<sup>1</sup>Doshisha University, Japan  ; <sup>2</sup>Saitama University, Japan 
- PAGE 402  
We1C-4  
9:00  **C** **Miniaturized Multilayer and Self-Packaged Triple-Mode Bandpass Filter with High Selectivity and Wide Stopband**  
*Lin Gu, Xun Luo, Yuandan Dong, UESTC, China* 

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## We1D: Advances in Computational Techniques

Chair: Vladimir Okhmatovski, University of Manitoba, Canada — Co-Chair: Werner Thiel, ANSYS, USA

Room 207, 08:00–09:40, Wednesday 18 June 2025

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- N/A  
We1D-1  
8:00  **C** **AI on Functions and Neural Operators**  
*Zongyi Li, Kamyar Azizzadenesheli, Anima Anandkumar, Caltech, USA* 
- (MWTL)  
We1D-2  
8:20  **C** **Electromagnetic Emission Simulation of Radio Frequency Circuits Using Direct Domain Decomposition Solver**  
*Jiaqing Lu, The Ohio State University, USA* 
- PAGE 407  
We1D-3  
8:40  **C** **Towards Tensor-Train Solution of Vector Volume Integral Equation in 3D with log-N Complexity**  
*Chris Nguyen, Vladimir Okhmatovski, University of Manitoba, Canada* 
- (MWTL)  
We1D-4  
9:00  **C** **Fusing Leontovich Boundary Conditions and Scalar 2-D FEM to Compute Lid and Lateral Wall Losses in H-Plane Waveguide Devices**  
*Hui Jiang<sup>1</sup>, Juan Córcoles<sup>2</sup>, Jorge A. Ruiz-Cruz<sup>2</sup>*  
*<sup>1</sup>Universidad Autónoma de Madrid, Spain*  ; *<sup>2</sup>Universidad Politécnica de Madrid, Spain* 
- PAGE 411  
We1D-5  
9:20  **C** **A Finite Element Method to Model Transmission Lines with Various Rough Conductor Surfaces up to 110GHz**  
*Felix Sepaintner<sup>1</sup>, Franz Roehrl<sup>2</sup>, Georg Fischer<sup>3</sup>, Werner Bogner<sup>1</sup>, Stefan Zorn<sup>2</sup>*  
*<sup>1</sup>Technische Hochschule Deggendorf, Germany*  ; *<sup>2</sup>Rohde & Schwarz, Germany*  ; *<sup>3</sup>FAU Erlangen-Nürnberg, Germany* 

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## We1E: Advanced Non-Planar Filter Designs

Chair: Simone Bastioli, RS Microwave, USA — Co-Chair: Mohamed M. Fahmi, DRDC, Canada

Room 208, 08:00–09:40, Wednesday 18 June 2025

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- (MWTL)  
We1E-1  
8:00  **C** **Compact Ku-Band Diplexer with Additive Manufactured Multimaterial Dielectric Resonator Insets**  
*Patrick Boe<sup>1</sup>, Dominik Brouczek<sup>2</sup>, Lisa Mikiss<sup>2</sup>, Marc Hofbauer<sup>2</sup>, Daniel Miek<sup>1</sup>, Michael Höft<sup>1</sup>*  
*<sup>1</sup>CAU, Germany*  ; *<sup>2</sup>Lithoz, Austria* 
- PAGE 415  
We1E-2  
8:20  **C** **Novel Double Rejection Cavity to Improve Selectivity in Inline Rectangular Waveguide Filters**  
*C. Tomassoni<sup>1</sup>, Giuseppe Macchiarella<sup>2</sup>, M. Oldoni<sup>2</sup>*  
*<sup>1</sup>Università di Perugia, Italy*  ; *<sup>2</sup>Politecnico di Milano, Italy* 
- PAGE 419  
We1E-3  
8:40  **C** **Advances on Size Reduction and Spurious Suppression in Rectangular Waveguide Filters**  
*David Rubio, Santiago Cogollos, Vicente E. Boria, Marco Guglielmi, Universitat Politècnica de València, Spain* 
- PAGE 423  
We1E-4  
9:00  **C** **Coupling Matrix Reconfiguration Aided with a Start System Based on Simultaneous Diagonalization**  
*Yi Zeng<sup>1</sup>, Yang Wu<sup>2</sup>, Ming Yu<sup>1</sup>*  
*<sup>1</sup>SUSTech, China*  ; *<sup>2</sup>NUIST, China* 
- PAGE 427  
We1E-5  
9:10  **C** **Band-Pass Filter Based on Stacked Metal Plates in V-Band Waveguide Technology**  
*Eugen Dischke<sup>1</sup>, Sonja Noznic<sup>1</sup>, Daniel Georg Helmich<sup>2</sup>, Thomas Flisgen<sup>3</sup>, Adam Rämmer<sup>1</sup>, Wolfgang Heinrich<sup>1</sup>, Viktor Krozer<sup>1</sup>*  
*<sup>1</sup>FBH, Germany*  ; *<sup>2</sup>RWTH Aachen University, Germany*  ; *<sup>3</sup>BTU, Germany* 
- PAGE 431  
We1E-6  
9:20  **C** **Ultra-Compact Surface-Mountable Air-Filled Coaxial Filter for 5G Applications**  
*Yimin Yang<sup>1</sup>, Shangru Li<sup>1</sup>, Qiuyi Wu<sup>1</sup>, Ming Yu<sup>2</sup>*  
*<sup>1</sup>Xidian University, China*  ; *<sup>2</sup>SUSTech, China* 

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## We1G: Advanced mm-Wave Frequency Converters and Modulators

Chair: Hong-Yeh Chang, National Central University, Taiwan — Co-Chair: Stephen Maas, Nonlinear Technologies, USA  
Room 211, 08:00–09:40, Wednesday 18 June 2025

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- (MWTL)  **C** **A Q-Band Ultralow-Jitter Subharmonically Injection-Locked Frequency Quadrupler with FTL and Switched-Capacitor Array**  
Po-Yuan Chen, Hong-Yeh Chang, National Central University, Taiwan **A**
- PAGE 435  **C** **A 22–34GHz CMOS Neutralization-Based Direct-Conversion I/Q Up-Converter for 1024-QAM Modulation**  
Cheng-Yang Lee, Po-Yuan Chen, Hong-Yeh Chang, National Central University, Taiwan **A**
- PAGE 439  **C** **A 14.5Gb/s, 2.75pJ/bit, Direct-Digital, Star-QAM Modulator and Co-Designed Frequency Multiplier Operating at 140GHz**  
Shah Zaib Aslam, Asif Iftikhar Omi, Baibhab Chatterjee, David P. Arnold, University of Florida, USA **A**
- PAGE 443  **C** **Monolithic Implementation and Performance Comparison of Three Single Balanced Architectures for D-Band HEMT Mixers**  
Patrick Umbach, Fabian Thome, Arnulf Leuther, Rüdiger Quay, Fraunhofer IAF, Germany **A**
- PAGE 447  **C** **A DC-to-170GHz Direct-Coupled Mixer Achieving 47dB LO-RF Isolation in 250nm InP DHBT Technology**  
Ping Xiang<sup>1</sup>, Kunming Yang<sup>1</sup>, Weibo Wang<sup>2</sup>, Wei Cheng<sup>2</sup>, Yinghao Chen<sup>1</sup>, Heyu Miao<sup>1</sup>, Yingmei Chen<sup>1</sup>  
<sup>1</sup>Southeast University, China **A** ; <sup>2</sup>Nanjing Electronic Devices Institute, China **A**

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## We1H: X-Band III-V MMIC Power Amplifiers with Harmonic Control

Chair: Taylor W. Barton, University of Colorado Boulder, USA — Co-Chair: Rajah Vysyaraju, MACOM, USA  
Room 215, 08:00–09:40, Wednesday 18 June 2025

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- N/A  **C** **LNA and Power Amplifiers for Operation up to 100GHz**  
David W. Runton, MACOM, USA **A**
- PAGE 452  **C** **A Ku-Band Input Harmonically Tuned Class-F GaAs MMIC Power Amplifier Achieving 28.4-dBm P<sub>sat</sub> and 56% Peak PAE**  
Kyung Pil Jung, Seung Hun Kim, Sungjae Oh, Jungsik Kim, Seong-Kyun Kim, Dongjin Jung, Dae Young Lee, Samsung, Korea **A**
- PAGE 456  **C** **A Continuous-Mode Class-F<sup>-1</sup> X-Band GaN MMIC Power Amplifier with a 29.7% Fractional Bandwidth**  
Yu-Hsiang Shang<sup>1</sup>, Kun-Yi Chuang<sup>1</sup>, Hsin-Chieh Lin<sup>2</sup>, Yin-Cheng Chang<sup>2</sup>, Da-Chiang Chang<sup>2</sup>, Shawn S.H. Hsu<sup>1</sup>  
<sup>1</sup>National Tsing Hua University, Taiwan **A** ; <sup>2</sup>NARLabs-TSRI, Taiwan **A**
- PAGE 460  **C** **An X-Band 35-dBm Compact Continuous-Mode Class-J Power Amplifier in 0.25- $\mu$ m GaN Process**  
Yi-Fu Chen, Jia-Jia Chen, Po-Yuan Chen, Hong-Yeh Chang, National Central University, Taiwan **A**
- PAGE 464  **C** **An X-Band Low-Voltage GaN HEMT Stacked Power Amplifier Operating in Class-J with Active Second Harmonic Injection**  
Atsushi Yamaguchi, Kazumasa Kohama, Masayuki Shimada, Sony, Japan **A**

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## We2B: Advanced Ku-Ka Beamforming ICs and Calibration Techniques

Chair: Mahdi Javid, Qorvo, USA — Co-Chair: Glenn Hopkins, Georgia Tech, USA

Room 203, 10:10-11:50, Wednesday 18 June 2025

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- PAGE 468  **C** **A 22–30GHz Ultra Low RMS Phase Error SiGe HBT BiCMOS Active Vector Modulator Phase Shifter with a Tunable Two-Section Lumped Element Differential Quadrature Hybrid**  
*Ki Woong Choi<sup>1</sup>, Seong-Mo Moon<sup>2</sup>, Dongpil Chang<sup>2</sup>, Inchan Ju<sup>1</sup>*  
<sup>1</sup>Ajou University, Korea **A** ; <sup>2</sup>ETRI, Korea **A**
- (MWTL) We2B-2 10:30  **C** **A 28/39-GHz Reconfigurable Phased-Array Transmitter Front-End for 5G New Radio in a 65-nm CMOS**  
*Ruiqi Wang, Yiming Yu, Runyu Liu, Yanpeng Wu, Xin Xie, Zhiguang Chen, Zhinan Jing, Zhixiong Li, Mengqian Geng, Huihua Liu, Chenxi Zhao, Yunqiu Wu, Kai Kang, UESTC, China **A***
- PAGE 472 We2B-3 10:50  **C** **A 28GHz Compact Phased-Array Beamformer with 21.3dBm PSAT and 5.2dB Noise Figure in 40nm CMOS**  
*Zheng Ma, Zonglin Ma, Hao Shi, Ming Yin, Yifei Yan, Weihong Liu, Yongqiang Wang, Fanyi Meng, Keping Wang, Kaixue Ma, Tianjin University, China **A***
- PAGE 476 We2B-4 11:10  **C** **A 16.2-to-22.2-GHz Phased-Array Receiver with -60-to-85°C Simultaneously Gain and NF Temperature Compensation Supporting 24Gb/s 64QAM Modulation**  
*Dongze Li, Wei Deng, Haikun Jia, Ziyuan Guo, Xintao Li, Xiangyu Nie, Baoyong Chi, Tsinghua University, China **A***
- PAGE 480 We2B-5 11:30  **C** **Calibration of Vector-Summing Type Variable-Gain Phase Shifters Using Novel Rectangular Constellation Modeling**  
*Yuxuan Chen, Mehran Hazer Sahlabadi, Slim Boumaiza, University of Waterloo, Canada **A***

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## We2C: Synthesis and Design Techniques for Advanced Filter Design

Chair: Roberto Gómez García, Universidad de Alcalá, Spain — Co-Chair: Photos Vryonides, Frederick University, Cyprus

Room 205, 10:10-11:50, Wednesday 18 June 2025

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- PAGE 484 We2C-1 10:10  **C** **Direct Synthesis for High Selectivity Lowpass/Bandpass Co-Designed Filters with Independent Sub-Band Responses**  
*Lunyong Xiao<sup>1</sup>, Yuxing He<sup>1</sup>, Changning Wei<sup>2</sup>, Xihua Zou<sup>1</sup>, Lianshan Yan<sup>1</sup>, Giuseppe Macchiarella<sup>3</sup>*  
<sup>1</sup>Southwest Jiaotong University, China **A** ; <sup>2</sup>Shenzhen Polytechnic University, China **A** ; <sup>3</sup>Politecnico di Milano, Italy **A**
- PAGE 488 We2C-2 10:30  **C** **Novel Synthesis Method for Wideband Filter with Additional Insertion Phase**  
*Chengfei Yi<sup>1</sup>, Xiong Chen<sup>2</sup>, Bin Liu<sup>1</sup>, Pei-Ling Chi<sup>3</sup>, Tao Yang<sup>1</sup>*  
<sup>1</sup>UESTC, China **A** ; <sup>2</sup>CETC 29, China **A** ; <sup>3</sup>NYCU, Taiwan **A**
- PAGE 492 We2C-3 10:50  **C** **Compact 7–23-GHz Bandpass Filter with High Selectivity and Wide Stopband Using Hybrid Microstrip/SIDGS Scheme for 6G Application**  
*Yunxiang Bai, Lingzhi Du, Jie Zhou, Xun Luo, UESTC, China **A***
- PAGE 496 We2C-4 11:10  **C** **Extraction of Coupling Matrix for Bandpass Filters Based on Magnitude of S-Parameters**  
*Kam Fung Lao, Junyi Liu, Wing Hung Hung, Ke-Li Wu, CUHK, China **A***

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## We2D: Modeling Techniques for Innovative Applications

Chair: Oscar Quevedo-Teruel, KTH, Sweden — Co-Chair: Werner Thiel, ANSYS, USA

Room 207, 10:10–11:50, Wednesday 18 June 2025

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- N/A  
We2D-1  
10:10  **C** **Reverberation Chambers as a New Solution for Wireless Testing of Highly Integrated Antenna Systems**  
*Anouk Hubrechs, Antennex, The Netherlands* 
- PAGE 501  
We2D-2  
10:30  **C** **Green's Function Analysis of Spatially Discrete Traveling-Wave Modulated (Parametric) Loop Networks**  
*Amirhossein Babae, Zachary Fritts, Steve M. Young, Anthony Grbic, University of Michigan, USA* 
- PAGE 505  
We2D-3  
10:50  **C** **Equation-Based Solver for High-Performance SI CuMax Routing Within Pin Fields**  
*Yingcong Zhang<sup>1</sup>, Xiao-Ding Cai<sup>2</sup>, Kai Li<sup>3</sup>, Yan Li<sup>3</sup>, Dongxu Fu<sup>3</sup>, Bidyut Sen<sup>2</sup>, Guoan Wang<sup>1</sup>*  
*<sup>1</sup>University of South Carolina, USA  ; <sup>2</sup>Cisco, USA  ; <sup>3</sup>Cisco, China *
- PAGE 509  
We2D-4  
11:10  **C** **A Power-Efficient Plasma Jet Line Enabled by Dielectric Anapole Resonator Technology**  
*Muhammad Rizwan Akram, Abbas Semnani, University of Toledo, USA* 
- PAGE 513  
We2D-5  
11:30  **C** **Mixed-Mode Distributed Physical-Based Model on OSFP Connector for Fast PAM-4 Channel Analysis and Pathfinding up to 212.5Gbps**  
*Yulin He, Kewei Song, Haonan Wu, Zetai Liu, Milton Feng, University of Illinois Urbana-Champaign, USA* 
- PAGE 517  
We2D-6  
11:40  **C** **THz Diffraction Radiation Analysis of Finite Graphene Strip Grating with Grounded Dielectric Substrate Excited by Electron Beam**  
*Dariia O. Herasymova<sup>1</sup>, Mstyslav E. Kaliberda<sup>2</sup>, Sergey A. Pogarsky<sup>2</sup>, Aleksandr Biloshenko<sup>2</sup>*  
*<sup>1</sup>NASU, Ukraine  ; <sup>2</sup>V.N. Karazin Kharkiv National University, Ukraine *

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## We2E: Innovative Non-Planar Passive and Multi-Functional Components

Chair: Dimitrios Peroulis, Purdue University, USA — Co-Chair: Vicente E. Boria, Universitat Politècnica de València, Spain

Room 208, 10:10–11:50, Wednesday 18 June 2025

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- (MWTL)  
We2E-1  
10:10  **C** **50-Way W-Band All Waveguide Radial Combiner Design**  
*Mohamed M. Fahmi<sup>1</sup>, Michael E. MacDonald<sup>2</sup>, Aly E. Fathy<sup>3</sup>, Mohamed D. Abouzahra<sup>2</sup>*  
*<sup>1</sup>DRDC, Canada  ; <sup>2</sup>MIT Lincoln Laboratory, USA  ; <sup>3</sup>University of Tennessee, USA *
- PAGE 521  
We2E-2  
10:30  **C** **Novel Radial Combiners with Integrated Low Pass Filtering Function**  
*Mohamed M. Fahmi<sup>1</sup>, Jorge A. Ruiz-Cruz<sup>2</sup>, Raafat R. Mansour<sup>3</sup>*  
*<sup>1</sup>DRDC, Canada  ; <sup>2</sup>Universidad Politècnica de Madrid, Spain  ; <sup>3</sup>University of Waterloo, Canada *
- PAGE 525  
We2E-3  
10:50  **C** **A Multi-Functional Circularly Polarized All Pole Filtering Conical Horn Antenna**  
*Manoj Kumar, Gowrish Basavarajappa, IIT Roorkee, India* 
- PAGE 528  
We2E-4  
11:10  **C** **Rectangular Waveguide-Based CRLH Frequency Scanning Array Antenna Operating at W-Band**  
*Michael E. Farage, Chong Li, University of Glasgow, UK* 
- PAGE 532  
We2E-5  
11:30  **C** **High-Power Handling, Amplitude and Phase Stable, Full Band WR-06 Rotary Joint Based on TE<sub>01</sub> Mode**  
*Alex H. Chen, Yonghui Shu, Eravant, USA* 
- PAGE 536  
We2E-6  
11:40  **C** **Optimizing Material and Shape of 3D-Printed Waveguide Terminations**  
*Lana Damaj<sup>1</sup>, Vincent Laur<sup>1</sup>, Alexis Chevalier<sup>1</sup>, Azar Maalouf<sup>1</sup>, Kevin Elis<sup>2</sup>*  
*<sup>1</sup>Lab-STICC (UMR 6285), France  ; <sup>2</sup>CNES, France *

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## We2G: Advanced RF/mm-Wave Frequency Multiplication Techniques

Chair: Steve Maas, Nonlinear Technologies, USA — Co-Chair: Austin Chen, Nokia, USA

Room 211, 10:10-11:50, Wednesday 18 June 2025

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- PAGE 540  
We2G-1  
10:10  **C** **A 13.7–41GHz Ultra-Wideband Frequency Doubler with Cross-Coupled Push-Push Structure Achieving 10.6% Peak Efficiency and 7-dBm  $P_{\text{sat}}$**   
*Kai Li, Keping Wang, Tianjin University, China* 
- PAGE 544  
We2G-2  
10:30  **C** **A 110–130-GHz Frequency Quadrupler with 12.5% Drain Efficiency in 22-nm FD-SOI CMOS**  
*Justin J. Kim<sup>1</sup>, Jeff Shih-Chieh Chien<sup>2</sup>, James F. Buckwalter<sup>1</sup>*  
<sup>1</sup>University of California, Santa Barbara, USA  ; <sup>2</sup>Samsung, USA 
- PAGE 548  
We2G-3  
10:50  **C** **A D-Band  $\times 15$  Frequency Multiplier Chain in 45nm SiGe BiCMOS for Board-Level Packaged Array Applications**  
*Runzhou Chen, Hao-Yu Chien, Christopher Chen, Boxun Yan, Chih-Kong Ken Yang, Mau-Chung Frank Chang, University of California, Los Angeles, USA* 
- PAGE 552  
We2G-4  
11:10  **C** **A 100–180-GHz InP Distributed Frequency Doubler with 11.5dBm Peak Output Power Using a Power-Bandwidth Enhancement Technique**  
*Phat T. Nguyen<sup>1</sup>, Viet-Anh Ngo<sup>1</sup>, Nhat Tran<sup>1</sup>, Natalie S. Wagner<sup>2</sup>, Alexander N. Stameroff<sup>2</sup>, Anh-Vu Pham<sup>1</sup>*  
<sup>1</sup>University of California, Davis, USA  ; <sup>2</sup>Keysight Technologies, USA 
- PAGE 556  
We2G-5  
11:30  **C** **A 220–280GHz InP Frequency Doubler with a Compact, Low-Loss Folded Marchand Balun**  
*Tyler Shepard<sup>1</sup>, Phat T. Nguyen<sup>2</sup>, Natalie S. Wagner<sup>2</sup>, Alexander N. Stameroff<sup>2</sup>, Anh-Vu Pham<sup>1</sup>*  
<sup>1</sup>University of California, Davis, USA  ; <sup>2</sup>Keysight Technologies, USA 

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## We2H: High-Efficiency Power Amplifiers for 6G FR3 Handset and MIMO Radar Applications

Chair: Rajah Vysyaraju, MACOM, USA — Co-Chair: Wing Shing Chan, CityUHK, Hong Kong

Room 215, 10:10-11:50, Wednesday 18 June 2025

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- PAGE 560  
We2H-1  
10:10  **C** **Efficient InGaP/GaAs HBT Differential Power Amplifier Using a New Adaptive Cross-Capacitor Bias Circuit for 6G FR3 Handset Applications**  
*Sooji Bae<sup>1</sup>, Byeongcheol Yoon<sup>1</sup>, Seungju Lee<sup>1</sup>, Sungwoon Hwang<sup>1</sup>, Jooyoung Jeon<sup>2</sup>, Junghyun Kim<sup>1</sup>*  
<sup>1</sup>Hanyang University, Korea  ; <sup>2</sup>Gangneung-Wonju National University, Korea 
- PAGE 564  
We2H-2  
10:30  **C** **A High-Efficiency GaAs HBT Power Amplifier for 6G FR3 Applications**  
*Jung-Tao Chung<sup>1</sup>, Keng-Li Hsu<sup>1</sup>, Cheng-Te Chang<sup>1</sup>, Kai-Chen Feng<sup>1</sup>, Kun-You Lin<sup>1</sup>, Chao-Hsin Wu<sup>1</sup>, Jyun-Hao Li<sup>2</sup>, Shan-Yu Tu<sup>2</sup>, Tung-Yao Chou<sup>2</sup>, Shu-Hsiao Tsai<sup>2</sup>, Cheng-Kuo Lin<sup>2</sup>*  
<sup>1</sup>National Taiwan University, Taiwan  ; <sup>2</sup>WIN Semiconductors, Taiwan 
- PAGE 568  
We2H-3  
10:50  **C** **A 9-to-13.5GHz 29.2-dBm- $P_{\text{SAT}}$  44.4%-PAE Power Amplifier Using Extended Cascode Cores and 4-to-1 Folded Transformers in 130-nm CMOS SOI**  
*Yiting Zhang, Nengxu Zhu, Fanyi Meng, Tianjin University, China* 
- (MWTL)  
We2H-4  
11:10  **C** **A Compact Doubly Neutralized Ku-Band Power Amplifier with 39% Peak PAE and 23-dBm Output Power in 22FDX+ EDMOS for 6G FR3**  
*Jinglong Xu, Mohamed Eleraky, Tzu-Yuan Huang, Chenhao Chu, Hua Wang, ETH Zürich, Switzerland* 
- PAGE 572  
We2H-5  
11:30  **C** **A 24GHz Power Amplifier with a Switching Output Combiner for a Dual-Mode MIMO Radar System**  
*Yu-Chen Pan<sup>1</sup>, Zi-Hao Fu<sup>1</sup>, Hsiang-Chieh Jhan<sup>2</sup>, Jia-Wei Ye<sup>1</sup>, Yi-Chu Chen<sup>2</sup>, Chun-Hung Wang<sup>2</sup>, Kun-You Lin<sup>1</sup>*  
<sup>1</sup>National Taiwan University, Taiwan  ; <sup>2</sup>KaiKuTeK, Taiwan 

## We3B: Advances in Millimeter-Wave Transceivers for Next Generation Radar and Communication Applications

Chair: Julio Navarro, Boeing, USA — Co-Chair: Glenn Hopkins, Georgia Tech, USA

Room 203, 13:30-15:10, Wednesday 18 June 2025

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- N/A  
We3B-1  
13:30  **➤ From Components to Turn-Key Systems: Innovations in Aerospace Through Heterogeneous Integration**  
*Julio Navarro, Boeing, USA* 
- PAGE 577  
We3B-2  
13:50  **➤ A 60-GHz RadCom Down-Converter in 22-nm CMOS FDSOI for Short-Range Hand Gesture Sensing and High-Data-Rate Proximity Communication**  
*N. Rzaik, C. Dehos, Alexandre Siligaris, M. Zarudniev, Benjamin Blampey, José-Luis Gonzalez Jimenez, CEA-Leti, France* 
- PAGE 581  
We3B-3  
14:10  **➤ A 71-to-76GHz 8-Element Switchless Isolated Spectrum Phased-Array Transceiver with Direct-Modulation and Reflectionless Sliding-IF**  
*Wen Chen, Bingzheng Yang, Changxuan Han, Jie Zhou, Xun Luo, UESTC, China* 
- PAGE 585  
We3B-4  
14:30  **➤ A D-Band Front-End T/R MMIC in a 70-nm GaN HEMT Technology**  
*Thomas Zieciak, Philipp Neining, Christian Friesicke, Peter Brückner, Rüdiger Quay, Fraunhofer IAF, Germany* 
- PAGE 589  
We3B-5  
14:50  **➤ A 71-76GHz Phased-Array Transmitter with Nested-Coupler-Based Phase Shifter in 65nm CMOS**  
*Zixuan Mai<sup>1</sup>, Lujia Wu<sup>1</sup>, Quanyong Li<sup>1</sup>, Jingwen Xu<sup>1</sup>, Zesen Chen<sup>1</sup>, Wenyan Zhao<sup>1</sup>, Nayu Li<sup>2</sup>, Xiaokang Qi<sup>1</sup>, Chunyi Song<sup>2</sup>, Zhiwei Xu<sup>2</sup>*  
*<sup>1</sup>Zhejiang University, China* ; *<sup>2</sup>Donghai Laboratory, China* 

We3B continues next page ...

We3B continued ...

- PAGE 593  
We3B-6  
15:00  **➤ A 71-76GHz Four-Element Phased-Array Receiver with Compact Footprint in 65-nm CMOS**  
*Lujia Wu<sup>1</sup>, Zixuan Mai<sup>1</sup>, Quanyong Li<sup>1</sup>, Wenyan Zhao<sup>1</sup>, Zesen Chen<sup>1</sup>, Jingwen Xu<sup>1</sup>, Nayu Li<sup>2</sup>, Xiaokang Qi<sup>1</sup>, Chunyi Song<sup>1</sup>, Zhiwei Xu<sup>2</sup>*  
*<sup>1</sup>Zhejiang University, China* ; *<sup>2</sup>Donghai Laboratory, China* 

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## We3C: Highly Integratable Passive Devices Based on CMOS and SOI Technology

Chair: Hamhee Jeon, Qorvo, USA — Co-Chair: Ki Shin, Qorvo, USA

Room 205, 13:30–15:10, Wednesday 18 June 2025

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- PAGE 597  **C** **A Highly Linear 4W Differential SOI-CMOS RF Switch**  
 We3C-1 *Valentyn Solomko<sup>1</sup>, Ting-Li Hsu<sup>2</sup>, Semen Syroiezhin<sup>1</sup>, Yiwen Zhang<sup>1</sup>,*  
 13:30 *Amelie Hagelauer<sup>2</sup>*  
<sup>1</sup>Infinion Technologies, Germany  ; <sup>2</sup>Technische Universität München, Germany 
- PAGE 601  **C** **Miniaturized D-Band SPDT/DPDT Switches Using Series Triple Coupled Transformer Cores in 65-nm CMOS SOI**  
 We3C-2 *Nengxu Zhu, Yiting Zhang, Fanyi Meng, Tianjin University, China*   
 13:50
- (MWTL)  **C** **A DC–51.5GHz Digital Step Attenuator with Sub-5dB Insertion Loss and 3.1° RMS Phase Error**  
 We3C-3 *Ziang Zhang, Jianing He, Qin Chen, Xuhao Jiang, Xiangning Fan, Lianming Li,*  
 14:10 *Southeast University, China* 
- (MWTL)  **C** **A 10–17GHz Continuously Tunable CMOS Filter with Flexible Bandwidth Control Based on Mode-Switching Inductors**  
 We3C-4 *Bin Liu<sup>1</sup>, Kun Li<sup>1</sup>, Ziyuan Chen<sup>1</sup>, Yuhang Ning<sup>1</sup>, Shihai Shao<sup>1</sup>, Pei-Ling Chi<sup>2</sup>,*  
 14:30 *Tao Yang<sup>1</sup>*  
<sup>1</sup>UESTC, China  ; <sup>2</sup>NYCU, Taiwan 
- PAGE 605  **C** **An Ultra-Compact D-Band SIW Filter with Multifunction Transitions to Coplanar Input/Output**  
 We3C-5 *Xinghao Tong, Xiaopeng Wang, Tianze Li, Lei Li, Matteo Ciabattoni,*  
 14:50 *Francesco Monticone, James C.M. Hwang, Cornell University, USA* 

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## We3D: Computational Methods, Optimization, and Modelling Techniques for Circuit and System Design

Chair: Marco Pirola, Politecnico di Torino, Italy — Co-Chair: Erin Kiley, Massachusetts College of Liberal Arts, USA

Room 207, 13:30–15:10, Wednesday 18 June 2025

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- N/A  **C** **Computational Electromagnetics and a Facilitator of Microwave Creativity and Industrial Innovation**  
 We3D-1 *Malgorzata Celuch, QWED, Poland*   
 13:30
- PAGE 610  **C** **A Simple Closed-Form CAD Approach for Sensitivity Analysis and Optimization of Passive Networks Against Load Variations**  
 We3D-2 *Chiara Ramella<sup>1</sup>, Paolo Colantonio<sup>2</sup>, Marco Pirola<sup>1</sup>*  
 13:50 <sup>1</sup>Politecnico di Torino, Italy  ; <sup>2</sup>Università di Roma “Tor Vergata”, Italy 
- PAGE 614  **C** **Frequency-Query Enhanced Electromagnetic Surrogate Modeling with Edge Anti-Aliasing Pixelation for Bandpass Filter Inverse Design**  
 We3D-3 *Jingyun Bi<sup>1</sup>, Xinyu Zhou<sup>1</sup>, Jing Xia<sup>2</sup>, Shichang Chen<sup>3</sup>, Wing Shing Chan<sup>4</sup>*  
 14:00 <sup>1</sup>PolyU, China  ; <sup>2</sup>Jiangsu University, China  ; <sup>3</sup>Hangzhou Dianzi University, China  ; <sup>4</sup>CityUHK, China 
- (MWTL)  **C** **Cognitive Broyden-Based Input Space Mapping for Design Optimization**  
 We3D-4 *José E. Rayas-Sánchez, ITESO, Mexico*   
 14:10
- (MWTL)  **C** **Knowledge-Based Extrapolation of Neural Network Model for Transistor Modeling**  
 We3D-5 *Jinyuan Cui<sup>1</sup>, Lei Zhang<sup>2</sup>, Humayun Kabir<sup>2</sup>, Zhihao Zhao<sup>2</sup>, Rick Sweeney<sup>2</sup>,*  
 14:30 *Qi-Jun Zhang<sup>1</sup>*  
<sup>1</sup>Carleton University, Canada  ; <sup>2</sup>NXP Semiconductors, USA 
- PAGE 618  **C** **Analysis of a Self-Injected Super-Regenerative Oscillator for Motion Sensing**  
 We3D-6 *Sergio Sancho, Mabel Ponton, Almudena Suárez, Universidad de Cantabria, Spain*   
 14:50

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## We3G: Advanced RF/mm-Wave Low-Phase Noise Signal Generation

Chair: Amit Jha, Nokia, USA — Co-Chair: Sushil Kumar, National Instruments, USA

Room 211, 13:30-15:10, Wednesday 18 June 2025

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- PAGE 622  
We3G-1  
13:30  **C** **A 7.8-11.9GHz Quad-Mode Class-F<sub>2,3</sub> VCO with Multi-Stage Cross-Shared Common-Mode Path Achieving -131.9dBc/Hz 1-MHz Phase Noise and 201.8dBc/Hz FoM<sub>T</sub>**  
*Yu Wang, Yiyang Shu, Qiao Leng, Xun Luo, UESTC, China* **A**
- PAGE 626  
We3G-2  
13:50  **C** **A 19.3-to-27.3GHz Area-Reuse Double Dual-Core Complementary Class-F<sup>-1</sup> VCO with Non-Interfering Multiple Resonances Achieving 203.3dBc/Hz FoM<sub>T</sub> and 213.3dBc/Hz FoM<sub>TA</sub>**  
*Zijian Zhao, Yiyang Shu, Jiacheng Xie, Xun Luo, UESTC, China* **A**
- PAGE 630  
We3G-3  
14:10  **C** **A 60GHz Super Harmonic Injection Locked Oscillator with Quadrature Outputs**  
*Mengqi Cui, Xin Xu, Jens Wagner, Frank Ellinger, Technische Universität Dresden, Germany* **A**
- PAGE 634  
We3G-4  
14:30  **C** **Low-Power and Low-Phase Noise 94-GHz and 107.2-GHz Differential Fundamental Oscillators in 70-nm GaAs pHEMT Technology**  
*Chih-Ju Wu<sup>1</sup>, Xu Jiang<sup>1</sup>, Austin Ying-Kuang Chen<sup>2</sup>, Jung-Tao Chung<sup>3</sup>, Li-Cheng Chang<sup>3</sup>, Lung-Yi Tseng<sup>3</sup>, Chung-Tse Michael Wu<sup>1</sup>*  
*<sup>1</sup>National Taiwan University, Taiwan* **A** ; *<sup>2</sup>University of California, Santa Cruz, USA* **A** ; *<sup>3</sup>WIN Semiconductors, Taiwan* **A**
- PAGE 638  
We3G-5  
14:50  **C** **A 134GHz High Efficiency High Power Fundamental Oscillator in 16nm p-FinFET with 12dBm Output Power and 6.5% DC-to-RF Efficiency**  
*Lachlan Cuskelly, Yongho Lee, Christopher Chen, Daquan Huang, Mau-Chung Frank Chang, University of California, Los Angeles, USA* **A**

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## We3H: High Efficiency Doherty and LMBA Power Amplifiers

Chair: Vittorio Camarchia, Politecnico di Torino, Italy — Co-Chair: Peter Asbeck, University of California, San Diego, USA

Room 215, 13:30-15:10, Wednesday 18 June 2025

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- N/A  
We3H-1  
13:30  **C** **Future State of GaN MMIC Technology for Defense Electronics**  
*David F. Brown, BAE Systems, USA* **A**
- (MWTL)  
We3H-2  
13:50  **C** **A Broadband Doherty-Like Load-Modulated Balanced Amplifier with an Optimized Impedance Transformation Ratio in InGaP/GaAs HBT Process for Handset Applications**  
*Byeongcheol Yoon<sup>1</sup>, Sooji Bae<sup>1</sup>, Seungju Lee<sup>1</sup>, Sungwoon Hwang<sup>1</sup>, Jooyoung Jeon<sup>2</sup>, Junghyun Kim<sup>1</sup>*  
*<sup>1</sup>Hanyang University, Korea* **A** ; *<sup>2</sup>Gangneung-Wonju National University, Korea* **A**
- PAGE 643  
We3H-3  
14:10  **C** **Wideband 3-W GaAs MMIC Doherty PA with Stacked Devices and Load Variation Tolerance Under 2.5:1 VSWR**  
*Anna Piacibello, Giulia Bartolotti, Vittorio Camarchia, Politecnico di Torino, Italy* **A**
- PAGE 647  
We3H-4  
14:30  **C** **A Sub-6GHz Ultra-Compact 69.8% Drain Efficiency Harmonic Control Doherty Power Amplifier in GaN Technology**  
*Sih-Han Li<sup>1</sup>, Jie Zhang<sup>1</sup>, Shawn S.H. Hsu<sup>2</sup>*  
*<sup>1</sup>ITRI, Taiwan* **A** ; *<sup>2</sup>National Tsing Hua University, Taiwan* **A**
- PAGE 651  
We3H-5  
14:50  **C** **A Ka-Band GaN Doherty Power Amplifier with High Efficiency Over a Fractional Bandwidth of 20.4%**  
*Moïse Safari Mugisho<sup>1</sup>, Christian Friesicke<sup>1</sup>, Mohammed Ayad<sup>2</sup>, Thomas Maier<sup>1</sup>, Rüdiger Quay<sup>1</sup>*  
*<sup>1</sup>Fraunhofer IAF, Germany* **A** ; *<sup>2</sup>UMS, France* **A**

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**Th1A: Advanced In-Package mm-Wave Radiating and Waveguiding Structures**


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Chair: Manos M. Tentzeris, Georgia Tech, USA — Co-Chair: Kamal Samanta, Sony Europe, UK

Room 203, 08:00–09:40, Thursday 19 June 2025

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- PAGE 655  
Th1A-1  
8:00  **C** **A D-Band Tx FOWLP Module with Silicon-Based Resonator Antenna Array**  
*Sirous Bahrami<sup>1</sup>, Dongseop Lee<sup>1</sup>, Junhyeong Kim<sup>2</sup>, Kangseop Lee<sup>1</sup>, Jiwon Kang<sup>1</sup>, Seung-Uk Choi<sup>1</sup>, Donghoon Oh<sup>3</sup>, Junkyu Lee<sup>3</sup>, Wonbin Hong<sup>1</sup>, Ho-Jin Song<sup>1</sup>*  
<sup>1</sup>POSTECH, Korea **A** ; <sup>2</sup>Samsung, Korea **A** ; <sup>3</sup>LB Semicon, Korea **A**
- PAGE 659  
Th1A-2  
8:20  **C** **Empty-SIW (eSIW) Based Beamformer System on Glass Package for G-Band Phased Array Applications**  
*Xingchen Li<sup>1</sup>, Mohammad Al-Juwahri<sup>2</sup>, Mahin Ahamed<sup>2</sup>, Mohamed Basha<sup>3</sup>, Jeb Flemming<sup>3</sup>, Madhavan Swaminathan<sup>1</sup>*  
<sup>1</sup>Georgia Tech, USA **A** ; <sup>2</sup>Pennsylvania State University, USA **A** ; <sup>3</sup>3DGS, USA **A**
- PAGE 663  
Th1A-3  
8:40  **C** **Evaluation of Stacked Structure for 160GHz End-Fire Type Compact Antenna-in-Package Considering Thermal Design**  
*Ryosuke Hasaba<sup>1</sup>, Akihiro Egami<sup>1</sup>, Yohei Morishita<sup>1</sup>, Tomoki Abe<sup>1</sup>, Ken Takahashi<sup>1</sup>, Tomohiro Murata<sup>1</sup>, Masatoshi Suzuki<sup>1</sup>, Yoichi Nakagawa<sup>1</sup>, Yudai Yamazaki<sup>2</sup>, Sunghwan Park<sup>2</sup>, Takaya Uchino<sup>2</sup>, Chenxin Liu<sup>2</sup>, Jun Sakamaki<sup>2</sup>, Takashi Tomura<sup>2</sup>, Hiroyuki Sakai<sup>2</sup>, Makoto Tsukahara<sup>3</sup>, Kenichi Okada<sup>2</sup>, Koji Takinami<sup>1</sup>*  
<sup>1</sup>Panasonic, Japan **A** ; <sup>2</sup>Science Tokyo, Japan **A** ; <sup>3</sup>Shinko Electric Industries, Japan **A**
- N/A  
Th1A-4  
9:00  **C** **A Wideband W-Band Slotted Over-Mode Cavity Array with Dumbbell-Shaped Holey-EBG Units Based on Metallic Silicon-Based Process**  
*Jing Cai<sup>1</sup>, Miao Zhang<sup>1</sup>, Qing Huo Liu<sup>2</sup>*  
<sup>1</sup>Xiamen University, China **A** ; <sup>2</sup>Eastern Institute for Advanced Study, China **A**
- PAGE 670  
Th1A-5  
9:20  **C** **An Antipodal SIW-Fed Vivaldi Antenna at D-Band in LTCC for Flip-Chip RFIC Integration**  
*Alex Dinkelacker, Justin J. Kim, James F. Buckwalter, University of California, Santa Barbara, USA **A***

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**Th1B: Innovative RF Switches, Varactor and Modulator Technologies**


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Chair: Amir Mortazawi, University of Michigan, USA — Co-Chair: Pierre Blondy, XLIM and Université de Limoges, France

Room 205, 08:00–09:40, Thursday 19 June 2025

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- PAGE 674  
Th1B-1  
8:00  **C** **Edge Coupled DC–60GHz Differential SPDT MEMS Switch for High-Speed Digital Applications**  
*Xu Zhu, Nicholas Yost, Stewart Yang, Menlo Microsystems, USA **A***
- PAGE 678  
Th1B-2  
8:20  **C** **A Low-Loss, Wideband, 0–110GHz SPDT Using PCM RF Switches with Integrated CMOS Drivers**  
*Jeff Dykstra<sup>1</sup>, Jean-Luc Erb<sup>1</sup>, Waleed Asadi<sup>1</sup>, Bryan Hash<sup>1</sup>, Yuji Mitsui<sup>1</sup>, Nabil El-Hinnawy<sup>2</sup>, Greg Slovin<sup>2</sup>, David Howard<sup>2</sup>, Rodd Novak<sup>1</sup>, Eric Shapiro<sup>1</sup>*  
<sup>1</sup>pSemi, USA **A** ; <sup>2</sup>Tower Semiconductor, USA **A**
- (MWTL)  
Th1B-3  
8:40  **C** **A Millimeter-Wave Analog-Digital Variable Capacitor with High Tuning Ratio Realized by Monolithic Integration of BST Varactors and GeTe Switches**  
*Mehran Golcheshmeh, Raafat R. Mansour, University of Waterloo, Canada **A***
- PAGE 682  
Th1B-4  
9:00  **C** **Wideband Sub-THz Evanescent-Mode Waveguide Switch Using Reconfigurable Photogenerated Solid-State Plasma Elements**  
*Eric T. Der<sup>1</sup>, Thomas R. Jones<sup>1</sup>, Nahid Vahabisani<sup>1</sup>, Daniel Mildenerberger<sup>1</sup>, Dimitrios Peroulis<sup>2</sup>*  
<sup>1</sup>Jones Microwave, Canada **A** ; <sup>2</sup>Purdue University, USA **A**
- PAGE 686  
Th1B-5  
9:20  **C** **A Microwave Acoustic QPSK Modulator Leveraging Poled Ferroelectrics**  
*Hersh Desai, Amir Mortazawi, University of Michigan, USA **A***

## Th1C: Integrated Waveguide Technologies and Systems for RF and mm-Wave Applications

Chair: Jason Soric, Raytheon Technologies, USA — Co-Chair: Tarek Djerafi, INRS, Canada

Room 207, 08:00–09:40, Thursday 19 June 2025

- PAGE 690  
Th1C-1  
8:00  **C** **Innovative Hybrid Stripline Guiding Structure for Wideband Crossover Implementation**  
*Mohamed Mamdouh M. Ali<sup>1</sup>, L. Talbi<sup>2</sup>, K. Hettak<sup>2</sup>, Ke Wu<sup>3</sup>*  
<sup>1</sup>Assiut University, Egypt  ; <sup>2</sup>Université du Québec en Outaouais, Canada  ;  
<sup>3</sup>Polytechnique Montréal, Canada 
- PAGE 694  
Th1C-2  
8:20  **C** **A Compact Millimeter-Wave Phase Shifter Integrated Variable Coupler in SIW Technology for Beam-Forming Applications**  
*Inapurapu Suryarajitha, Gowrish Basavarajappa, R.K. Panigrahi, M.V. Kartikeyan, IIT Roorkee, India *
- (MWTL)  
Th1C-3  
8:40  **C** **Ka-Band AFSIW Circuit-on-Substrate for Satellite Applications**  
*Maxime Le Gall<sup>1</sup>, Anthony Ghiotto<sup>1</sup>, Issam Marah<sup>2</sup>*  
<sup>1</sup>IMS (UMR 5218), France  ; <sup>2</sup>Exens Solutions, France 
- PAGE 698  
Th1C-4  
9:00  **C** **Twisted-Shaped Millimeter-Wave Hybrid Couplers in 150nm GaN Technology for 5G Applications**  
*Sujeevan Vigneswaran<sup>1</sup>, Eric Kerhervé<sup>1</sup>, Nathalie Deltimple<sup>1</sup>, Romain Mathieu<sup>2</sup>, Kimon Vivien<sup>2</sup>*  
<sup>1</sup>IMS (UMR 5218), France  ; <sup>2</sup>UMS, France 
- PAGE 702  
Th1C-5  
9:20  **C** **A 150-GHz Butler Matrix in Quartz-IPD Technology**  
*Yun-Chien Tseng, Zi-Wei Shao, Chien-Nan Kuo, NYCU, Taiwan *

## Th1D: Microwave to THz Dielectric Material Characterization and Plasma Applications

Chair: Katia Grenier, LAAS-CNRS, France — Co-Chair: Kamel Haddadi, Université de Lille, France

Room 208, 08:00–09:40, Thursday 19 June 2025

- PAGE 706  
Th1D-1  
8:00  **C** **An EVA-Based High-Power and Absorptive Frequency-Selective Plasma Limiter**  
*Sandeep Narasapura Ramesh, Kushagra Singhal, Abbas Semnani, University of Toledo, USA *
- PAGE 710  
Th1D-2  
8:20  **C** **A Microwave Plasma Jet Array Based on SIW-Enabled Evanescent-Mode Cavity Resonator Technology**  
*Kushagra Singhal, Kazi Sadman Kabir, Abbas Semnani, University of Toledo, USA *
- PAGE 713  
Th1D-3  
8:30  **C** **Temperature and Humidity Effects on Electromagnetic Waves Utilizing 140GHz Radar Measurements**  
*Javagar Mahendran, Francesca Schenkel, Birk Hattenhorst, Thomas Musch, Ilona Rolfes, Jan Barowski, Christian Schulz, Ruhr-Universität Bochum, Germany *
- PAGE 717  
Th1D-4  
8:40  **C** **Dielectric Measurements of Conventional and 3-D Printed Substrate Materials from 50GHz to 1.5THz Using Free-Space and TDS Methods**  
*Xiaobang Shang<sup>1</sup>, Liam Ausden<sup>1</sup>, Mira Naftaly<sup>1</sup>, Nick Ridler<sup>1</sup>, Dou Feng<sup>2</sup>, Miguel Navarro-Cia<sup>2</sup>, Joel Hales<sup>3</sup>, Romeo Premierlani<sup>4</sup>*  
<sup>1</sup>NPL, UK  ; <sup>2</sup>University of Birmingham, UK  ; <sup>3</sup>Rogers, UK  ; <sup>4</sup>Varioprint, Switzerland 
- (MWTL)  
Th1D-5  
9:00  **C** **A Novel Q-Choked Sapphire Sandwiched Resonator for Wideband Measurements of Flat Dielectric Samples**  
*Wojciech Gwarek, Malgorzata Celuch, Lukasz Nowicki, QWED, Poland *
- PAGE 721  
Th1D-6  
9:20  **C** **A Radio-Frequency Microfluidic Dielectric Sensor Based on Coupled Stepped-Impedance Resonators**  
*Huai-En Liu<sup>1</sup>, Chao-Hsiung Tseng<sup>2</sup>*  
<sup>1</sup>NTUST, Taiwan  ; <sup>2</sup>NYCU, Taiwan 

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## Th1F: MMIC Power Amplifiers Covering E-Band to D-Band

Chair: David Brown, BAE Systems, USA — Co-Chair: Munkyo Seo, Sungkyunkwan University, Korea

Room 211, 08:00–09:40, Thursday 19 June 2025

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- PAGE 725  
Th1F-1  
8:00  **C** **A High-Efficiency E-Band GaN Doherty Power Amplifier with 35.7dBm Output Power and 22.8%/16.8% Peak/6-dB Back-Off Efficiency**  
*Bharath Cimbili<sup>1</sup>, Mingquan Bao<sup>2</sup>, Moise Safari Mugisho<sup>1</sup>, Christian Friesicke<sup>3</sup>, Sandrine Wagner<sup>3</sup>, Rüdiger Quay<sup>1</sup>*  
<sup>1</sup>Albert-Ludwigs-Universität Freiburg, Germany **A** ; <sup>2</sup>Ericsson, Sweden **A** ; <sup>3</sup>Fraunhofer IAF, Germany **A**
- PAGE 729  
Th1F-2  
8:20  **C** **E-Band Power Amplifier with 32.2dBm Psat, 31.3dBm OP1dB Utilizing Commercial 0.10- $\mu$ m GaAs pHEMT Technology**  
*Zhenbei Li, Qiuze Yu, Jian Zhang, Wuhan University, China **A***
- PAGE 733  
Th1F-3  
8:40  **C** **A Compact Wideband Low-Loss On-Chip Power Combiner for High-Efficiency GaN mm-Wave Power Amplifiers**  
*Bharath Cimbili<sup>1</sup>, Mingquan Bao<sup>2</sup>, Christian Friesicke<sup>3</sup>, Sandrine Wagner<sup>3</sup>, Rüdiger Quay<sup>1</sup>*  
<sup>1</sup>Albert-Ludwigs-Universität Freiburg, Germany **A** ; <sup>2</sup>Ericsson, Sweden **A** ; <sup>3</sup>Fraunhofer IAF, Germany **A**
- PAGE 737  
Th1F-4  
9:00  **C** **A 16-Way 115–129GHz High Power Amplifier with 20.9dBm P<sub>SAT</sub> and 17.6dBm P<sub>1dB</sub> in 40nm Bulk CMOS**  
*Jaegwan Kim, Munkyo Seo, Sungkyunkwan University, Korea **A***

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## Th1G: Mixed-Signal mm-Wave Circuits for High-Speed Communcation

Chair: Shi Bu, Broadcom, USA — Co-Chair: Edward Gebara, Michigan State University, USA

Room 215, 08:00–09:40, Thursday 19 June 2025

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- PAGE 741  
Th1G-1  
8:00  **C** **Broadband and Power-Efficient Optoelectronic Transmitter Monolithically Integrated in a SiGe BiCMOS ePIC Technology**  
*Festim Iseini, Andrea Malignaggi, Anna Peczek, Corrado Carta, Gerhard Kahmen, IHP, Germany **A***
- (MWTL)  
Th1G-2  
8:20  **C** **DC-to-89-GHz AMUX-Based IQ Modulator in 250-nm InP HBT Technology for Multiplexing-DAC Subsystem**  
*Munehiko Nagatani, Hitoshi Wakita, Teruo Jyo, Yuta Shiratori, Miwa Mutoh, Akira Kawai, Masanori Nakamura, Fukutaro Hamaoka, Hiroshi Yamazaki, Takayuki Kobayashi, Yutaka Miyamoto, Hiroyuki Takahashi, NTT, Japan **A***
- PAGE 745  
Th1G-3  
8:40  **C** **A 132GHz SiGe BiCMOS Sampler for Linear Front-Ends**  
*Srirup Bagchi<sup>1</sup>, Gregory Cooke<sup>2</sup>, Suyash Pati Tripathi<sup>1</sup>, Peter Schvan<sup>3</sup>, Sorin Voinigescu<sup>1</sup>*  
<sup>1</sup>University of Toronto, Canada **A** ; <sup>2</sup>Alphawave Semi, Canada **A** ; <sup>3</sup>Ciena, Canada **A**
- PAGE 749  
Th1G-4  
9:00  **C** **A >22GS/s, 44dB SNDR Wideband 4 $\times$ 4 Time-Interleaved Sampling Front-End with Bulk-Driven Mismatch Calibration in 22nm FDSOI**  
*Patrick J. Artz, Qihang He, Marcel Runge, Frowin Buballa, Enne Wittenhagen, Philipp Scholz, Friedel Gerfers, Technische Universität Berlin, Germany **A***
- PAGE 753  
Th1G-5  
9:20  **C** **A 0.9pJ/Bit 56Gb/s High-Swing Tri-Mode Wireline Transmitter with 6-Bit DAC Controlled Tailless-CML Driver and Impedance Calibration Loop**  
*Ruixiao Kuai, Fangxu Lv, Jiaqing Xu, Qiang Wang, Geng Zhang, Liangyong Yuan, Kewei Xin, Heng Huang, Hao Ding, Mingche Lai, NUDT, China **A***
- PAGE 757  
Th1G-6  
9:30  **C** **A Bi-Directional 5-Bit 131.5–150.5GHz Digital-Programmable Phase Shifter with 2.1°/0.3dB RMS Phase/Gain Errors in 40nm CMOS**  
*Lize Wang, Nengxu Zhu, Yibo Cui, Fanyi Meng, Tianjin University, China **A***

## Th2A: Advanced Packaging and Integration Technologies up to Sub-THz Frequencies

Chair: Dominique Baillargeat, XLIM and Université de Limoges, France — Co-Chair: Telesphor Kamgaing, Intel, USA  
Room 203, 10:10–11:50, Thursday 19 June 2025

- (MWTL) Th2A-1 10:10  **C** **Novel Low-Loss Shielded Interconnects for D-Band/Sub-THz Applications Using Microscale Metal Printing Technologies**  
*Genaro Soto-Valle, Marvin Joshi, Yaw Mensah, Nikolas Roeske, Charles A. Lynch III, John D. Cressler, Manos M. Tentzeris, Georgia Tech, USA* 
- PAGE 761 Th2A-2 10:30  **C** **3DGS 3D Heterogeneous Integrated RF Multi-Layers Glass-Interposer System-in-Package**  
*Jeb Flemming, Kyle McWethy, Rob Hulsman, Mohamed Basha, 3DGS, USA* 
- PAGE 765 Th2A-3 10:50  **C** **High Performance Waveguide Launcher in Interposer Package Technology for 77/79GHz Automotive 4D Imaging Radar**  
*R. Ebrahimzadeh<sup>1</sup>, T. Elkarkraoui<sup>1</sup>, M. Marvasti<sup>1</sup>, A. Zanati<sup>2</sup>, J. Harm<sup>2</sup>, M.R. Nezhad-Ahmadi<sup>1</sup>*  
<sup>1</sup>*mmSense Technologies, Canada*  ; <sup>2</sup>*NXP Semiconductors, Germany* 
- PAGE 769 Th2A-4 11:10  **C** **First Demonstration of Highly Scaled RF GaN-on-Si Dielets Embedded in Glass Interposer**  
*Pradyot Yadav<sup>1</sup>, Xingchen Li<sup>2</sup>, John Niroula<sup>1</sup>, Patrick Darmawi-Iskandar<sup>1</sup>, Ulrich L. Rohde<sup>3</sup>, Tomás Palacios<sup>1</sup>, Madhavan Swaminathan<sup>4</sup>*  
<sup>1</sup>*MIT, USA*  ; <sup>2</sup>*Georgia Tech, USA*  ; <sup>3</sup>*Universität der Bundeswehr München, Germany*  ; <sup>4</sup>*Pennsylvania State University, USA* 
- PAGE 773 Th2A-5 11:20  **C** **Thin Film Transmission Lines on Low-k Polymer Films for Sub-THz Applications**  
*Lakshmi Narasimha Vijay Kumar<sup>1</sup>, Pragna Bhaskar<sup>1</sup>, Mohammad Al-Juwahri<sup>2</sup>, Madhavan Swaminathan<sup>2</sup>*  
<sup>1</sup>*Georgia Tech, USA*  ; <sup>2</sup>*Pennsylvania State University, USA* 

## Th2B: Recent Advances in Microwave Acoustic Filter and Resonator Technologies

Chair: Holger Maune, OvG Universität Magdeburg, Germany — Co-Chair: Amelie Hagelauer, Fraunhofer EMFT, Germany  
Room 205, 10:10–11:50, Thursday 19 June 2025

- N/A Th2B-1 10:10  **C** **The Unexpected Technology Race Between Surface (SAW) and Bulk (BAW) Acoustic Wave Filters in Today's Cell Phones**  
*Rich Ruby, Broadcom, USA* 
- PAGE 778 Th2B-2 10:30  **C** **Low-Loss Longitudinal Leaky SAW Filter with 1350MHz Bandwidth on LiNbO<sub>3</sub>/SiO<sub>2</sub>/SiC Platform for Wi-Fi 7**  
*Xiaoli Fang, Mijing Sun, Shibin Zhang, Pengcheng Zheng, Xinjian Ke, Juxing He, Xin Ou, CAS, China* 
- (MWTL) Th2B-3 10:50  **C** **Frequency and Bandwidth Design Toward Millimeter-Wave Thin-Film Lithium Niobate Acoustic Filters**  
*Omar Barrera, Taran Anusorn, Sinwoo Cho, Jack Kramer, Vakhtang Chulukhadze, Tzu-Hsuan Hsu, Joshua Campbell, Ian Anderson, Ruochen Lu, University of Texas at Austin, USA* 
- PAGE 782 Th2B-4 11:10  **C** **Miniature High-Coupling Lithium Niobate Thin Film Bulk Acoustic Wave Resonators at 10–30GHz**  
*Vakhtang Chulukhadze, Yinan Wang, Ian Anderson, Jack Kramer, Sinwoo Cho, Ruochen Lu, University of Texas at Austin, USA* 
- PAGE 786 Th2B-5 11:30  **C** **A 36GHz Trilayer AlN/ScAlN/AlN Periodically Poled FBAR**  
*Wenhao Peng, Suhyun Nam, Ding Wang, Zetian Mi, Amir Mortazawi, University of Michigan, USA* 

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## Th2C: Multi-Functional Phase-Shifting Devices

Chair: Shahrokh Saeedi, Boeing, USA — Co-Chair: Roberto Gómez-García, Universidad de Alcalá, Spain

Room 207, 10:10–11:50, Thursday 19 June 2025

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- (MWTL)  
Th2C-1  
10:10  **C** **A Reconfigurable Filtering Circulator/Isolator with Continuously Controllable Center Frequency and Insertion Phase**  
*Yuhang Ning<sup>1</sup>, Zhihua Wei<sup>1</sup>, Bin Liu<sup>1</sup>, Pei-Ling Chi<sup>2</sup>, Tao Yang<sup>1</sup>*  
<sup>1</sup>UESTC, China  ; <sup>2</sup>NYCU, Taiwan 
- PAGE 790  
Th2C-2  
10:30  **C** **A Miniaturized Marchand Balun-Based Broadband Vector Sum Phase Shifter with 0.49° RMS Phase Error**  
*Sungwon Kwon, Byung-Wook Min, Yonsei University, Korea *
- PAGE 794  
Th2C-3  
10:50  **C** **Novel Reflective-Type Bandpass Filter with Simultaneously Integrated Tunable Attenuation and Phase Shifting Functions**  
*Zhihua Wei<sup>1</sup>, Xiong Chen<sup>2</sup>, Yuhang Ning<sup>1</sup>, Huaizong Shao<sup>1</sup>, Pei-Ling Chi<sup>3</sup>, Tao Yang<sup>1</sup>*  
<sup>1</sup>UESTC, China  ; <sup>2</sup>CETC 29, China  ; <sup>3</sup>NYCU, Taiwan 
- PAGE 798  
Th2C-4  
11:10  **C** **Enhanced Performance of Continuously Variable Phase Shifters Using Liquid Crystals in Corrugated Oversized Substrate Integrated Waveguides**  
*Olivier Tomé, Emanuele Orgiu, Tarek Djerafi, INRS-EMT, Canada *
- PAGE 802  
Th2C-5  
11:30  **C** **A Novel Multi-Functional Filtering Amplitude/Phase Circuit with Tunable Frequency Using Simple Phase Control Network**  
*Yuhang Ning<sup>1</sup>, Zhihua Wei<sup>1</sup>, Bin Liu<sup>1</sup>, Pei-Ling Chi<sup>2</sup>, Tao Yang<sup>1</sup>*  
<sup>1</sup>UESTC, China  ; <sup>2</sup>NYCU, Taiwan 

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## Th2D: (Joint with ARFTG) Advances in RF to THz Instrumentation and Device Measurements

Chair: Gian Piero Gibiino, Università di Bologna, Italy — Co-Chair: Marcus Da Silva, National Instruments, USA

Room 208, 10:10–11:50, Thursday 19 June 2025

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- (MWTL)  
Th2D-1  
10:10  **C** **Traceable S-Parameter Measurements up to 165GHz Using 0.8mm Coaxial Standards**  
*Andreas Schramm, Frauke Gellersen, Florian Rausche, Karsten Kuhlmann, PTB, Germany *
- (MWTL)  
Th2D-2  
10:30  **C** **Millimeter-Wave Wideband Active Load-Pull System Using Vector Network Analyzer Frequency Extenders**  
*Ahmed Ben Ayed, Slim Boumaiza, University of Waterloo, Canada *
- PAGE 806  
Th2D-3  
10:50  **C** **A Wideband Digital Compensation Model Based on Fast Bandwidth Sensing for Zero-IF Receiver**  
*Jiaxuan Zhu, Jun Peng, Lei Liu, Xiaoling Qin, Tianyang Zhong, Yuchen Bian, Xinyu Wang, Fangzhou Yu, Min Xiong, Chenrui Liang, UESTC, China *
- PAGE 810  
Th2D-4  
11:10  **C** **Cross-Spectrum Phase Noise Measurements of 10<sup>-15</sup>-Level Stability Photonic Microwave Oscillators**  
*M. Giunta<sup>1</sup>, B. Rauf<sup>1</sup>, S. Pucher<sup>1</sup>, S. Afrem<sup>1</sup>, W. Wendler<sup>2</sup>, A. Roth<sup>2</sup>, J. Kornprobst<sup>2</sup>, S. Peschl<sup>3</sup>, J. Schulz<sup>3</sup>, J. Schorer<sup>3</sup>, M. Fischer<sup>1</sup>, R. Holzwarth<sup>1</sup>*  
<sup>1</sup>Menlo Systems, Germany  ; <sup>2</sup>Rohde & Schwarz, Germany  ; <sup>3</sup>HENSOLDT, Germany 

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## Th2F: Group III-V MMICs Above D-Band Frequencies

Chair: Nguyen L.K. Nguyen, University of California, Davis, USA — Co-Chair: Kevin Kobayashi, Qorvo, USA

Room 211, 10:10-11:50, Thursday 19 June 2025

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- N/A  
Th2F-1  
10:10  **C** **InP HBT Technologies for Integrated Circuit Development of Efficient mm-Wave and THz Power Amplifiers and Sources**  
*Zach Griffith, Teledyne Scientific & Imaging, USA *
- (MWTL)  
Th2F-2  
10:30  **C** **300-GHz-Band InP HBT Power Amplifier Module Enabling 280-Gb/s 0-dBm Signal Generation with Digital Predistortion**  
*Teruo Jyo<sup>1</sup>, Sam Kusano<sup>2</sup>, Hiroaki Katsurai<sup>1</sup>, Hiroshi Hamada<sup>1</sup>, Munehiko Nagatani<sup>1</sup>, Miwa Mutoh<sup>1</sup>, Yuta Shiratori<sup>1</sup>, Hiroyuki Takahashi<sup>1</sup>*  
<sup>1</sup>NTT, Japan  ; <sup>2</sup>Keysight Technologies, USA 
- PAGE 815  
Th2F-3  
10:50  **C** **300GHz 8×1 Active Phased Array MMIC with On-Chip Power Amplifiers, Vector Modulators, and Antennas**  
*Bersant Gashi<sup>1</sup>, Laurenz John<sup>1</sup>, Konstantin Kuliabin<sup>2</sup>, Arnulf Leuther<sup>1</sup>, Rüdiger Quay<sup>1</sup>*  
<sup>1</sup>Fraunhofer IAF, Germany  ; <sup>2</sup>Albert-Ludwigs-Universität Freiburg, Germany 
- PAGE 819  
Th2F-4  
11:10  **C** **208GHz InP Distributed Amplifier with Combining Loss Reduction Techniques**  
*Can Cui<sup>1</sup>, Nguyen L.K. Nguyen<sup>1</sup>, Phat T. Nguyen<sup>1</sup>, Natalie S. Wagner<sup>2</sup>, Alexander N. Stameroff<sup>2</sup>, Anh-Vu Pham<sup>1</sup>*  
<sup>1</sup>University of California, Davis, USA  ; <sup>2</sup>Keysight Technologies, USA 
- PAGE 823  
Th2F-5  
11:30  **C** **A Broadband InP Darlington Amplifier with Two-Way Distributed Power Combining**  
*Lianbo Liu, Zhaojing Fu, Sensen Li, University of Texas at Austin, USA *

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## Th2G: Advances in Receivers and Building Blocks

Chair: Mohammad Ghadiri-Sadrabadi, Kyocera, USA — Co-Chair: Damla Dimlioglu, Cornell University, USA

Room 215, 10:10-11:50, Thursday 19 June 2025

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- PAGE 827  
Th2G-1  
10:10  **C** **A Ku-Band CMOS LNA with Symmetric Polarity-Selective Transformer for Efficient 180° Phase Shifting**  
*Jae-Hyeok Song, Jeong-Taek Lim, Jae-Eun Lee, Jeong-Taek Son, Joon-Hyung Kim, Min-Seok Baek, Eun-Gyu Lee, Choul-Young Kim, Chungnam National University, Korea *
- PAGE 831  
Th2G-2  
10:30  **C** **A 130GHz 360° Gain-Invariant Phase Shifter with 5.625° Phase Resolution, 0.19° RMS Phase Error and < 0.56dB RMS Gain Error**  
*Jirui Li, Peiting Li, Peigen Zhou, Wei Hong, Southeast University, China *
- PAGE 835  
Th2G-3  
10:50  **C** **An 86-90GHz Adaptive Gain CMOS LNA with Linearity Enhancement & -6dBm Blocker Tolerance**  
*Harsh Pallav Govind Rao, Tal Elazar, Eran Socher, Tel Aviv University, Israel *
- PAGE 839  
Th2G-4  
11:00  **C** **A 71-86-GHz Receiver with 5-GHz IF Signal Bandwidth for E-Band Broadband Communication in 65-nm CMOS**  
*Wenyang Zhao<sup>1</sup>, Quanyong Li<sup>1</sup>, Jingwen Xu<sup>1</sup>, Bing Ruan<sup>1</sup>, Lujia Wu<sup>1</sup>, Nayu Li<sup>2</sup>, Xiaokang Qi<sup>1</sup>, Chunyi Song<sup>1</sup>, Zhiwei Xu<sup>2</sup>*  
<sup>1</sup>Zhejiang University, China  ; <sup>2</sup>Donghai Laboratory, China 
- PAGE 843  
Th2G-5  
11:10  **C** **A 6.5-GHz Low-Power Self-Interference Cancellation Receiver with Two-Stage Feedforward Technique and Automatic Gain Control Loop**  
*Teng-Shen Yang, Yi-Chieh Chou, Liang-Hung Lu, National Taiwan University, Taiwan *

Th2G continued ...

- PAGE 847  
Th2G-6  
11:30
-  **C** **First Demonstration of MMIC Low-Noise Amplifiers Operating at Ka-Band Realized with Enhancement-Mode Gallium Nitride HEMTs**  
*Patrick E. Longhi<sup>1</sup>, Philippe Altuntas<sup>2</sup>, Mohamed Salah Khenissa<sup>2</sup>, Peter Frijlink<sup>2</sup>, Charles Edoua Kacou<sup>2</sup>, Julien Poulain<sup>2</sup>, Sergio Colangeli<sup>1</sup>, Walter Ciccognani<sup>1</sup>, Antonio Serino<sup>1</sup>, Vanya Sharma<sup>1</sup>, Ernesto Limiti<sup>1</sup>*  
<sup>1</sup>Università di Roma "Tor Vergata", Italy  ; <sup>2</sup>MACOM, France 

## Th3A: Advances in 3D-Printing and Additive Manufacturing

Chair: Nicholas Koliass, Raytheon Technologies, USA — Co-Chair: Neelam Prabhu Gaunkar, Intel, USA

Room 203, 13:30-15:10, Thursday 19 June 2025

- PAGE 851  
Th3A-1  
13:30
-  **C** **Flexible Focalization: An Additively Manufactured, Conformal, Low-Profile Multilayer Transmitarray for Space-Based 5G/mmWave Applications**  
*Theodore W. Callis, Marvin Joshi, Denitsa G. Dimitrova, Charles A. Lynch III, Manos M. Tentzeris, Georgia Tech, USA* 
- PAGE 855  
Th3A-2  
13:50
-  **C** **A Reconfigurable Dielectric-Loaded Millimeter-Wave Waveguide Bandpass Filter Based on Customized 3D-Printing Vanadium Dioxide Filament**  
*Hong Tang<sup>1</sup>, Daniel Kelley<sup>1</sup>, Powei Liu<sup>2</sup>, S.M. Rakibul Hasan Shawon<sup>1</sup>, Bowen Zheng<sup>1</sup>, Yi Huang<sup>1</sup>, Yunxi Dong<sup>1</sup>, Huan Zhao<sup>1</sup>, Boyang Xiang<sup>1</sup>, Jie Li<sup>3</sup>, Bayaner Arigong<sup>2</sup>, Guy DeMartinis<sup>1</sup>, Wei Guo<sup>1</sup>, Hualiang Zhang<sup>1</sup>*  
<sup>1</sup>UMass Lowell, USA  ; <sup>2</sup>FAMU-FSU, USA  ; <sup>3</sup>Argonne National Laboratory, USA 
- PAGE 859  
Th3A-3  
14:10
-  **C** **Aerosol Jet Fully 3D Printed RF Attenuator Using Resistive Ink**  
*Lucas Hendershot, Matt Hodek, John Albrecht, Prem Chahal, John Papapolymerou, Michigan State University, USA* 
- (MWTL)  
Th3A-4  
14:30
-  **C** **An Agile Additively Manufactured 5G/mm-Wave RF Front-End with Multilayer Conformality and Printed RF VIAs for Ultrawideband and Miniaturized Systems**  
*Hani Al Jamal, Manos M. Tentzeris, Georgia Tech, USA* 
- PAGE 862  
Th3A-5  
14:50
-  **C** **Integration of Millimeter-Wave Air Filled Cavities and Filters Using Vertically Aligned Carbon Nanotubes**  
*Ankit Kumar Verma<sup>1</sup>, Rongtao Jiang<sup>2</sup>, Jianping Zou<sup>2</sup>, Chong Wei Tan<sup>2</sup>, Amit Kumar<sup>3</sup>, Beng Kang Tay<sup>2</sup>, Dominique Baillargeat<sup>3</sup>, Philippe Coquet<sup>2</sup>, Stéphane Bila<sup>1</sup>*  
<sup>1</sup>XLIM (UMR 7252), France  ; <sup>2</sup>CINTRA (UMI 3288), Singapore  ; <sup>3</sup>CNRS@CREATE, Singapore 

## Th3B: Advanced Semiconductor Technologies

Chair: Wolfram Stiebler, Raytheon Technologies, USA — Co-Chair: Lei Zhang, NXP Semiconductors, USA

Room 205, 13:30–15:10, Thursday 19 June 2025

- PAGE 866  
Th3B-1  
13:30  **C** **Deep Level Effects and Hot-Electron Reliability in Scaled GaN HEMTs**  
*Enrico Zanoni, Andrea Carlotto, Francesco De Pieri, Manuel Fregolent, Marco Saro, Fabiana Rampazzo, Carlo De Santi, Gaudenzio Meneghesso, Matteo Meneghini, Università di Padova, Italy* 
- PAGE 870  
Th3B-2  
13:50  **C** **On-Wafer Characterization of K-Band to V-Band GaN IMPATT Diodes**  
*Zhongtao Zhu<sup>1</sup>, Lina Cao<sup>1</sup>, Juncheng Xiong<sup>1</sup>, Yu Duan<sup>1</sup>, Yu-En Jeng<sup>1</sup>, Jinqiao Xie<sup>2</sup>, Patrick Fay<sup>1</sup>*  
*<sup>1</sup>University of Notre Dame, USA*  ; *<sup>2</sup>Qorvo, USA* 
- (MWTL)  
Th3B-3  
14:10  **C** **AlN/GaN MIS-HEMT with GeN Gate Dielectric for mm-Wave Applications**  
*Jianchao Wang, Kaiyu Wang, Ruizhe Zhang, Xiaoqiang He, Sheng Zhang, Jiaqi Guo, Jiebin Niu, Yankui Li, Weichao Wu, Weijun Luo, Xiaojuan Chen, Sen Huang, Xinhua Wang, Ke Wei, Xinyu Liu, CAS, China* 
- PAGE 874  
Th3B-4  
14:30  **C** **Influence of Double-Deck T-Gate Structures on Cut-Off Frequency in Al<sub>0.3</sub>Ga<sub>0.7</sub>N/AlN/GaN HEMTs**  
*Jong Yul Park, Junhyung Jeong, Gyejung Lee, Kyujun Cho, Junhyung Kim, Byoung-Gue Min, Jong-Min Lee, Woojin Chang, Hong-Gu Ji, Dong-Min Kang, ETRI, Korea* 
- PAGE 878  
Th3B-5  
14:50  **C** **Small- and Large-Signal Characterization of RF Substrates Down to Cryogenic Temperatures**  
*Jose Lugo-Alvarez, Quentin Berlingard, Ismaël Charlet, Mikaël Cassé, CEA-Leti, France* 

## Th3C: Reconfigurable Filtering Devices

Chair: Hjalti H. Sigmarsson, University of Oklahoma, USA

Co-Chair: Julien Lintignat, XLIM and Université de Limoges, France

Room 207, 13:30–15:10, Thursday 19 June 2025

- PAGE 882  
Th3C-1  
13:30  **C** **Unilateral Single-Pole Multi-Throw Filtering Switch Using Spatiotemporally Modulated Resonator Arrays**  
*Zixiao Zhang, Dimitra Psychogiou, University College Cork, Ireland* 
- PAGE 886  
Th3C-2  
13:50  **C** **Tunable Dual-Band Coaxial Filter with Independent Band Control Using a Single Tuning Element Per Band**  
*S. Mojtaba Pourjaafari<sup>1</sup>, Mohamed M. Fahmi<sup>2</sup>, Raafat R. Mansour<sup>1</sup>*  
*<sup>1</sup>University of Waterloo, Canada*  ; *<sup>2</sup>DRDC, Canada* 
- PAGE 890  
Th3C-3  
14:10  **C** **A Magnetostatic Surface Wave Filter Tunable Over 8–32GHz Realized in Thickness Scaled Yttrium Iron Garnet**  
*Xingyu Du, Shun Yao, Shuxian Wu, Chin-yu Chang, Roy H. Olsson III, University of Pennsylvania, USA* 
- PAGE 894  
Th3C-4  
14:30  **C** **Spin Wave Fast Tunable (SWiFT) Filter**  
*Kyle D. Holzer, Elvin C. Chou, L3Harris Technologies, USA* 
- PAGE 898  
Th3C-5  
14:50  **C** **An Electrical Balance Duplexer Architecture without Inherent Insertion Loss Limitation**  
*Christof Pfannenmüller, Björn Lenhart, Martin Frank, Alexander Spielberger, Dominic Köhler, Robert Weigel, Oliver Dorn, FAU Erlangen-Nürnberg, Germany* 

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## Th3D: (Joint with ARFTG) On-Wafer Measurement Structures and Processes

Chair: Shuhei Amakawa, Hiroshima University, Japan — Co-Chair: Jon Martens, Anritsu, USA

Room 208, 13:30–15:10, Thursday 19 June 2025

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- N/A  
Th3D-1  
13:30  **C** **Past, Present and Future Challenges of Testing RFIC Industry**  
*Gerardo Orozco, Emerson, USA* 
- PAGE 903  
Th3D-2  
13:50  **C** **Integrated Solution for Linear and Non-Linear Single-Touchdown On-Wafer Characterization of D-Band Mixers**  
*Patrick Umbach<sup>1</sup>, Nico Riedmann<sup>2</sup>, Fabian Thome<sup>1</sup>, Martin Vossiek<sup>3</sup>, Rüdiger Quay<sup>1</sup>*  
<sup>1</sup>Fraunhofer IAF, Germany  ; <sup>2</sup>Rohde & Schwarz, Germany  ; <sup>3</sup>FAU Erlangen-Nürnberg, Germany 
- PAGE 907  
Th3D-3  
14:10  **C** **Characterization Approaches to Reduce Process Variation Dependencies for On-Wafer Power Calibration Transfer Devices in Bi/CMOS Technologies**  
*Zerui Gao<sup>1</sup>, Carmine de Martino<sup>1</sup>, Marco Pelk<sup>1</sup>, Steffen Lehmann<sup>2</sup>, Marco Spirito<sup>1</sup>*  
<sup>1</sup>Technische Universiteit Delft, The Netherlands  ; <sup>2</sup>GlobalFoundries, Germany 
- PAGE 911  
Th3D-4  
14:30  **C** **Differential-Mode Characterization of Multi-Port Passives up to 170GHz Using Independent Single-Ended Two-Port Measurements**  
*R. Schalk<sup>1</sup>, M. Lont<sup>2</sup>, T.H. Both<sup>2</sup>, L. Tiemeijer<sup>2</sup>, M. Neofytou<sup>1</sup>, G. Radulov<sup>1</sup>, V. Vidojkovic<sup>1</sup>, K. Doris<sup>1</sup>*  
<sup>1</sup>Technische Universiteit Eindhoven, The Netherlands  ; <sup>2</sup>NXP Semiconductors, The Netherlands 
- PAGE 915  
Th3D-5  
14:50  **C** **Cryogenic Microwave Probe Technology with High Thermal Insulation**  
*Tomonori Arakawa, Junta Igarashi, Shota Norimoto, Noriyoshi Hashimoto, Makoto Minohara, Nobu-Hisa Kaneko, Hiroyuki Kayano, AIST, Japan* 

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## Th3F: AI for Design and Optimization of RFICs and Arrays

Chair: Zheng Liu, Texas Instruments, USA — Co-Chair: Chenhao Chu, ETH Zürich, Switzerland

Room 211, 13:30–15:10, Thursday 19 June 2025

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- PAGE 918  
Th3F-1  
13:30  **C** **Algorithmic Design of Nonintuitive On-Chip Multilayered Passive Networks**  
*Vinay Chenna, Hossein Hashemi, University of Southern California, USA* 
- (MWTL)  
Th3F-2  
13:50  **C** **A D-Band InP Power Amplifier Featuring Fully AI-Generated Passive Networks**  
*Song Hang Chai, Hyunsu Chae, Hao Yu, David Z. Pan, Sensen Li, University of Texas at Austin, USA* 
- PAGE 922  
Th3F-3  
14:10  **C** **AI-Assisted Template-Seeded Pixelated Design for Multi-Metal-Layer High-Coupling EM Structures: A Ku-Band 6G FR3 PA in 22nm FDX+**  
*Chenhao Chu<sup>1</sup>, Jinglong Xu<sup>1</sup>, Yuqi Liu<sup>1</sup>, Jianping Zeng<sup>1</sup>, Adam Wang<sup>1</sup>, Takuma Torii<sup>2</sup>, Shintaro Shinjo<sup>2</sup>, Koji Yamanaka<sup>2</sup>, Hua Wang<sup>1</sup>*  
<sup>1</sup>ETH Zürich, Switzerland  ; <sup>2</sup>Mitsubishi Electric, Japan 
- PAGE 926  
Th3F-4  
14:30  **C** **Dall-EM: Generative AI with Diffusion Models for New Design Space Discovery and Target-to-Electromagnetic Structure Synthesis**  
*Yingqing Guo, Emir Ali Karahan, Zihao Li, Zijian Shao, Zaixi Zhang, Mengdi Wang, Kaushik Sengupta, Princeton University, USA* 
- PAGE 930  
Th3F-5  
14:50  **C** **On-Board Array Self-Calibration Using Amplitude-Only Proximal-Field Sensors and Machine-Learning-Based Phase Retrieval**  
*Ailec Wu, Imaad A. Syed, Alex Ayling, Ali Hajimiri, Caltech, USA* 

## Th3G: Advances in LNAs from C-Band to D-Band

Chair: Roee Ben Yishay, Mobileye, Israel — Co-Chair: Shirin Montazeri, Google, USA

Room 215, 13:30–15:10, Thursday 19 June 2025

- PAGE 934  
Th3G-1  
13:30  **C** **A C/X-Band LNA Leveraging a Voltage-Tapered Gain-Cell Stacking Technique for 6G and IR-UWB**  
*Bo Lindstrom, Jesse Moody, Sandia National Laboratories, USA* 
- PAGE 938  
Th3G-2  
13:50  **C** **An 8–12.2GHz CMOS Low-Noise Amplifier with Partially Tail-Coupled Transformer and Large-Transistor Achieving 1.8dB Average NF**  
*Min-Seok Baek<sup>1</sup>, Jae-Hyeok Song<sup>1</sup>, Jae-Eun Lee<sup>1</sup>, Jong-Seong Park<sup>1</sup>, Ilhun Kim<sup>1</sup>, Jeong-Taek Lim<sup>1</sup>, Eun-Gyu Lee<sup>1</sup>, Seong-Mo Moon<sup>2</sup>, Dongpil Chang<sup>2</sup>, Choul-Young Kim<sup>1</sup>*  
<sup>1</sup>Chungnam National University, Korea  ; <sup>2</sup>ETRI, Korea 
- PAGE 942  
Th3G-3  
14:10  **C** **Broadband LNA with Dual-Resonance Matching Network with Capacitive Feedback for Improved Gain and Noise Figure Using 0.1- $\mu$ m GaAs pHEMT Technology**  
*Jong-Seong Park<sup>1</sup>, Jeong-Taek Son<sup>1</sup>, Joon-Hyung Kim<sup>1</sup>, Min-Seok Baek<sup>1</sup>, Byeong-Chan Lee<sup>1</sup>, Eun-Gyu Lee<sup>1</sup>, Jeong-Taek Lim<sup>1</sup>, Seong-Mo Moon<sup>2</sup>, Dongpil Chang<sup>2</sup>, Choul-Young Kim<sup>1</sup>*  
<sup>1</sup>Chungnam National University, Korea  ; <sup>2</sup>ETRI, Korea 
- (MWTL)  
Th3G-4  
14:30  **C** **A 140-GHz Low-Noise Amplifier in 45-nm RFSOI Based on a Joint-Noise-and-Gain-Optimized Embedding Network**  
*Phong Nguyen, Harish Krishnaswamy, Columbia University, USA* 
- PAGE 946  
Th3G-5  
14:50  **C** **A 50–70.9-GHz LNA with Defectively-Coupled-Transformer Achieving Sub-4 dB NF and 298.6-GHz GBW for 5G NR-FR2-2 and SATCOM**  
*Aoran Han, Deshan Tang, Xun Luo, UESTC, China* 

## IF1: Interactive Forum

Chair: Bert Henderson, Consultant, USA and Kiyoshi Miyashita, ASML, USA and Matt Clements, CAES by Honeywell, USA

Room Exhibit Hall Floor, 15:10–17:00, Wednesday 18 June 2025

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IF1-1  
15:10  **C** **Ku-Band Multi-Functional Bandpass Filtering Isolators (BPFIs) Using GaAs Coupled-Line-Based Unilateral Frequency-Selective Stages**  
*Kexin Li, Andrés Fontana, Dimitra Psychogiou, University College Cork, Ireland* 
- N/A  
IF1-2  
15:30  **C** **GaN-Based Power Amplification Unit for the Europa Clipper Mission**  
*Karthik Srinivasan<sup>1</sup>, Harry S. Figueroa<sup>1</sup>, Duane C. Howard<sup>2</sup>, Erich T. Schlecht<sup>1</sup>, Ricardo S. Zebulum<sup>1</sup>, Tushar Shenoy<sup>3</sup>, Donald L. Kirchner<sup>4</sup>, Alina Moussessian<sup>1</sup>*  
<sup>1</sup>Jet Propulsion Laboratory, USA  ; <sup>2</sup>Astranis Space Technologies, USA  ; <sup>3</sup>Blue Origin Enterprises, USA  ; <sup>4</sup>University of Iowa, USA 
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IF1-3  
15:50  **C** **Dielectric Filled Waveguide Antenna for Air-Borne Application**  
*Madhumita Chakravarti<sup>1</sup>, Anil Chopala<sup>2</sup>, Asudeb Dutta<sup>1</sup>*  
<sup>1</sup>IIT Hyderabad, India  ; <sup>2</sup>DRDO, India 
- PAGE 962  
IF1-4  
16:10  **C** **An Area-Efficient Reconfigurable Compact Multi-Band Directional Coupler in RF SOI CMOS Technology**  
*Ting-Li Hsu<sup>1</sup>, Amelie Hagelauer<sup>1</sup>, Valentyn Solomko<sup>2</sup>*  
<sup>1</sup>Technische Universität München, Germany  ; <sup>2</sup>Infineon Technologies, Germany 
- PAGE 966  
IF1-5  
16:30  **C** **Metasurface Design for RCS Reduction Applications**  
*Irfan Ahmed<sup>1</sup>, Muhammad Noman<sup>2</sup>, Muhammad Imran<sup>2</sup>, Farooq A. Tahir<sup>2</sup>, Qammer H. Abbasi<sup>2</sup>*  
<sup>1</sup>NUST, Pakistan  ; <sup>2</sup>University of Glasgow, UK 

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IF1-6  
16:50  **C** **USB Type-C Receptacle Connector with Ceramic Insulator and Three-Layer Ground Plates**  
*Jeong-Hun Park<sup>1</sup>, Chung-Seok Lee<sup>2</sup>, Jin-Man Jang<sup>2</sup>, Seon-Hwa Yun<sup>1</sup>, Jae-Hyuk Choi<sup>2</sup>, Moon-Que Lee<sup>1</sup>*  
<sup>1</sup>University of Seoul, Korea **A** ; <sup>2</sup>EDS Solution, Korea **A**
- PAGE 974  
IF1-7  
17:10  **C** **A TSPC mm-Wave Frequency Divider with up to 50GHz Input Frequency in 12nm FinFET Bulk CMOS**  
*Konstantin Vilyuk, Kai Scheller, Philip Hetterle, Florian Probst, Andre Engelmann, Albert-Marcel Schrotz, Norman Franchi, Robert Weigel, FAU Erlangen-Nürnberg, Germany **A***
- PAGE 978  
IF1-8  
17:30  **C** **A 28GHz Dual-Mode Power Amplifier for Enhanced Load Resiliency or Back-Off Efficiency Enhancement in 22nm FDSOI Process**  
*Hang Yu, Mehran Hazer Sahlabadi, Slim Boumaiza, University of Waterloo, Canada **A***
- PAGE 982  
IF1-9  
17:50  **C** **Electromagnetically Induced Transparency Based Metamaterials Integrated with Plasma Cells for High Power Microwave Protection**  
*Muhammad Rizwan Akram, Abbas Semnani, University of Toledo, USA **A***
- PAGE 985  
IF1-10  
18:10  **C** **A Full V-Band High-Output Power Frequency Doubler with High Fourth Harmonic Suppression in a InGaAs mHEMT Technology**  
*Eric Sigle, Arnulf Leather, Rüdiger Quay, Fraunhofer IAF, Germany **A***
- PAGE 989  
IF1-11  
18:30  **C** **Tensor Train Optimization for Polynomial Chaos for High Dimensional Uncertainty Quantification**  
*Ziyuan Wang, Roni Khazaka, McGill University, Canada **A***

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IF1-12  
18:50  **C** **Detection Algorithm for Waveguide Connection and Probe Contact States Based on Machine Learning in Frequency up to 1.1THz**  
*Ryo Sakamaki<sup>1</sup>, Seitaro Kon<sup>1</sup>, Shuhei Amakawa<sup>2</sup>, Takeshi Yoshida<sup>2</sup>, Satoshi Tanaka<sup>2</sup>, Minoru Fujishima<sup>2</sup>*  
<sup>1</sup>AIST, Japan **A** ; <sup>2</sup>Hiroshima University, Japan **A**
- PAGE 997  
IF1-13  
19:10  **C** **A Wideband TIA-Driver Unit in 22-nm CMOS FDSOI for Integrated Microwave Optoelectronic Oscillators**  
*Sareh Banavdi, Jierui Fu, Kamran Entesari, Texas A&M University, USA **A***
- PAGE 1001  
IF1-14  
19:30  **C** **New Coaxial Interconnection — Application to Wilkinson Dividers/Combiners**  
*Eric Rius, Jessica Benedicto, Jean François Favennec, Juan Pablo Guzmán Vélez, Lab-STICC (UMR 6285), France **A***
- PAGE 1005  
IF1-15  
19:50  **C** **A 230-GHz 3.5-dBm Phase-Shifter-Embedded Frequency Tripler with 360° Phase-Shifting Range in 40-nm CMOS**  
*Chun-Sheng Lin, Chun-Hsing Li, National Taiwan University, Taiwan **A***
- PAGE 1009  
IF1-16  
20:10  **C** **RPRS: Real-Time Privacy mm-Wave Radar Sensing System**  
*Haoyang Wu, Xiaodong Cai, Yichuan Gao, Chenlu Miao, Intel, China **A***
- PAGE 1013  
IF1-17  
20:30  **C** **Material Characterization of Graphene Oxide and Reduced Graphene Oxide Using Resonance Methods**  
*Lukasz Nowicki<sup>1</sup>, Mila Milenkovic<sup>2</sup>, Svetlana Jovanovic<sup>2</sup>, Marzena Olszewska-Placha<sup>1</sup>, Malgorzata Celuch<sup>1</sup>*  
<sup>1</sup>QWED, Poland **A** ; <sup>2</sup>University of Belgrade, Serbia **A**

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- PAGE 1017  **C** **A High-Efficiency Outphasing Power Amplifier Utilizing a Synthesized Direct-Matching Technique Based on Two-Section Branch-Line Coupler Output Combiner**  
*Baihua Zeng<sup>1</sup>, Pei-Wen Shu<sup>1</sup>, Shaoyong Zheng<sup>2</sup>, Xinyu Zhou<sup>3</sup>, Wing Shing Chan<sup>1</sup>*  
<sup>1</sup>CityUHK, China **A** ; <sup>2</sup>Sun Yat-sen University, China **A** ; <sup>3</sup>PolyU, China **A**
- N/A  **C** **Accurate Large-Scale Motion Sensing With FMCW Radar Based on Range-Dependent DFT Technique**  
*Jiayu Zhang, Zhiwei Zhang, Yuchen Li, Changzhan Gu, Junfa Mao, SJTU, China **A***
- PAGE 1025  **C** **A THz Attenuator Based on Voltage-Tunable Whispering Gallery Mode Resonator**  
*Huilin Zhang, Xuecou Tu, Dingxuan Gu, Zeyu Xu, Yunjie Rui, Zhanzhang Mai, Bingnan Yan, Chen Zhang, Xu Yan, Junyi Wu, Shuyu Zhou, Lin Kang, Jian Chen, Peiheng Wu, Nanjing University, China **A***
- PAGE 1028  **C** **Modified GaN Based Sequential Load-Modulated-Balanced-Amplifier Avoiding Schottky-Gate Effects & Increase Linearisability**  
*Gautam Jindal, Björn Jelonnek, Tilman Felgentreff, Nokia, Germany **A***
- PAGE 1032  **C** **Ultra-Wideband 6-Bit Passive Phase Shifter with Open-Circuit Microstrip Pseudo- $\pi$  Network and Low RMS Phase Error**  
*Tianci Zhang, Yuying Zhang, Kuisong Wang, Jing Wan, Xuming Sun, Xiaoxin Liang, CAS, China **A***
- PAGE 1036  **C** **A 28nm CMOS Almost All-Digital 0.5 to 4.0GHz Ultra-Wideband Ground Penetrating Radar for Lunar Surface Exploration**  
*Adrian Tang<sup>1</sup>, Arhison Bharathan<sup>2</sup>, Zachary Gonzalez-Ruskiewicz<sup>3</sup>, Omid Janani<sup>3</sup>, Christopher Kniss<sup>4</sup>, Yanghyo Kim<sup>4</sup>*  
<sup>1</sup>Jet Propulsion Laboratory, USA **A** ; <sup>2</sup>University of California, Los Angeles, USA **A** ; <sup>3</sup>Second Order Effects, USA **A** ; <sup>4</sup>Stevens Institute of Technology, USA **A**

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- PAGE 1039  **C** **Parallel Differential-Line Fed Planar Aperture Antenna-in-Package with Signal Lines Isolated from IC in 300-GHz Band**  
*Taisuke Uemura, Atsuya Yamazaki, Yoshiki Sugimoto, Kunio Sakakibara, Nobuyoshi Kikuma, Nagoya Institute of Technology, Japan **A***
- PAGE 1043  **C** **2200W High-Efficiency Amplifier Module Covering 325MHz and 352MHz Applications**  
*William G. Leijenaar, Leijenaar Electronics, The Netherlands **A***
- PAGE 1047  **C** **An Ultra-Low-Cost Early Warning Sensor for Pedestrians**  
*Cavon Hajimiri<sup>1</sup>, Ali Hajimiri<sup>2</sup>*  
<sup>1</sup>Polytechnic School, USA **A** ; <sup>2</sup>Caltech, USA **A**
- PAGE 1051  **C** **Quantum Method for Solving S-Parameters of Lossless Waveguides Based on the HHL Method and Finite-Element-Method**  
*Xiaolong Li<sup>1</sup>, Feng Feng<sup>1</sup>, Qi-Jun Zhang<sup>2</sup>*  
<sup>1</sup>Tianjin University, China **A** ; <sup>2</sup>Carleton University, Canada **A**
- PAGE 1055  **C** **High Power-Added-Efficiency AlGaIn/GaN E-Mode HEMTs for Low-Supply-Voltage RF Terminal Applications**  
*Xiaoqiang He, Ke Wei, Sheng Zhang, Ruizhe Zhang, Kaiyu Wang, Jiaqi Guo, Jianchao Wang, Rikang Zhao, Xinhua Wang, Yankui Li, Weijun Luo, Jiebin Niu, Xinyu Liu, CAS, China **A***
- PAGE 1059  **C** **GaN Trap Model Extraction Based on MHz Load-Line Measurements**  
*Petros Beleniotis, Cristina Andrei, Christos Zervos, Ulrich L. Rohde, Matthias Rudolph, BTU, Germany **A***
- PAGE 1063  **C** **A Coupler-Feedback Technique for Power Amplifier Gain Enhancement**  
*Ricky Mannion, Taylor Barton, University of Colorado Boulder, USA **A***

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- PAGE 1067  **C** **Analysis of High-Efficiency Power Amplifiers Exploiting Input Harmonics and Nonlinear I-V Knee Characteristics**  
*Pei-Wen Shu<sup>1</sup>, Baihua Zeng<sup>1</sup>, Li-Heng Zhou<sup>2</sup>, Xinyu Zhou<sup>3</sup>, Wing Shing Chan<sup>1</sup>*  
<sup>1</sup>CityUHK, China  ; <sup>2</sup>Nantong University, China  ; <sup>3</sup>PolyU, China 
- PAGE 1071  **C** **S-Parameter-Based Simulation Technique and Crosstalk Suppression for Large-Scale Superconducting Quantum-Computing Chip Design**  
*Shoichi Shiba<sup>1</sup>, Shuhei Tamate<sup>2</sup>, Peter A. Spring<sup>2</sup>, Aki Dote<sup>1</sup>, Norinao Kouma<sup>1</sup>, Yoshiyasu Doi<sup>1</sup>, Yasunobu Nakamura<sup>2</sup>, Shintaro Sato<sup>1</sup>*  
<sup>1</sup>Fujitsu, Japan  ; <sup>2</sup>RIKEN, Japan 
- PAGE 1075  **C** **High-Efficiency Low-Complexity ASK Transmitter Using an Inverse Class-F Power Amplifier with a Nonuniform Transmission-Line-Based Load Transformation Network**  
*Lukas Hüssen, Muh-Dey Wei, Renato Negra, RWTH Aachen University, Germany *
- PAGE 1079  **C** **A SiGe J-Band Gilbert Cell-Based Frequency Doubler and Power Amplifier Chain with 10dBm Output Power**  
*Stephan Hauptmeier, Muhammed Ali Yildirim, Nils Pohl, Ruhr-Universität Bochum, Germany *
- PAGE 1083  **C** **An Effective Basis Function Generation Structure for Digital Pre-Distortion in Wideband Scenarios**  
*Tianyang Zhong, Jun Peng, Songbai He, Jiakuan Zhu, Yuchen Bian, Min Xiong, Xinyu Wang, Chenrui Liang, Yijie Tang, UESTC, China *

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- PAGE 1087  **C** **Multi-Functional Modulated Surface Based on M-Type Ferrite for mmWave Application**  
*Nohgyeom Ha<sup>1</sup>, Soohyun Kim<sup>2</sup>, Horim Lee<sup>3</sup>, Min Jang<sup>3</sup>, Byeongjin Park<sup>3</sup>, Manos M. Tentzeris<sup>4</sup>, Sangkil Kim<sup>2</sup>*  
<sup>1</sup>Hanwha Systems, Korea  ; <sup>2</sup>Pusan National University, Korea  ; <sup>3</sup>KIMS, Korea  ; <sup>4</sup>Georgia Tech, USA 
- PAGE 1091  **C** **Dual-Band Surface Acoustic Wave Filter Based on Parallel Connected Resonators**  
*Junhong Cai, Yuandan Dong, UESTC, China *
- PAGE 1095  **C** **Fast-Switchable 3.6GHz GaN Doherty Power Amplifier for Energy-Efficient Non-Continuous Transmission of 256-QAM Signals**  
*Maximilian G. Becker, Robert Krämer, Marco Gunia, Frank Ellinger, Technische Universität Dresden, Germany *
- PAGE 1099  **C** **Predicting the Fidelity of Multiplexed Superconducting Qubit Readout with Multiphysics Numerical Methods**  
*Samuel T. Elkin<sup>1</sup>, Michael Haider<sup>2</sup>, Thomas E. Roth<sup>1</sup>*  
<sup>1</sup>Purdue University, USA  ; <sup>2</sup>Technische Universität München, Germany 
- PAGE 1103  **C** **TCN-DPD: Parameter-Efficient Temporal Convolutional Networks for Wideband Digital Predistortion**  
*Huanqiang Duan<sup>1</sup>, Manno Versluis<sup>1</sup>, Qinyu Chen<sup>2</sup>, Leo C.N. de Vreede<sup>1</sup>, Chang Gao<sup>1</sup>*  
<sup>1</sup>Technische Universiteit Delft, The Netherlands  ; <sup>2</sup>Universiteit Leiden, The Netherlands 
- PAGE 1107  **C** **Enhancing Long-Range Battery-Free Communication: A Passive Lens-Enabled Broadbeam Harmonic mmID for Emerging IoT Systems**  
*Marvin Joshi, Charles A. Lynch III, Kexin Hu, Manos M. Tentzeris, Georgia Tech, USA *

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IF1-42  
4:50  **C** **Heart Rate Variability Monitoring Using a Chord-Based Algorithms in Low-IF CW Radar Systems**  
*Yuan-Chi Tseng, Chin-Lung Yang, National Cheng Kung University, Taiwan* 
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IF1-43  
5:10  **C** **A Compact Brick-Type 40GHz-Band DBF Transmit Antenna Module Using Direct Digital RF Technology**  
*Koki Furuuchi, Ryosei Miyagawa, Yuki Fujiya, Junhao Zhang, Tomoyuki Furuichi, Satoshi Tsukamoto, Noriharu Suematsu, Tohoku University, Japan* 
- PAGE 1119  
IF1-44  
5:30  **C** **A 30-mW D-Band High-Sensitivity Self-Injection-Locked Radar Sensor with Integrated SIW Antenna in 70-nm GaAs pHEMT Technology**  
*Chih-Ju Wu<sup>1</sup>, Donglin Gao<sup>2</sup>, Shuping Li<sup>2</sup>, Austin Ying-Kuang Chen<sup>3</sup>, Chung-Tse Michael Wu<sup>1</sup>*  
*<sup>1</sup>National Taiwan University, Taiwan*  ; *<sup>2</sup>Rutgers University, USA*  ; *<sup>3</sup>University of California, Santa Cruz, USA* 
- PAGE 1123  
IF1-45  
5:50  **C** **Direction Finding for Software Defined Radios with Switched Uniform Circular Arrays**  
*Lennart Werner<sup>1</sup>, Markus Gardill<sup>2</sup>, Marco Hutter<sup>1</sup>*  
*<sup>1</sup>ETH Zürich, Switzerland*  ; *<sup>2</sup>BTU, Germany* 
- PAGE 1127  
IF1-46  
6:10  **C** **Extended D-Band Low-Noise-Amplifier MMICs Based on a 50-nm Metamorphic HEMT Technology**  
*Felix Heinz, Fabian Thome, Arnulf Leuther, Fraunhofer IAF, Germany* 
- PAGE 1131  
IF1-47  
6:30  **C** **A Body-Floating G-Band Frequency Doubler for Astronomical Receiver in 90-nm CMOS Process**  
*Yi-Heng Lee<sup>1</sup>, Chau-Ching Chiong<sup>2</sup>, Yunshan Wang<sup>1</sup>, Huei Wang<sup>1</sup>*  
*<sup>1</sup>National Taiwan University, Taiwan*  ; *<sup>2</sup>Academia Sinica, Taiwan* 