



**IMC-5G**  
Atlanta, 2019

**IEEE MTT-S International Microwave Conference on  
5G Hardware and System Technologies**  
August 15th-16th 2019, Atlanta, USA

## Conference Technical Program

Thursday, 15 <sup>th</sup> August 2019	10:00-11:30 Exhibition	08:00-08:45 <b>Registration and Coffee</b>		
		08:45-09:35	<b>Opening Session</b>	
			08:45-09:00	<b>Opening Remarks by Conference Chair</b> , Professor Hua Wang
			09:00-09:35	<b>Keynote Talk-1: 5G Evolution and Beyond</b> Dr. Christopher Hull, Director and Senior Principal Engineer Intel Labs, Intel Corporation, Hillsboro, OR, USA.
		09:35-09:50 <b>Coffee Break</b>		
		09:50-11:20	<b>Session 1: Advanced Systems and Networking Technologies</b>	
			09:50-10:15	<b>S1-1: Large Intelligent Surfaces Assisted MIMO Communication</b> , M.-S. Alouini, KAUST, Saudi Arabia ( <i>Invited Talk</i> )
			10:15-10:30	<b>S1-2: Towards Dynamic 5G Networks Utilizing Flexible Function Split</b> , Y. Alfadhli, Georgia Institute of Technology, USA ( <i>Regular Talk</i> )
			10:30-10:45	<b>S1-3: Reliable Multi-user Uplinks in Fiber-Wireless Integrated Network using Quasi-orthogonal Chirp Spreading OFDM</b> , Y.-W. Chen, Georgia Institute of Technology, USA ( <i>Regular Talk</i> )
			10:45-11:05	<b>S1-4: Key Techniques for high-capacity 5G wireless networks</b> , P.-T. (Boris) Shih, Corning, USA ( <i>Invited Talk</i> )
	11:05-11:20		<b>S1-5: W-band PAM-4 wireless delivery employing intensity modulation and coherent detection based on CMMA equalization</b> , W. Zhou, Georgia Institute of Technology, USA ( <i>Regular Talk</i> )	
	11:30-13:00 <b>Luncheon Keynote Talk</b> Professor Gabriel Rebeiz, UCSD, USA			
13:15-17:00 Poster	13:15-14:45	<b>Session 2: Mm-Wave to THz Circuits and Technologies</b>		
		13:15-13:40	<b>S2-1: 300-GHz-Band CMOS Transmitter and Receiver Modules with WR-3.4 Waveguide Interface</b> , S. Amakawa, Hiroshima University, Japan ( <i>Invited Talk</i> )	

		13:40-14:05	<b>S2-2: Sub-THz and THz Signal Generation Using Photonic and Electronic Techniques</b> , A. Banerjee, imec, USA ( <i>Invited Talk</i> )
		14:05-14:30	<b>S2-3: Packaging Approaches for mm-Wave and Sub-THz Communication</b> , S. Ravichandran, Georgia Institute of Technology, USA ( <i>Invited Talk</i> )
		14:30-14:45	<b>S2-4: High-Performance Optically Controlled RF Switches for Advanced Reconfigurable Millimeterwave-to-THz Circuits</b> , Y. Shi, University of Notre Dame, USA ( <i>Regular Talk</i> )
		14:45-15:00	<b>Coffee Break</b>
	15:00-16:00	<b>Session 3: Advanced RF PAs with Back-Off Enhancement Techniques</b>	
		15:00-15:15	<b>S3-1: Design and characterization of an outphasing power amplifier with balun combiner</b> , A. Bogusz, Cardiff University, United Kingdom ( <i>Regular Talk</i> )
		15:15-15:30	<b>S3-2: Envelope Tracking for 5G Mobile Handsets</b> , J. Retz, Qorvo, USA ( <i>Regular Talk</i> )
		15:30-15:45	<b>S3-3: Linearity Characterizations of Highly Efficient, Infrastructure GaN Doherty Power Amplifier for 5G Applications</b> , M. Masood, NXP Semiconductors, USA ( <i>Regular Talk</i> )
		15:45-16:00	<b>S3-4: Linearity-aware design of Doherty power amplifiers</b> , A. Piacibello, Politecnico di Torino, Italy ( <i>Regular Talk</i> )
		16:00-16:15	<b>Coffee Break</b>
	16:15-17:25	<b>Session 4: Beamforming, Antennas, and Packaging Technologies</b>	
		16:15-16:40	<b>S4-1: Advanced Packaging and its Characterization for 5G mmWave Antenna in Package</b> , S.-W. Lu, Advanced Semiconductor Engineering Inc., Taiwan ( <i>Invited Talk</i> )
		16:40-16:55	<b>S4-2: 28-32 GHz Dual-Polarized Single-Layer Microstrip Line Beamforming Network for 2x2 Beam</b> , N. Ashraf, Concordia University, Canada ( <i>Regular Talk</i> )
		16:55-17:10	<b>S4-3: Dual-Polarized Substrate-Integrated-Waveguide Cavity-Backed Monopulse Antenna Array for 5G Millimeter-Wave Applications</b> , C. Chu, University College Dublin, Ireland ( <i>Regular Talk</i> )
		17:10-17:25	<b>S4-4: Wideband Front-End Integration and Unification of Circuit-Antenna for Simultaneous Stabilized Amplification and Steered Radiation</b> , S. N. Nallandhigal, École Polytechnique de Montréal, Canada ( <i>Regular Talk</i> )
		19:00-21:30	<b>Conference Dinner / Social Event</b>

<b>Friday, 16<sup>th</sup> August 2019</b>		08:30-09:00	<b>Registration and Coffee</b>	
		09:00-09:35	<b>Keynote Talk-2: 5G Radio: A Perspective on Silicon Technologies and Solutions</b> Dr. Anirban Bandyopadhyay, Director, RF Strategic Applications & Business Development, Globalfoundries, USA	
		09:40-10:15	<b>Keynote Talk-3: ComSenTer: Pushing Frequency, Bandwidth, and Spectral Efficiency by 10X Cubed for mm-Wave and Terahertz Arrays for Communication and Imaging Applications</b> Professor Ali M. Niknejad, EECS department, UC Berkeley, CA, USA.	
		10:15-10:30	<b>Coffee Break</b>	
			<b>Session 5: System Architectures and Algorithms for 5G Applications</b>	
		10:30-10:45	<b>S5-1: Flexible Architectures for Concurrent Reception of Multiple RF Carriers and Compressed-Sampling Signal Detection in Frequency and Direction-of-Arrival</b> , T. Haque, Columbia University, USA ( <i>Regular Talk</i> )	
		10:45-11:00	<b>S5-2: Linearizing Active Antenna Arrays: Digital Predistortion Method and Measurements</b> , A. Brihuega, Tampere University of Technology, Finland ( <i>Regular Talk</i> )	
		11:00-11:15	<b>S5-3: Digital Cancellation of Passive Intermodulation: Method, Complexity and Measurements</b> , M. Waheed, Nokia Mobile Networks, Finland ( <i>Regular Talk</i> )	
		11:15-11:30	<b>S5-4: Pattern Sensing Based Digital Predistortion of RF Power Amplifiers under Dynamical Signal Transmission</b> , H. Yin, Southeast University, P.R. China ( <i>Regular Talk</i> )	
		11:30-11:45	<b>S5-5: Phase Calibration of a Massive MIMO System for Direction of Arrival Applications</b> , M. Dawood Al-Dabbagh, Otto von Guericke University Magdeburg, Germany ( <i>Regular Talk</i> )	
	11:45-12:00	<b>S5-6: Parallel-Processing-Based Digital Predistortion Architecture and FPGA Implementation for Wide-band 5G Transmitters</b> , H. Huang, University of Waterloo, Canada ( <i>Regular Talk</i> )		
	12:00-12:15	<b>S5-7: 88.9-GHz W-Band Multi-Channel Integrated Fiber-Wireless Access Network with KK Coherent Receiver</b> , S.-J. Su, Georgia Institute of Technology, USA ( <i>Regular Talk</i> )		
		12:15-13:15	<b>Lunch</b>	

<b>13:00-16:00 Exhibition</b>	<b>13:15-14:40</b>	<b>Session 6: Circuits Techniques for High-Performance Frontends</b>	
		13:15-13:40	<b>S6-1: Sub-Sampling PLL For Millimeter Wave Applications: An Overview</b> , X. Gao, Zhejiang University, P.R. China <i>(Invited Talk)</i>
		13:40-13:55	<b>S6-2: An Integrated 28 GHz Front-End Module for 5G Applications in 45 nm PD-SOI</b> , R. Ciocoveanu, Infineon Technologies AG / Friedrich-Alexander University Erlangen-Nuremberg (FAU), Germany <i>(Regular Talk)</i>
		13:55-14:10	<b>S6-3: A 9-Bit Vector-Sum Digital Phase Shifter Using High Resolution VGAs and Compensated Quadrature Signal Generator</b> , J. Zhou, University of Electronic Science and Technology of China, P.R. China <i>(Regular Talk)</i>
		14:10-14:25	<b>S6-4: A 27-29GHz Integer-N PLL with Quadrature phases for 5G applications</b> , V. Aggarwal, Cadence Design Systems, India <i>(Regular Talk)</i>
		14:25-14:40	<b>S6-5: Approaches to Nonoverlapping Clock Generation for RF to Millimeter-Wave Mixer-First Receivers</b> , S. Hari, North Carolina State University, USA <i>(Regular Talk)</i>
	14:40-14:50 <b>Coffee Break</b>		
	<b>14:50-16:15</b>	<b>Session 7: Mm-Wave Power Amplifiers</b>	
		14:50-15:15	<b>S7-1: High-Efficiency Stacked Cell CMOS SOI Power Amplifiers for 5G Applications</b> , S. Mohammadi, Purdue University, USA <i>(Invited Talk)</i>
		15:15-15:30	<b>S7-2: An Artificial-Intelligence (AI) Assisted Mm-Wave Doherty Power Amplifier with Rapid Mixed-Mode In-Field Performance Optimization</b> , F. Wang, Georgia Institute of Technology, USA <i>(Regular Talk)</i>
		15:30-15:45	<b>S7-3: A 21 to 31 GHz Multi-Stage Stacked SOI Power Amplifier with 33% PAE and 18 dBm Output Power</b> , T. Ren, North Carolina State University, USA <i>(Regular Talk)</i>
		15:45-16:00	<b>S7-4: High Power Ka Band Amplifier Using Multigate Structure With Capacitive Feedback in CMOS-SOI</b> , N. Rostomyan, UCSD, USA <i>(Regular Talk)</i>
16:00-16:15	<b>S7-5: Implementation of A Differential mm-Wave CMOS SOI Power Amplifier</b> , J. Peterson, Purdue University, USA <i>(Regular Talk)</i>		
16:15-16:30 <b>Closing Remarks / Conference Adjourned</b>			

**Poster Papers:**

**P-1: W-band low-power millimeter-wave direct down converter using SiGe HBTs in saturation region,** A. Mukherjee, M. Schroter, Technische Universität Dresden, Germany

**P-2: 5G mm-Wave SPDT Switch IMDn Investigation,** K. Barnett, Globalfoundries, USA

**P-3: Behavioral Modeling of Power Amplifiers With Modern Machine Learning Techniques,** S. Dikmese, L. Anttila, P. P. Campo, M. Valkama, M. K. Renfors, Tampere University of Technology, Finland

**P-4: Resilient Mobile Fronthaul Links with Heterodyne Detection in Integrated Fiber-MMW-Fiber Transmission,** R. Zhang, Y. Chen, S. Liu, Y. Alfadhli, Y. Tang, G.-K. Chang, Georgia Institute of Technology, USA

**P-5: A compact, 42% PAE, two-stage, LDMOS Doherty PA Module for Massive MIMO Applications,** H. Ladhani, E. Maalouf, J. Jones, M. Masood, and J. S. Kenney, NXP Semiconductors, USA and Georgia Institute of Technology, USA

**P-6: A 180 GHz High-Gain Cascode Amplifier in 130-nm SiGe process,** X. Li, W. Chen, Z. Feng, Tsinghua University, P.R. China

**P-7: 3D Glass-Based Panel-Level Package with Antenna and Low-Loss Interconnects for Millimeter-Wave 5G Applications,** A. Watanabe, M. Swaminathan, R. Tummala, M. M. Tentzeris, Georgia Institute of Technology, USA