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Xin Huang (<i>University of Houston, Houston, TX, USA</i>); Zhichao Wang (<i>University of Houston, Houston, TX, USA</i>); Ji Chen (<i>University of Houston, Houston, TX, USA</i>); Jianfeng Zheng (<i>University of Houston, Houston, TX, USA</i>)	

Modal Q Factor and Modal Overlap of Electrically Small Avionics Boxes	286
Paul G. Bremner (<i>Robust Physics, Del Mar, CA, USA</i>); Dawn Trout (<i>NASA Kennedy Space Center, Cape Canaveral, FL, USA</i>); Gabriel Vazquaz (<i>NASA Kennedy Space Center, Cape Canaveral, FL, USA</i>); Neda Nourshamsi (<i>Oklahoma State University, Stillwater, OK, USA</i>); James C. West (<i>Oklahoma State University, Stillwater, OK, USA</i>); Charles F. Bunting (<i>Oklahoma State University, Stillwater, OK, USA</i>)	

RF-Power Induced Clock Jitter Degradation and Its Modeling in High-Speed I/O Interfaces	292
Steven G. Gaskill (<i>Intel Corporation, Hillsboro, OR, USA</i>); Hao-Han Hsu (<i>Intel Corporation, Hillsboro, OR, USA</i>); Chung-Hao Chen (<i>Intel Corporation, Hillsboro, OR, USA</i>)	

An Overview of Wide Bandgap Power Semiconductor Device Packaging Techniques for EMI Reduction	297
Boyi Zhang (<i>University of Florida, Gainesville, FL, USA</i>); Shuo Wang (<i>University of Florida, Gainesville, FL, USA</i>)	

EMC Management and Lab Accreditation	303
Poojita Rao Bhattu (<i>Cisco Systems, Inc., San Jose, CA, USA</i>)	

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Design of an Enhanced Filter for a Wireless Portable Twelve-Lead Electrocardiogram Monitoring System	N/A
Jinling Zhang (<i>Beijing University of Posts and Telecommunications, Beijing, China</i>); Siyi Wang (<i>Beijing University of Posts and Telecommunications, Beijing, China</i>); Ruijie Sun (<i>Beijing University of Posts and Telecommunications, Beijing, China</i>)	

WED-AM-2 Power Electronics EMC (Sponsored by SC 5)

8:30 am - 12:00 pm

Chair: Shuo Wang, University of Florida, Gainesville, FL, USA

Co-Chair: Jiangqi He, Huawei, Chandler, AZ, USA

8:30 am	Mitigation of High-Frequency CM Conducted EMI in Offline Switching Power Supplies	317
Ashritha Manjunath (<i>University Visvesvaraya College of Engineering, Bengaluru, India</i>); M.L. Sudheer (<i>University Visvesvaraya College of Engineering, Bangalore, India</i>)		
9:00 am	Modeling and Stability Analysis of Voltage Sensing based Differential Mode Active EMI Filters for AC-DC Power Converters	322
Balaji Narayanasamy (<i>University of Arkansas, Fayetteville, AR, USA</i>); Fang Luo (<i>University of Arkansas, Fayetteville, AR, USA</i>); Yongbin Chu (<i>Texas Instruments Inc., Dallas, TX, USA</i>)		

- 9:30 am **Modeling and Verification of Automotive Multi-Gig Ethernet Communication up to 2.5 Gbps and the Corresponding EMC Analysis** 329
 Sanaz Mortazavi (Volkswagen AG, Wolfsburg, Germany); Detlef Schleicher (Volkswagen AG, Wolfsburg, Germany); Friedel Gerfers (Technical University of Berlin, Berlin, Germany)

WED-AM-3 EM Environment and Low Frequency EMC (Sponsored by TC 3 and TC 7)

8:30 am - 12:00 pm

Chair: Petre-Marian Nicolae, University of Craiova, Craiova / Dolj County, Romania

Co-Chair: David Thomas, University of Nottingham, Nottingham, United Kingdom

Co-Chair: Flavia Grassi, Politecnico di Milano, Milan, Italy

- 8:30 am **Direction of Arrival Estimation Algorithm for Smart Antennas based on Independent Component Analysis** N/A
 Luis A.C. Filho (Federal University of Campina Grande and Federal Institute of Science and Tech. of Bahia (IFBA), Campina Grande, Brazil); Glauco Fontgalland (Federal University of Campina Grande, Campina Grande-PB, Brazil); Raymundo A. Junior (Federal University of Campina Grande, Campina Grande, Brazil); Tagleorge M. Silveira (Federal University of Campina Grande, Campina Grande, Brazil); Humberto D. Andrade (Federal University of the Semi-Arid Region, Mossoro, RN, Brazil); Paulo I.L. Ferreira (Federal Institute of Science and Tech. of Paraiba (IFPB), Joao Pessoa, Brazil)

- 9:00 am **Diminishing the Conducted Emissions at a Monitoring and Diagnosis Equipment** 339
 Petre-Marian Nicolae (University of Craiova, Craiova, Romania); Marian-Ştefan Nicolae (University of Craiova, Craiova, Romania); Ileana-Diana Nicolae (University of Craiova, Craiova, Romania); Dumitru Sacerdotianu (ICMET Craiova, Craiova, Romania); Paul-Adrian Nicolescu (ICMET Craiova, Craiova, Romania)

- 9:30 am **Measurement and Evaluation of the Conducted Emissions of a DC/DC Power Converter in the Frequency Range 2-150 kHz** 345
 Leonardo Sandrolini (University of Bologna, Bologna, Italy); David W.P. Thomas (University of Nottingham, Nottingham, United Kingdom); Mark Sumner (University of Nottingham, Nottingham, United Kingdom); Christopher Rose (University of Nottingham, Nottingham, United Kingdom)

WED-AM-4 Lightning and Aircraft EMI (Sponsored by TC 5)

8:30 am - 12:00 pm

Chair: Bill Radasky, Metatech Corporation, Goleta, CA, USA

Co-Chair: Michael McNerney, US Army Corp of Engineers, Champaign, IL, USA

- 8:30 am **Analysis of the Impact of the Lightning Return Stroke Models on Overhead Transmission Lines Induced Voltages** 351
 Daniele Mestriner (University of Genoa, Genoa, Italy)
Best EMC Student Paper Award Finalist

- 9:00 am **Coupling of Wideband Radiated IEMI to Wiring Harness: A Statistical Analysis of the Main Influencing Parameters** 357
 Tao Liang (Politecnico di Milano, Milan, Italy); Giordano Spadacini (Politecnico di Milano, Milan, Italy); Flavia Grassi (Politecnico di Milano, Milan, Italy); Sergio A. Pignari (Politecnico di Milano, Milan, Italy)
Best EMC Paper Award Finalist

WED-AM-5 EMI Estimation and Mitigation (Sponsored by TC 4)

8:30 am - 12:00 pm

Chair: John Kraemer, Rockwell Collins, Cedar Rapids, IA, USA

Co-Chair: Jamil Shafil, Rockwell Collins, Cedar Rapids, IA, USA

- 8:30 am **Estimating Reverberant Electromagnetic Fields in Populated Enclosures by using the Diffusion Model** 363
Jiexiong Yan (*University of York, York, United Kingdom*); John Dawson (*University of York, York, United Kingdom*); Andy Marvin (*University of York, York, United Kingdom*)
Best EMC Paper Award Finalist
- 9:00 am **System Level Electromagnetic Compatibility Remedy using Absorbing Frequency Selective Surfaces** 368
Ali Khoshniat (*Santa Clara University, Santa Clara, CA, USA*); Ramesh Abhari (*Santa Clara University, Santa Clara, CA, USA*)
Best EMC Student Paper Award Finalist
- 9:30 am **EMI Radiation Mitigation for Heatsinks using Characteristic Mode Analysis** 374
Xiong Yang (*University of Electronic Science and Technology of China, Chengdu, China*); Ying S. Cao (*Missouri University of Science and Technology, Rolla, MO, USA*); Xu Wang (*University of Electronic Science and Technology of China, Chengdu, China*); Ling Zhang (*Missouri University of Science and Technology, Rolla, MO, USA*); Shiquan He (*University of Electronic Science and Technology of China, Chengdu, China*); Huapeng Zhao (*University of Electronic Science and Technology of China, Chengdu, China*); Jun Hu (*University of Electronic Science and Technology of China, Chengdu, China*); Lijun Jiang (*The University of Hong Kong, Hong Kong, China*); Albert Ruehli (*Missouri University of Science and Technology, Rolla, MO, USA*); Jun Fan (*Missouri University of Science and Technology, Rolla, MO, USA*); James L. Drewniak (*Missouri University of Science and Technology, Rolla, MO, USA*)

WED-AM-6-SIPI Power Integrity Design and Analysis (Sponsored by TC 10)

8:30 am - 12:00 pm

Chair: Bill Chen, Yangtze Delta Region Institute of Tsinghua University, Beijing, China

Co-Chair: Yangsheng Wang, Missouri University of Science and Technology, Rolla, MO, USA

- 9:00 am **System Level Power Integrity Analysis with Physics-Based Modeling Methodology** 379
Biyao Zhao (*Missouri University of Science and Technology, Rolla, MO, USA*); Siqi Bai (*Missouri University of Science and Technology, Rolla, MO, USA*); Samuel Connor (*IBM Corporation, Research Triangle Park, NC, USA*); Matteo Cocchini (*IBM Corporation, New York, NY, USA*); Dale Becker (*IBM Corporation, Poughkeepsie, NY, USA*); Michael Cracraft (*IBM Corporation, Poughkeepsie, NY, USA*); Albert Ruehli (*Missouri University of Science and Technology, Rolla, MO, USA*); B. Archambeault (*IBM Corporation, Research Triangle Park, NC, USA*); James Drewniak (*Missouri University of Science and Technology, Rolla, MO, USA*)
- 9:30 am **Reverse Power Distribution Network and Phase Considerations for Low Power RF Near Field Coupling in IoT Applications** 385
Colin Pardue (*Georgia Institute of Technology, Atlanta, GA, USA*); Anto Kavungal Davis (*Georgia Institute of Technology, Atlanta, GA, USA*); Mohamed L.F. Bellaredj (*Georgia Institute of Technology, Atlanta, GA, USA*); Madvahan Swaminathan (*Georgia Institute of Technology, Atlanta, GA, USA*)

THURSDAY TECHNICAL PAPERS

Thursday, August 2, 2018

TH-AM-1 Special Session 1: ElectroStatic Discharge (ESD) (Sponsored by TC 5)

8:30 am - 12:00 pm

Chair: Michael Khazhinsky, Freescale Semiconductor, Austin, TX, USA

Co-Chair: Mike McInerney, US Army Corps of Engineers, Champaign, IL, USA

- 8:30 am **Relating the Commonalities and Robustness Characteristics of EMC and ESD Tests** 391
Alan W. Righter (*Analog Devices, San Jose, CA, USA*)
- 9:00 am **The Case for Measurement and Analysis of ESD Fields in Semiconductor Manufacturing** 396
Timothy J. Maloney (*Center for Analytic Insights, Palo Alto, CA, USA*)
- 9:30 am **Implementation and Practical Experience with an Automatic Secondary ESD Detection Algorithm** 402
Shubhankar Marathe (*Missouri University of Science and Technology, Rolla, MO, USA*);
Giorgi Maghlakelidze (*Missouri University of Science and Technology, Rolla, MO, USA*);
David Pommerenke (*Missouri University of Science and Technology, Rolla, MO, USA*);
Mike Hertz (*Teledyne LeCroy, Chestnut Ridge, NY, USA*)
- 10:30 am **A Preliminary Study of ESD Effects on the Process Calls Tree of a Wireless Router** 408
Xiaorui Liu (*Missouri University of Science and Technology and Ocean University of China, Rolla, MO and Qingdao, USA and China*); Omid Hoseini Izadi (*Missouri University of Science and Technology, Rolla, MO, USA*); Giorgi Maghlakelidze (*Missouri University of Science and Technology, Rolla, MO, USA*); Martin Pommerenke (*AVM Computersystem Vertriebs GmbH, Berlin, Germany*); David Pommerenke (*Missouri University of Science and Technology, Rolla, MO, USA*)

TH-AM-2 Special Session 2: EMI/EMC Research in Power Electronics Systems (Sponsored by SC 5)

8:30 am - 12:00 pm

Chair: Chulsoon Hwang, Missouri University of Science and Technology, Rolla, MO, USA

Co-Chair: Shuo Wang, University of Florida, Gainesville, FL, USA

- 8:30 am **A Terminal Ground Filter between Cable and Chassis for Reduction of Conducted Emissions at a Home Appliance** 414
Sangyeong Jeong (*Ulsan National Institute of Science and Technology, Ulsan, Korea, Republic of (South)*); Jinguok Kim (*Ulsan National Institute of Science and Technology, Ulsan, Korea, Republic of (South)*); Youngjin Baek (*LG Electronics, Changwon-si, Korea, Republic of (South)*); Wonwoo Lee (*LG Electronics, Changwon-si, Korea, Republic of (South)*); Gwigeun Park (*LG Electronics, Changwon-si, Korea, Republic of (South)*)
- 9:00 am **Planar Resonance Reactive Shield for Reducing the EMI in Portable WPT Device Application** 419
Jaehyoung Park (*Korean Advanced Institute of Science and Technology, Daejeon, Korea, Republic of (South)*); Yujun Shin (*Korean Advanced Institute of Science and Technology, Daejeon, Korea, Republic of (South)*); Dongwook Kim (*Korean Advanced Institute of Science and Technology, Daejeon, Korea, Republic of (South)*); Bumjin Park (*Korean Advanced Institute of Science and Technology, Daejeon, Korea, Republic of (South)*); Seungyoung Ahn (*Korean Advanced Institute of Science and Technology, Daejeon, Korea, Republic of (South)*)

9:30 am	Simplified Procedure to Predict the EM Emissions of Wind Energy Conversion Systems	423
	Sebastian Koj (<i>Leibniz Universität Hannover, Hanover, Germany</i>); Sven Fisahn (<i>Leibniz Universität Hannover, Hanover, Germany</i>); Heyno Garbe (<i>Leibniz Universität Hannover, Hanover, Germany</i>)	
10:30 am	EM Interferences between Power Converters and FM Radio Services on Vehicles of Security Authorities	427
	Sven Fisahn (<i>Leibniz Universität Hannover, Hanover, Germany</i>); Sebastian Koj (<i>Leibniz Universität Hannover, Hanover, Germany</i>); Heyno Garbe (<i>Leibniz Universität Hannover, Hanover, Germany</i>)	
11:00 am	Reduction and Cancellation Techniques for the Near Field Capacitive Coupling and Parasitic Capacitance of Inductors	432
	Yiming Li (<i>University of Florida, Gainesville, FL, USA</i>); Shuo Wang (<i>University of Florida, Gainesville, FL, USA</i>); Honggang Sheng (<i>Google Inc., Mountain View, CA, USA</i>); Srikanth Lakshmikanthan (<i>Google Inc., Mountain View, CA, USA</i>)	
11:30 am	Measurement Techniques of CM Currents, Impedance and Voltages for Radiated EMI in Isolated Power Converters	438
	Juntao Yao (<i>University of Florida, Gainesville, FL, USA</i>); Shuo Wang (<i>University of Florida, Gainesville, FL, USA</i>); Hui Zhao (<i>University of Florida, Gainesville, FL, USA</i>); Yingjie Zhang (<i>University of Florida, Gainesville, FL, USA</i>); Qinghai Wang (<i>Huawei Technologies Co., Ltd, Shenzhen, China</i>); Yuliang Lu (<i>Huawei Technologies Co., Ltd, Shenzhen, China</i>); Dianbo Fu (<i>Huawei Technologies Co., Ltd, Shenzhen, China</i>)	

TH-AM-3 Special Session 3: Automotive EMC and Electric Vehicles (Sponsored by TC 7 and TC 9)

8:30 am - 12:00 pm

Chair: Patrick DeRoy, CST of America, LLC, Framingham, MA, USA

Co-Chair: Flavia Grassi, Politecnico di Milano, Milan, Italy

8:30 am	Numerical Calculation of the Near Field Shielding for Carbon Fiber Reinforced Polymer (CFRP) Panels at Wireless Power Transfer Automotive Frequencies	444
	T. Campi (<i>University of L'Aquila, L'Aquila, Italy</i>); S. Cruciani (<i>University of L'Aquila, L'Aquila, Italy</i>); V. De Santis (<i>University of L'Aquila, L'Aquila, Italy</i>); F. Maradei (<i>Sapienza University of Rome, Rome, Italy</i>); M. Feliziani (<i>University of L'Aquila, L'Aquila, Italy</i>)	
9:00 am	Numerical Modeling Application of ICNIRP Guidelines to Automobile Occupant Protection	448
	Scott Piper (<i>General Motors, Milford, MI, USA</i>); Laura Ball (<i>General Motors, Milford, MI, USA</i>); Michael Mandziuk (<i>General Motors, Milford, MI, USA</i>)	
9:30 am	A Circuit Model of the Rod Antenna Automotive and Military Test Setups: Analysis and Interpretation	454
	Carlo Carobbi (<i>University of Florence, Firenze, Italy</i>)	
10:30 am	Emission Reduction by Optimizing Current Return Paths in Electric Vehicles	460
	Matthias Tröscher (<i>CST GmbH, Munich, Germany</i>); Thomas Haschberger (<i>AVL Software and Functions GmbH, Regensburg, Germany</i>)	
11:00 am	Sensitivity Analysis of RF Current Injection Techniques for Immunity Testing of Automotive Ethernet	461
	Patrick DeRoy (<i>CST of America, LLC, Framingham, MA, USA</i>); Nicola Toscani (<i>Politecnico di Milano, Milan, Italy</i>); Flavia Grassi (<i>Politecnico di Milano, Milan, Italy</i>); Waldemar Schulz (<i>TU Dortmund, Dortmund, Germany</i>); Cyrus Rostamzadeh (<i>Robert Bosch, LLC, Plymouth, MI, USA</i>)	

TH-AM-4 Wireless Coexistence and Interference – 2

(Sponsored by TC 12)

8:30 am - 12:00 pm

Chair: Hanfeng Wang, Google Inc., Mountain View, CA, USA

Co-Chair: Qiaolei Huang, Missouri University of Science and Technology, Rolla, MO, USA

- 8:30 am **Spatial Uniformity Study in a Loaded Reverberation Chamber at Millimeter-Wave Frequencies** 467
Damir Senic (ANSYS, Canonsburg, PA, USA); Kate A. Remley (National Institute of Science and Technology, Boulder, CO, USA); Maria G. Becker (National Institute of Science and Technology, Boulder, CO, USA); Christopher L. Holloway (National Institute of Science and Technology, Boulder, CO, USA)
- 9:00 am **Electric Field Exposure Evaluation for Wireless Charging System of Vehicles** N/A
Li Jiang (China Automotive Technology and Research Center Co., Ltd, Tianjin, China); Haiming Liu (China Automotive Technology and Research Center Co., Ltd, Tianjin, China); Xu Zhang (China Automotive Technology and Research Center Co., Ltd, Tianjin, China); Yue Zhang (China Automotive Technology and Research Center Co., Ltd, Tianjin, China); Julong Feng (China Automotive Technology and Research Center Co., Ltd, Tianjin, China)
- 9:30 am **Higher-Order Multipoles in the Electromagnetic Field Produced by a Wireless Power Transfer System Employing DD Polarized Couplers** 477
James McLean (TDK R&D Corp., Cedar Park, TX, USA); Heinrich Foltz (University of Texas Rio Grande Valley, Edinburg, TX, USA); Robert Sutton (TDK R&D Corp., Cedar Park, TX, USA)
- 10:30 am **An Investigation of Electromagnetic Radiated Emissions from Wireless Charging System for Mobile Device using Qi Standard** 483
Chunyu Wu (Missouri University of Science and Technology, Rolla, MO, USA); Hongseok Kim (Missouri University of Science and Technology, Rolla, MO, USA); Anfeng Huang (Missouri University of Science and Technology, Rolla, MO, USA); Jun Fan (Missouri University of Science and Technology, Rolla, MO, USA); Siming Pan (Convenient Power Systems, Chengdu, China); Tun Li (Convenient Power Systems, Chengdu, China)
- 11:00 am **MIMO Performance Diagnosis based on the Radiated Two-Stage (RTS) Method** 489
Yansheng Wang (Missouri University of Science and Technology, Rolla, MO, USA); Songping Wu (Google Inc., Mountain View, CA, USA); Zhiping Yang (Google Inc., Mountain View, CA, USA); Penghui Shen (General Test Systems Inc., Shenzhen, China); Chunyu Wu (Missouri University of Science and Technology, Rolla, MO, USA); Jun Fan (Missouri University of Science and Technology, Rolla, MO, USA)
Best EMC Paper Award Finalist and Best EMC Student Paper Award Finalist
- 11:30 am **Correcting Antenna Pattern in Offset Measurements based on Equivalent Dipole Moments** 493
Yansheng Wang (Missouri University of Science and Technology, Rolla, MO, USA); Songping Wu (Google Inc., Mountain View, CA, USA); Zhiping Yang (Google Inc., Mountain View, CA, USA); Shuai Jin (Missouri University of Science and Technology, Rolla, MO, USA); Ying S. Cao (Missouri University of Science and Technology, Rolla, MO, USA); Jianmin Zhang (Google Inc., Mountain View, CA, USA); Tun Li (Convenient Power Systems, Chengdu, China); Jun Fan (Missouri University of Science and Technology, Rolla, MO, USA)

TH-AM-5 Test Facilities and Standards (Sponsored by TC 2)

8:30 am - 12:00 pm

Chair: Don Heirman, Don HEIRMAN Consultants, Lincroft, NJ, USA

Co-Chair: Ghery Pettit, Pettit EMC Consulting, Olympia, WA, USA

- 8:30 am **Ground Loops during Site Validation of Anechoic Rooms Below 30 MHz** 499
Alexander Kriz (*Seibersdorf Laboratories, Seibersdorf, Austria*)
- 9:00 am **Applicability of Measurement Uncertainty Models in a Reverberation Chamber including Frequency Stirring** 504
Angelo Gifuni (*Università di Napoli Parthenope, Napoli, Italy*); Luca Bastianelli (*Università Politecnica delle Marche, Ancona, Italy*); Gabriele Gradoni (*University of Nottingham, Nottingham, United Kingdom*); Maurizio Migliaccio (*Università di Napoli Parthenope, Napoli, Italy*); Franco Moglie (*Università Politecnica delle Marche, Ancona, Italy*); Valter Mariani Primiani (*Università Politecnica delle Marche, Ancona, Italy*)
- 9:30 am **Tunable Intermodulation Generator for Passive Intermodulation Tester Calibration** 510
Xiong Chen (*Xi'an Jiaotong University and Missouri University of Science and Technology, Xi'an, China*); Yongning He (*Xi'an Jiaotong University, Xi'an, China*); Wanzhao Cui (*China Academy of Space Technology, Xi'an, China*); David J. Pommerenke (*Missouri University of Science and Technology, Rolla, MO, USA*); Jun Fan (*Missouri University of Science and Technology, Rolla, MO, USA*)
- 10:30 am **Investigation on Difference of Radiated Emission Measurement Reproducibility between Two EUTs at International RRT by using CMAD as a Terminating Device for AC Mains Cable** 516
Shinichi Okuyama (*VCCI Council / NEC Platforms, Ltd., Tokyo, Japan*); Nobuo Kuwabara (*Kyushu Institute of Technology, Kitakyushu, Japan*); Kunihiro Osabe (*VCCI Council, Tokyo, Japan*); Hidenori Muramatsu (*VCCI Council, Tokyo, Japan*)
- 11:00 am **Improving the Reproducibility of Radiated Immunity Tests through the use of the CMAD** 522
Spartaco Caniggia (*Consultant, Bareggio, Italy*); Carlo Carobbi (*University of Florence, Firenze, Italy*)
Best EMC Paper Award Finalist
- 11:30 am **Application of the Predictive Posterior PDF to MU and Conformity Assessment in EMC** 527
Carlo Carobbi (*University of Florence, Firenze, Italy*)

TH-AM-6-SIPI High-Speed Interconnects – 4 (Sponsored by TC 10)

8:30 am - 12:00 pm

Chair: Mikheil Tsiklauri, Missouri University of Science and Technology, Rolla, MO, USA

Co-Chair: Tao Wang, TERADYNE, Agoura Hills, CA, USA

- 10:30 am **Differential Integrated Crosstalk Noise (ICN) Mitigation in the Pin Field Area of SerDes Channel** 533
Bichen Chen (*Missouri University of Science and Technology, Rolla, MO, USA*); Junda Wang (*Missouri University of Science and Technology, Rolla, MO, USA*); Ying S. Cao (*Missouri University of Science and Technology, Rolla, MO, USA*); Muqi Ouyang (*Missouri University of Science and Technology, Rolla, MO, USA*); Yansheng Wang (*Missouri University of Science and Technology, Rolla, MO, USA*); Shuai Jin (*Missouri University of Science and Technology, Rolla, MO, USA*); Guangyao Shen (*Missouri University of Science and Technology, Rolla, MO, USA*); Xusheng Liu (*Huawei Technologies Co., Ltd, Shenzhen, China*); Xiping Peng (*Huawei Technologies Co., Ltd, Shenzhen, China*); Jun Fan (*Missouri University of Science and Technology, Rolla, MO, USA*)
Best SIPI Student Paper Award Finalist

- 11:00 am **A Comprehensive and Practical Way to Look at Crosstalk for Transmission Lines with Mismatched Terminals** 538
 Shaohui Yong (*Missouri University of Science and Technology, Rolla, MO, USA*); Kevin Cai (*Cisco Systems, Inc., San Jose, CA, USA*); Bidyut Sen (*Cisco Systems, Inc., San Jose, CA, USA*); Jun Fan (*Missouri University of Science and Technology, Rolla, MO, USA*); Victor Khilkevich (*Missouri University of Science and Technology, Rolla, MO, USA*); Chunchun Sui (*Cisco Systems, Inc., San Jose, CA, USA*)
- 11:30 am **Experimental Assessment of Stochastic Signals through the Power Density Method** 544
 Maryna Nesterova (*Aprel Inc., Ottawa, ON, Canada*); Stuart Nicol (*Aprel Inc., Ottawa, ON, Canada*); Phillip Miller (*Intel Corporation, Chandler, AZ, USA*); Mehdi Chbihi (*Keysight Technologies, Ottawa, ON, Canada*); Yuliya Nesterova (*Queen's University, Kingston, ON, Canada*)

TH-PM-1 EMC Measurement and Interference Control (Sponsored by TC 4)

2:30 pm - 5:30 pm

Chair: Michael McInerney, US Army Corp of Engineers, Champaign, IL, USA
Co-Chair: Ahalya Srikanth, US Army Corp of Engineers, Champaign, IL, USA

- 3:00 pm **RFI Noise Source Quantification based on Reciprocity** 548
 Yin Sun (*Missouri University of Science and Technology, Rolla, MO, USA*); Bin-Chyi Tseng (*ASUSTek Computer Inc., Taipei, Taiwan*); Hank Lin (*ASUSTek Computer Inc., Taipei, Taiwan*); Chulsoon Hwang (*Missouri University of Science and Technology, Rolla, MO, USA*)
- 4:30 pm **An Improved Solution on Permittivity Measurement with Single Knife-Edge Model** 554
 Cheng Yao (*Beijing University of Posts and Telecommunications, Beijing, China*); Dan Shi (*Beijing University of Posts and Telecommunications, Beijing, China*); Yixuan Liu (*Beijing University of Posts and Telecommunications, Beijing, China*)

TH-PM-2 Computer Modeling Methods (Sponsored by TC 9)

2:30 pm - 5:30 pm

Chair: Matthias Troescher, CST GmbH, Munich, Germany
Co-Chair: Albert E. Ruehli, Missouri University of Science and Technology, Rolla, MO, USA

- 2:30 pm **An Approximate Model for Near-Field Calculation of Phased Array** 555
 Vladimir Chtcherbakov (*ASMAR, Concepcion, Chile*)
- 3:00 pm **Hybrid Modeling Method for Railway VCB Switching Noise Simulations at Whole Train Level** 560
 Umberto Paoletti (*Hitachi, Ltd., Yokohama, Japan*); Kiyoto Matsushima (*Hitachi, Ltd., Yokohama, Japan*)
- 4:00 pm **Convergence-Accelerated Foster-Type Network Model for Skin and Proximity Effect in Arbitrarily Shaped Parallel Conductors** 565
 Christian Bednarz (*Otto-von-Guericke University, Magdeburg, Germany*); Marco Leone (*Otto-von-Guericke University, Magdeburg, Germany*)
Best EMC Paper Award Finalist
- 4:30 pm **Experimental Validation of a Broadband Circuit Model for Electromagnetic-Interference Analysis in Metallic Enclosures** 571
 Christoph Lange (*Otto-von-Guericke University, Magdeburg, Germany*); Paul Konrad (*Otto-von-Guericke University, Magdeburg, Germany*); Marco Leone (*Otto-von-Guericke University, Magdeburg, Germany*)

TH-PM-3-SIPI High-Speed Interconnects – 3

(Sponsored by TC 10)

2:30 pm - 5:30 pm

Chair: Shaowu Huang, Invensas Corporation, San Jose, CA, USA

Co-Chair: Kevin Pham, Jet Propulsion Laboratory, Pasadena, CA, USA

- 2:30 pm **Power and Signal Integrity Analysis of High-Speed Mixed-Signal Backplane based on VPX** 577
Meng Hua (*Institute of Electronic Engineering China Academy of Engineering Physics, Mian yang, China*); Niu Minxi (*Institute of Electronic Engineering China Academy of Engineering Physics, Mian yang, China*); Tan Anju (*Institute of Electronic Engineering China Academy of Engineering Physics, Mian yang, China*); Miao Jianghong (*Institute of Electronic Engineering China Academy of Engineering Physics, Mian yang, China*)
- 3:00 pm **Hexagonal BGA Patterns for Power-Via Resonance Minimization and Common-Mode Suppression** 582
IL-Young Park (*Cisco Systems, Inc., San Jose, CA, USA*); Iftikhar Ahmed (*Molex, LLC, Lisle, IL, USA*); David Bruner (*Molex, LLC, Lisle, IL, USA*); Pu Xie (*Molex, LLC, Lisle, IL, USA*); Peerouz Amleshi (*Molex, LLC, Lisle, IL, USA*); Jayanthi Natarajan (*Cisco Systems, Inc., San Jose, CA, USA*)
Best SIPI Paper Award Finalist
- 4:00 pm **An Efficient Approach to Find the Truncation Frequency for Transmission Line-Based Dielectric Material Property Extraction** 588
Xinglin Sun (*Zhejiang University, Hangzhou, China*); Lingyun Ye (*Zhejiang University, Hangzhou, China*); Kaichen Song (*Zhejiang University, Hangzhou, China*); Yin Sun (*Missouri University of Science and Technology, Rolla, MO, USA*); Shuai Jin (*Missouri University of Science and Technology, Rolla, MO, USA*); Bichen Chen (*Missouri University of Science and Technology, Rolla, MO, USA*); Mikheil Tsiklauri (*Missouri University of Science and Technology, Rolla, MO, USA*); Xiaoning Ye (*Intel Corporation, Hillsboro, OR, USA*); Jun Fan (*Missouri University of Science and Technology, Rolla, MO, USA*)

TH-PM-4 EMC Management

(Sponsored by TC 1)

2:30 pm - 5:30 pm

Chair: Thomas Braxton, Shure Incorporated, Bolingbrook, IL, USA

Co-Chair: Dave Staggs, IEEE Sr. Member, Hunt, TX, USA

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**Long Beach, California, USA
30 July - 3 August 2018**

**Workshops and Tutorials
Part 1
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Darryl P. Ray (*Darryl Ray EMC Consulting, LLC, Carlsbad, CA, USA*)

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Greg Kiemel (*Element Materials Technology, Hillsboro, OR, USA*)

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Jeffrey L. Silberberg (*FDA Center for Devices and Radiological Health, Silver Spring, MD, USA*)

**WED-PM-5 EMC for Home Appliances, Including
Power Converters Applications
(Sponsored by TC 7)**

1:30 pm - 5:30 pm

Chair: Petre-Marian Nicolae, University of Craiova, Craiova / Dolj County, Romania

Co-Chair: Flavia Grassi, Politecnico di Milano, Milan, Italy

Special Issues Related to the Frequency Range 2kHz-150kHz.....1206

Alex McEachern (*Power Standards Lab, Alameda, CA, USA*)

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Frank Leferink (*Thales Nederland B.V. and University of Twente, Hengelo, and Enschede, Netherlands*)

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Ileana-Diana Nicolae (*University of Craiova, Craiova, Romania*)

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David Thomas (*University of Nottingham, Nottingham, United Kingdom*); M. Sumner (*University of Nottingham, Nottingham, United Kingdom*); C. Rose (*University of Nottingham, Nottingham, United Kingdom*); M. Rawa (*University of Nottingham, Nottingham, United Kingdom*); P. Ivry (*University of Nottingham, Nottingham, United Kingdom*); L. Ensini (*University of Bologna, Bologna, Italy*); L. Sandrolini (*University of Bologna, Bologna, Italy*)

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Petre-Marian Nicolae (*University of Craiova, Craiova, Romania*)

FRIDAY WORKSHOPS AND TUTORIALS

Friday, August 3, 2018

FR-AM-1 EMC Fundamentals – 3

(Sponsored by IEEE EMCS Education Committee (EdCom)) 8:30 am - 12:00 pm

Chair: Lee Hill, SILENT Solutions LLC, Amherst, NH, USA

Power Integrity Concepts for High-Speed Design on Multi-Layer PCBs.....1305

Chulsoon Hwang (*Missouri University of Science and Technology, Rolla, MO, USA*)

ESD.....1326

David Pommerenke (*Missouri University of Science and Technology, Rolla, MO, USA*)

Antenna Fundamentals.....1347

Zhong Chen (*ETS-Lindgren, Cedar Park, TX, USA*)

Conducted Emissions.....1371

Samuel Connor (*IBM Corporation, Research Triangle Park, NC, USA*)

**FR-AM-2a Techniques and Measures to Manage Risks with
Regard to Electromagnetic Disturbances
(Sponsored by TC 1)**

8:30 am - 10:00 am

Chair: Thomas Braxton, Shure Incorporated, Niles, IL, USA

Techniques and Measures to Manage Risks with Regard to Electromagnetic Disturbances.....1383

Davy Pissoort (*KU Leuven, Bruges, Belgium*); Keith Armstrong (*Cherry Clough Consultants Ltd, Stafford, United Kingdom*)

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Keith Armstrong (*Cherry Clough Consultants Ltd, Stafford, United Kingdom*)

**FR-AM-2b EMC Leadership Training – 1
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10:30 am - 12:00 pm

Chair: Kimball Williams, IEEE, Dearborn, MI, USA

Co-Chair: Thomas Braxton, Shure Incorporated, Niles, IL, USA

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Bob Scully (*NASA Johnson Space Center, Houston, TX, USA*)

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John LaSalle (*Northrop Grumman Corp., Melbourne, FL, USA*)

FR-AM-3 Advances in SI/PI/NI and EMC Modeling Approaches

8:30 am - 12:00 pm

Chair: Albert E. Ruehli, Missouri University of Science and Technology, Rolla, MO, USA

Co-Chair: Lijun Jiang, The University of Hong Kong, Hong Kong, Hong Kong

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Siqi Bai (*Missouri University of Science and Technology, Rolla, MO, USA*); Biyao Zhao (*Missouri University of Science and Technology, Rolla, MO, USA*); Jonghyun Cho (*Missouri University of Science and Technology, Rolla, MO, USA*); Albert Ruehli (*Missouri University of Science and Technology, Rolla, MO, USA*); Samuel Connor (*IBM Corporation, Research Triangle Park, NC, USA*); Matteo Cocchini (*IBM Corporation, Research Triangle Park, NC, USA*); Dale Becker (*IBM Corporation, Research Triangle Park, NC, USA*); Bruce Archambeault (*IBM Corporation and Missouri University of Science and Technology, Research Triangle Park, NC and Four Oaks, NC, USA*); James Drewniak (*Missouri University of Science and Technology, Rolla, MO, USA*)

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Zhiping Yang (*Google Inc., Mountain View, CA, USA*)

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Michel Nakhla (*Carleton University, Ottawa, ON, Canada*)

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S. Grivet-Talocia (*Politecnico di Torino, Torino, Italy*)

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Lijun Jiang (*The University of Hong Kong, Hong Kong, China*); Albert E. Ruehli (*Missouri University of Science and Technology, Rolla, MO, USA*)

**FR-AM-4 Material Characterization for EMC Design
(Sponsored by TC 4)**

8:30 am - 12:00 pm

Chair: Huadong Li, Molex Inc., Lisle, IL, USA

Co-Chair: Mark Montrose, Montrose Compliance Services, Santa Clara, CA, USA

Electromagnetic Characterization of Absorbers.....1591

Paul Dixon (*Laird, Manchester, NH, USA*)

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Ned Bryant (*RTP Company, Winona, MN, USA*)

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Huadong Li (*Molex, LLC, Naperville, IL, USA*); Iftikhar Ahmed (*Molex, LLC, Lisle, IL, USA*)

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David P. Johns (*CST, Framingham, MA, USA*)

**FR-AM-5 Global EMC Standards Update: Test Site Validation,
Instrumentation and RF Absorber**

8:30 am - 12:00 pm

Chair: Doug Kramer, ETS-Lindgren Inc, Cedar Park, TX, USA

Co-Chair: Janet O'Neil, ETS-Lindgren, Cedar Park, TX, USA

Co-Chair: Alistair Duffy, De Montfort University, Leicester, UK

**IEEE STD 1128-1998: IEEE Recommended Practice for RF Absorber
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Zhong Chen (*ETS-Lindgren, Cedar Park, TX, USA*)

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Zhong Chen (*ETS-Lindgren, Cedar Park, TX, USA*)

**Update on ANSI C63.4, including Amendment ANSI C63.4a (Methods of Measurement of Radio-Noise
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Daniel D. Hoolihan (*Hoolihan EMC Consulting, Lindstrom, MN, USA*)

**Antenna Calibration: ANSI C63.5:2017 (Calibration and Qualification of Antennas 9 kHz to 40 GHz)
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Doug Kramer (*ETS-Lindgren Inc, Cedar Park, TX, USA*)

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Trace McInturff (*A2LA, Frederick, MD, USA*)

**FR-PM-1 The Role of the IEC Advisory Committee on EMC
(ACEC) in Coordinating IEC EMC Activities
(Sponsored by TC 2)**

1:30 pm - 5:30 pm

Chair: Don Heirman, Don HEIRMAN Consultants, Lincroft, NJ, USA

What is ACEC?.....1731

William A. Radasky (*Metatech Corporation, Goleta, CA, USA*)

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Don Heirman (*Don HEIRMAN Consultants, Lincroft, NJ, USA*)

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William A. Radasky (*Metatech Corporation, Goleta, CA, USA*)

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Don Heirman (*Don HEIRMAN Consultants, Lincroft, NJ, USA*)

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Don Heirman (*Don HEIRMAN Consultants, Lincroft, NJ, USA*)

FR-PM-2 EMC Leadership Training – 2 (Sponsored by TC 1)

1:30 pm - 5:30 pm

Chair: Kimball Williams, IEEE, Dearborn, MI, USA

Co-Chair: Thomas Braxton, Shure Incorporated, Niles, IL, USA

How to Give Effective Presentations.....1785

Bruce Archambeault (*IBM Corporation and Missouri University of Science and Technology, Research Triangle Park, NC and Four Oaks, NC, USA*)

Networking Skills.....1801

Daniel D. Hoolihan (*Hoolihan EMC Consulting, Lindstrom, MN, USA*)

IEEE Code of Ethics.....1816

David Staggs (*IEEE Sr. Member, Hunt, TX, USA*)

Interspecies Communication, Boomers and Millennials in Conversation.....1826

Joanna McLellan (*JPHill, LLC, Holly, MI, USA*)

FR-PM-3 Lightning Effects on Power Distribution Systems (Sponsored by TC 5)

1:30 pm - 5:30 pm

Chair: Renato Procopio, University of Genoa, Genoa, Italy

Co-Chair: Massimo Brignone, University of Genoa, Genoa, Italy

Lightning Physics.....1833

Renato Procopio (*University of Genoa, Genoa, Italy*); Elisabetta Fiori (*CIMA Research Foundation, Savona, Italy*)

Current and Field Modelling.....1861

Mansueto Rossi (*University of Genoa, Genoa, Italy*); Massimo Brignone (*University of Genoa, Genoa, Italy*)

The Field to Line Coupling Problem.....1888

Massimo Brignone (*University of Genoa, Genoa, Italy*)

Lightning Performance and Protection Systems.....1903

Renato Procopio (*University of Genoa, Genoa, Italy*)

FR-PM-4 Advanced Materials and their Characterization for EMC and High-Speed Electronics (Sponsored by TC 11)

1:30 pm - 5:30 pm

Chair: Marina Koledintseva, Oracle, Santa Clara, CA, USA

Co-Chair: Emmanuel Decrossas, Jet Propulsion Laboratory,
California Institute of Technology, Pasadena, CA, USA

Microscopic Field Effects at the NanoScale Level and their Implications for Device Design in High-Speed Electronics.....1919

C.M. Krowne (*Naval Research Laboratory, Washington, DC, USA*)

Carbon Nanotubes for EMC Applications.....1934

Emmanuel Decrossas (*Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA*)

Soft Ferrites for EMC Applications.....1945

Marina Y. Koledintseva (*Oracle, Santa Clara, CA, USA*)

Quality Criteria for Electromagnetic Wave Absorbers.....1961

Konstantin N. Rozanov (*Russian Academy of Sciences, Moscow, Russia*);

Marina Y. Koledintseva (*Oracle, Santa Clara, CA, USA*)

FR-PM-5 EMI/EMC for Power Electronics Systems (Sponsored by SC 5)

1:30 pm - 5:30 pm

Chair: Shuo Wang, University of Florida, Gainesville, FL, USA

Co-Chair: Jiangqi He, Huawei USA Phoenix, Chandler, AZ, USA

EMI Modeling and Reduction in Modern Power Electronics Systems.....1968

Shuo Wang (*University of Florida, Gainesville, FL, USA*)

EMC Design Considerations for Sustainable Energy Applications.....1990

Michelle Liu (*Tesla Inc., Palo Alto, CA, USA*); Satish Thuta (*Tesla Inc., Palo Alto, CA, USA*);

Jan Rutkjaer (*Tesla Inc., Palo Alto, CA, USA*); Pete Krauer (*Tesla Inc., Palo Alto, CA, USA*)

Design of Compact Active EMI Filters to Reduce the CM Conducted Emissions.....2008

Jingook Kim (*Ulsan National Institute of Science and Technology, Ulsan, Korea, Republic of (South)*)

High Density EMI Filtering and Noise Self-Containment in Power Electronics System.....2029

Fang Luo (*University of Arkansas, Fayetteville, AR, USA*)