IEEE | EMC SOCIETY

ADVANCE PROGRAM

EMC+SIPI 2025

RALEIGH, NC • AUGUST 18-22

KEYNOTE SPEAKER
Christian Schuster
Hamburg University of Technology
Germany (IEEE Fellow)

EXHIBIT HALL

TECHNICAL PROGRAM DETAILS

www.emc2025.org

2025 IEEE INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY, SIGNAL & POWER INTEGRITY (SIPI)

BENEFITS OF ATTENDING

EMC+SIPI 2025 leads the industry in providing state-of-the-art education on EMC and Signal Integrity and Power Integrity techniques.

PARTICIPATE IN 200+ TECHNICAL SESSIONS,

Workshops & Tutorials, Hands on Experiments & Demonstrations, and Special Sessions with the world's leading engineers in EMC and SIPI.

PARTICIPATE IN LIVE DEMONSTRATIONS

presented by industry experts to learn how to solve real-world problems.

LEARN ABOUT THE LATEST GLOBAL STANDARDS

in EMC and SIPI, hear updates, ask questions, and attend Working Group Meetings as part of the "Standards Week" special track.

ENHANCE YOUR KNOWLEDGE OF EMC AND SIPI

during the educational courses for Clayton R. Paul Global University and Global SIPI University

ATTEND THE "ASK THE EXPERTS" PANELS

Bring your questions or simply listen and learn from the experts!

BRING THE FAMILY

and Experience Raleigh, North Carolina in the beautiful, "City of Oaks". Companions are invited to join the Social Events and fun area tours.

NETWORK WITH FRIENDS AND COLLEAGUES

during the Welcome Reception, the Gala Dinner, Young Professionals, and Women in Engineering events.

CROSSTALK

#IEEE_ESP25

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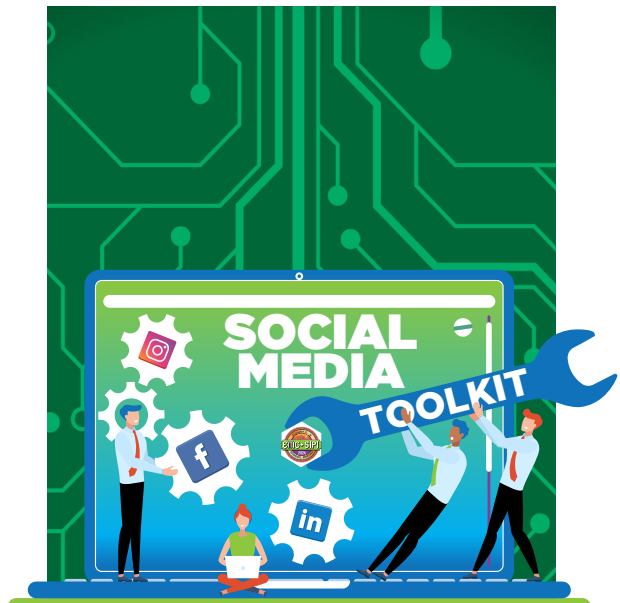
RALEIGH, NC
EMC+SIPI 2025



PROMOTE EMC+SIPI 2025 ON YOUR SOCIAL CHANNELS!

We've created this content for your convenience to promote the 2025 EMC+SIPI Symposium via social media

Use our logos and sample text below to promote visitors to your booth, attendance at your presentation, or simply your brilliance in attending the world's premier gathering of EMC and SIPI professionals!

www.emc2025.org

CHAIR'S MESSAGE

WELCOME FROM BRUCE ARMCHAMBEAULT
THE 2025 EMC+SIPI GENERAL CHAIR

Friends and Colleagues,

Are y'all ready for something a little different? I would like to welcome you to the 2025 IEEE International Symposium on Electromagnetic Compatibility, Signal & Power Integrity in Raleigh, North Carolina. I would also like to extend a welcome to the Eastern NC Section of the IEEE and to our local Electromagnetic Compatibility Society Chapter. It has been 11 years since the 2014 EMC+SIPI Symposium! Time to have another great symposium

For 2025 we have many exciting events planned! The embedded Signal and Power Integrity Conference continues to bring in a record number of technical papers in this very timely subject area. Of course, there will be numerous technical papers on traditional EMC and new technologies, such as wireless power transfer, AI, biological EMC, nanotechnology, information security and others. In addition to the outstanding technical papers, we'll have the high quality workshops/tutorials and special sessions that you have come to expect over the years!

The Symposium Organizing Committee has planned and designed the 2025 EMC Symposium with the goal of ensuring the most enriching technical and professional networking opportunities possible through multiple vendor exhibits, technical programs, companion programs, and social events. We have prepared three days of top-rated, peer-reviewed technical papers presented by experts in multi-track sessions and two days of practical workshops and tutorials, experiments and demonstrations presented by industry professionals. Also included are collateral industry standards meetings and a full exhibit hall to learn about the latest offerings in EMC products and services. Make sure to visit the booths of our new exhibitors.

Please plan to join us for this world class symposium for EMC 2025 in Raleigh to enjoy the networking, education, special events, and hospitality of North Carolina at its finest!

Hope to see you there!
Bruce Archambeault
General Chair, 2025 IEEE International Symposium on Electromagnetic Compatibility, Signal & Power Integrity (EMC+SIPI)

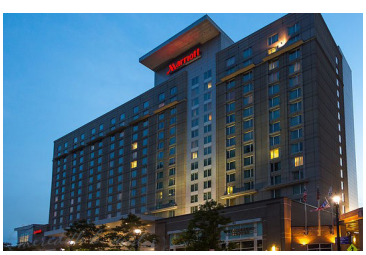
LEARN ABOUT RALEIGH, NORTH CAROLINA

ABOUT RALEIGH

Incorporated in 1792, Raleigh, the capital of North Carolina, is known as the "City of Oaks" for its many oak trees, which line the streets in the heart of the city. Often described as a "park with a city in it," an oak canopy practically covers the area, and there are also lakes for water activities, parks and greenways.

RALEIGH CONVENTION CENTER

The Raleigh Convention Center is a bustling hub for the culture, commerce and technologies that make the area one of the most admired and sought-after places in the United States. Surrounded by quality hotels, world-class performance facilities and scores of restaurants, downtown Raleigh offers everything an attendee will enjoy.



RALEIGH MARRIOTT CITY CENTER

A contemporary convention center hotel in the heart of downtown Raleigh, North Carolina with unparalleled luxury and convenience.

SHERATON RALEIGH HOTEL

A downtown hotel within walking distance of the Raleigh Convention Center, amphitheaters, museums, restaurants and breweries.

Housing is handled exclusively through the hotels linked from the Symposium website and not through any third-party vendors. To ensure you receive the room block rate, please only make your reservation through the provided link.

CLICK HERE TO RESERVE YOUR ROOM
EMC AND GOVERNMENT GROUP RATES AVAILABLE

THE 2025 EMC+SIPI COMMITTEE EXTENDS OUR GRATITUDE TO THIS YEAR'S SPONSORS FOR THEIR SUPPORT.

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RETLR

BRINGING COMPATIBILITY TO ENGINEERING INNOVATIONS SINCE 1957

The IEEE EMC Society has been at the pivot point of engineering technology for over a half-century. With a long history of developments in Electromagnetic Compatibility and Electromagnetic Environmental Effects, the Society brings sharp focus to methods and practices for proper performance of energy, electrical, communications, information technology and wireless systems. The Society promotes information sharing through regional chapters and international symposia. Collaboration across the research, design, test, regulatory and media industries has helped shape the world as we know it.

MEDIA SPONSORS

emv

International Exhibition and Conference
on Electromagnetic Compatibility (EMC)
Cologne, 17 – 19 March 2020

IN COMPLIANCE

Microwave Journal

安全与电磁兼容
SAFETY & EMC

Signal Integrity Journal

CALL FOR VOLUNTEERS

We are in need of volunteers to help make EMC+SIPI 2025 run as smoothly as possible. Previous year's volunteers have made the event a success.

We welcome new and past volunteers to help with the following positions:

- **Help with Registration**
- **Collect tickets and direct traffic at the Welcome Reception, and Gala Events**
- **Host Poster Papers**
- **Monitor Exhibit Hall Demonstrations**
- **Monitor Technical Papers, Workshops, and Tutorials**

Participating as a volunteer has some great perks!
Registered attendees contributing as a volunteer will receive:

- **An opportunity to connect with other peers and industry professionals**
- **Food and beverages during your hours of service**
- **Free Symposium shirt**

Local residents, who are not registered for the Symposium, will also receive these great benefits:

- **Free one-day registration for every day you volunteer**
- **See what's happening in the EMC and SIPI fields**
- **Free parking pass for the day you volunteer**

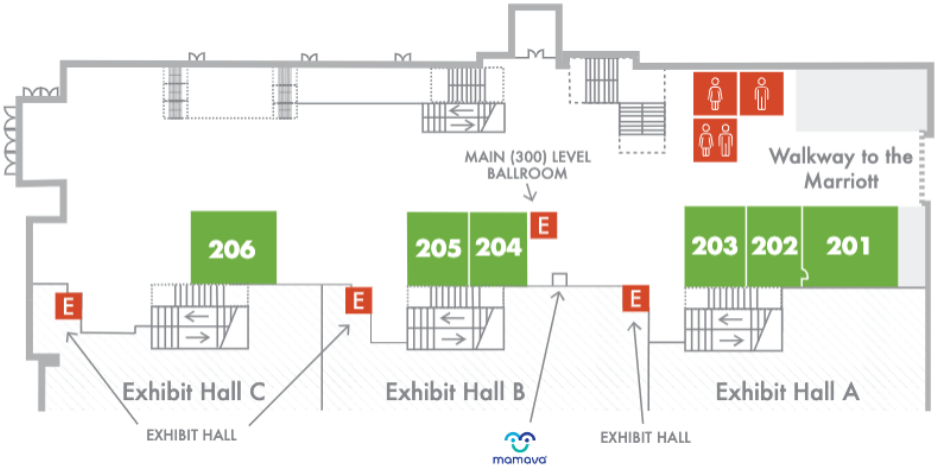
TO VOLUNTEER, PLEASE VISIT OUR WEBSITE AT: www.emc2025.org/programs/volunteer-info/

RALEIGH CONVENTION CENTER

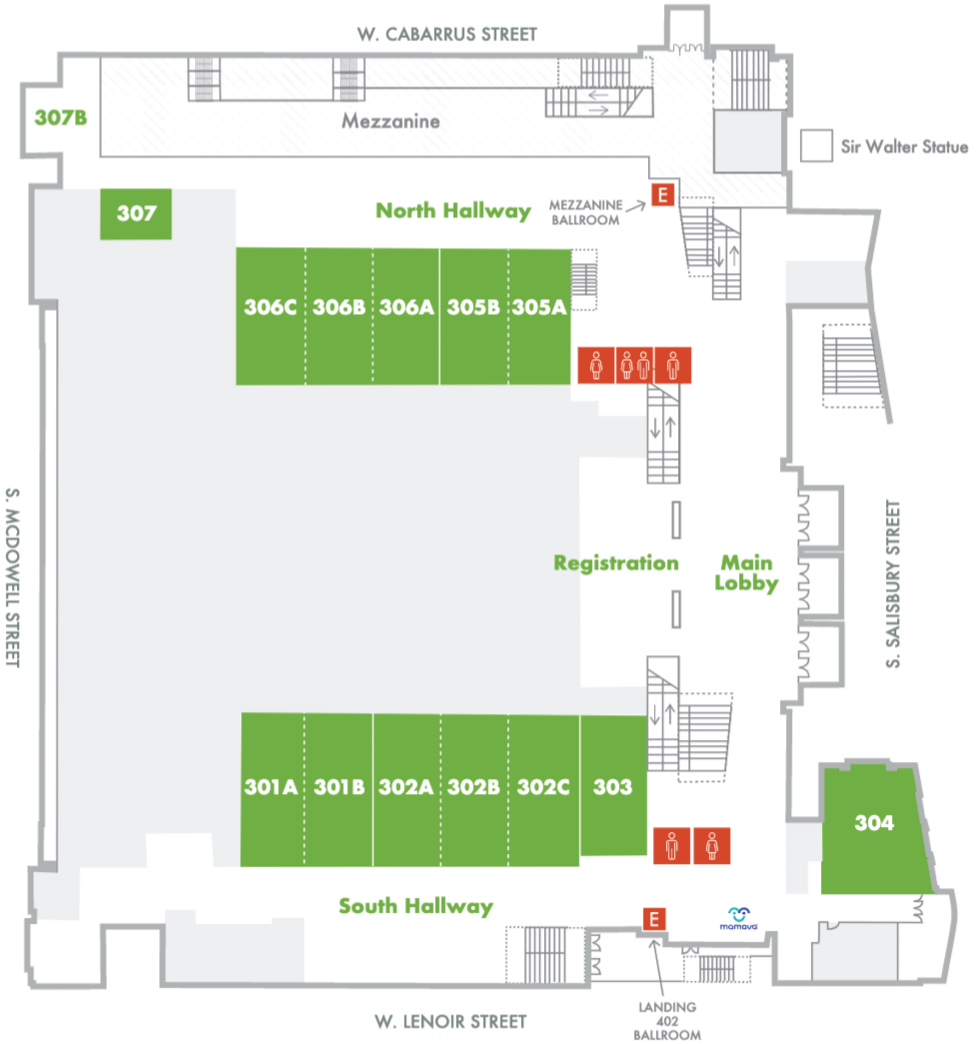
ROOMS MAPS

BALLROOM 400 LEVEL

MEZZANINE 200 LEVEL



ROOM MAPS



MAIN 300 LEVEL

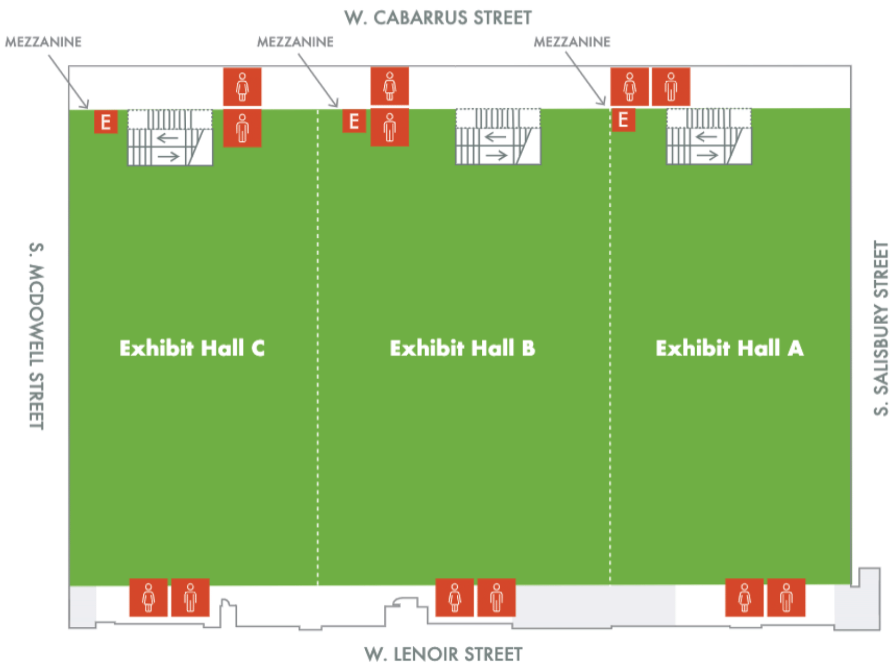


EXHIBIT HALL 100 LEVEL

TECHNICAL CHAIR'S MESSAGE

WELCOME FROM SAM CONNOR
THE 2025 TECHNICAL PROGRAM COMMITTEE CHAIR

On behalf of the Technical Program Committee, welcome to the 2025 IEEE International Symposium on Electromagnetic Compatibility, Signal & Power Integrity (EMC+SIPI). I am excited to welcome the Symposium back to Raleigh, North Carolina, where we hosted a great conference back in 2014. I hope to meet you during this exciting week full of discussions, in which we will share insights, ask questions, learn from the experts and innovators, and evaluate new products.

I encourage you to attend the special sessions and traditional paper sessions - there is a lot to learn in the late-breaking developments of our colleagues. Attend and be challenged! We will have a poster session in the exhibit hall on Tuesday morning after the Keynote Speaker, so you can enjoy that one-on-one discussion format and visit our exhibitors before heading up to the classrooms for topically organized paper sessions.

If you are seeking in-depth discussions on a specific topic, consider participating in either a workshop or a tutorial. Tutorials are delivered lecture-style, with speakers presenting comprehensive information and guidance to the audience. In comparison, workshops offer a more interactive experience, fostering discussions and active engagement among participants. We have almost thirty sessions this year which will run all-day on Monday and Friday plus Wednesday afternoon, and they cover a broad range of important topics.

The popular experiments and demonstrations program offers hands-on learning opportunities to complement the technical presentations. These presentations often vividly demonstrate what makes the EMC/SIPI area so fascinating and provoke new ideas or ways of looking at a problem. Engage with the presenters and then reproduce the experiments for your colleagues when you get back home.

The "Ask the Expert" panel sessions add another dimension to the Symposium because you can hear experts share their points of view on best practices, challenges, and future directions in their industries. Attendees are encouraged to ask questions and steer the conversation into interesting areas. This year, we are excited to offer three panels focused on Automotive EMC, Design of Ultra-High-Speed SERDES Links, and EMC Lab Operations.

For attendees seeking a foundational education track in either EMC or SIPI that will help with your skill development and career advancement, we have two, two-day Global University programs this year. First is the Clayton R. Paul Global EMC University (CRPGU) which covers fundamental topics presented by expert instructors from universities and industries from around the globe. Second is the Global SIPI University which is expanded this year and will include more topics plus hands-on measurement demonstrations to reinforce key concepts.

I am confident that the breadth and depth of this year's technical program will provide a valuable experience for you regardless of where you are in your career and whether you are in academia or industry. It will also be a chance to build your professional network, to catch up with old friends, and to make new ones. See you in Raleigh!

Sincerely,
Sam Connor
IBM, EMC+SIPI 2025 Technical Program Chair

KEYNOTE PRESENTATION

RALEIGH, NC
EMC+SIPI 2025

TUESDAY, AUGUST 19, 2025 • 8:30–9:30 AM • BALLROOM C

THE CONVERGENCE OF EMC AND SIGNAL/POWER INTEGRITY ENGINEERING

EMC engineering – the control of unwanted electromagnetic emissions and interference – and signal/power integrity (SIPI) engineering – the design of interconnects and packages that provide adequate signal transmission and power supply of electronic systems – seem to have a lot in common … or not, depending on how you look at it!

EMC engineering – seen from an exclusive SIPI perspective – is dealing with mostly regulatory compliance related, "low-frequency" problems such as ground loops and radiation from cables. Modeling and simulation are often difficult, test and measurement are paramount. In the end, "copper tape and ferrites" solve all problems.

SIPI engineering – seen from an exclusive EMC perspective – is dealing with mostly system performance related, "well-known" problems such as transmission line crosstalk and galvanic coupling. Modeling and simulation are paramount, test and measurement are often difficult. In the end, "equalization and integration" solve all problems.

Now, obviously, that's not how it really is!

Drawing from personal experience and the experience of other professionals well known in industry and academia, I will try to show that EMC and SIPI engineering are two sides of the same problem (control of currents, if you will) and that both sides can benefit from each other by being aware of the concepts, methods, and solutions that exist in their respective domains. I will also try to make the point that due to ever increasing data rates and power levels of digital systems EMC and SIPI engineering are on a path of "convergence" – if we want it or not.

PRESENTED BY:

Christian Schuster

Hamburg University of Technology, Germany (IEEE Fellow)

Christian Schuster received a Diploma degree in physics in 1996 and a Ph. D. degree in electrical engineering in 2000. Since 2006 he is a full professor at Hamburg University of Technology (TUHH), Germany. Prior to TUHH he was with the IBM T. J. Watson Research Center, Yorktown Heights, NY. His interests include signal and power integrity of digital systems, multiport measurement and calibration techniques, and development of physics-based as well as data-based modeling, simulation and optimization methods for EMC+SIPI. In the recent past, he has served as an Associate Editor for the IEEE Transactions on EMC as well as an Adjunct Associate Professor at the School of Electrical and Computer Engineering of the Georgia Institute of Technology. Currently, he is serving as President of the NIT Northern School of Technology Management at TUHH.

The following information is preliminary and subject to change.

GLOBAL SIGNAL INTEGRITY AND POWER INTEGRITY (SIPI) UNIVERSITY

TUESDAY – WEDNESDAY – THURSDAY, AUGUST 19 – 21, 2025

The Organizing Committee of the 2025 IEEE International Symposium on Electromagnetic Compatibility and Signal & Power Integrity (EMC+SIPI) is planning to offer a high-quality educational event encompassing Signal Integrity (SI) and Power Integrity (PI): the Global Signal Integrity and Power Integrity University.

Similar to the Clayton R. Paul Global EMC University that is held annually during the International Symposium, the intent is to offer two full days of lectures carefully curated to cover basic and advanced concepts of SI & PI during the symposium week. SI & PI are gaining ever-growing attention due to the higher data rates and larger currents in modern high-speed digital systems. Industry requires skilled engineers with a background in these two disciplines to address the increasing complexity and challenges of electronic system design.

The IEEE EMC Society therefore decided to offer – after its introduction in 2024 at the Symposium in Phoenix, Arizona – two full days of courses during the EMC + SIPI Symposium 2025 to bridge this gap. The mission of the Global SIPI University will be to give students, technicians, and engineers the opportunity to acquire SI & PI skills directly from experienced and well-known instructors from both industry and academia.

This year the program extends to 2 days to offer both lectures and practical demonstrations. The intent is to expand the discussion on the background concepts and to provide a more detailed presentation of advanced methods for achieving the current design challenges. Moreover, the demos will encompass the use of instruments typically employed for analysis, measurement and troubleshooting for the signal and power integrity.

COURSE PRE-REQUISITES:

Electrical engineers with a professional background in EMC that want to dive into or broaden their skills in state-of-the-art signal integrity and power integrity.

Full symposium registration required in addition to the SIPI GU course fee.

RATES

Advanced Registration Price: $295

$345 (if registered after July 18, 2025)

Photo by Patrick Andre

Read the instructor bios and presentation abstracts:
www.emc2025.org/programs/technical-programs/global-sipi-university

TECHNICAL PROGRAM

SPEAKERS AND TOPICS

TUESDAY 1:00PM-5:00PM	TIME	TOPIC	PRESENTER
	1:00pm – 1:30pm	**Registration / Introduction**	
	1:30pm – 2:15pm	**Opening**	**Stephen Scearce (Cisco)**
	2:15pm – 3:00pm	**Introduction to SI and PI** Evolution from the Basics to the Current Technology	**Francesco de Paulis (Univ. L'Aquila)**
	3:30pm – 4:15pm	**Signal Integrity I:** Transmission line effects, lumped effects, passive interconnect design, terminations and reflections	**John Golding (Siemens)**
	4:15pm – 5:00pm	**Signal Integrity II:** Crosstalk, vias, dielectric and conductive losses, surface roughness	**Bhyrav Mutnury (AMD)**
WEDNESDAY 8:30AM-5:00PM	**TIME**	**TOPIC**	**PRESENTER**
	8:30am – 9:15am	**Signal Integrity III:** Stack-up design, connectors, modulation and coding, equalization	**Brandon Gore (Samtec, Columbia SC)**
	9:15am – 10:00am	**Signal Integrity IV:** Measurements for Signal Integrity (VNA and TDR)	**Matteo Cocchini (IBM)**
	10:30am – 11:15am	**Keynote:** How useful is Machine Learning for Signal & Power Integrity Design?	**Madhavan Swaminathan (Penn State Univ.)**
	11:15am – 12:00pm	**Signal Integrity Demo I:** Time Domain – Scope measurements of the impact of transmission line effects and reflections demonstrating ringing noise, time of flight and eye diagrams.	**Eric Bogatin (Univ. Colorado)**
	1:30pm – 2:15pm	**Signal Integrity V:** Simulation and modeling for signal integrity (3D, cross-section analysis, circuit modeling)	**Roni Khazaka (McGill Univ., Montreal)**
	2:15pm – 3:00pm	**Signal Integrity Demo II:** Frequency Domain - VNA (channel analysis, calibration, de-embedding)	**Paul Peterson (R&S)**
	3:30pm – 4:15pm	**Power Integrity I:** PDN structure, IR-drop, decoupling capacitors, PDN design and optimization, low impedance measurements for PDN	**Chulsoon Hwang (MS&T)**
	4:15pm – 5:00pm	**Power Integrity II:** VRM design and modeling, PCB/package modeling of PDN	**Hanfeng Wang (Google)**
THURSDAY 8:30AM-12:00PM	**TIME**	**TOPIC**	**PRESENTER**
	8:30am – 9:15am	**Power Integrity III:** Package and IC PDN, on-chip VRM	**Zhiphing Yang (PCB Automation Inc.)**
	9:15am – 10:00am	**Hot Topic:** Engineering the Mind of Machines: Electrical Design Trends in Gen AI Processing	**Jayaprakash Balachandran (d-Matrix)**
	10:30am – 11:15am	**Power Integrity Demo:** Low impedance measurements of decaps and PDN, measurements of PDN noise on active circuit	**Benjamin Dannan (Signal Edge Solutions)**
	11:15am – 12:00pm	**Closing Session:** Compact and Surrogate Models in SI/PI	**Stefano Grivet-Talocia (PoliTo)**

CHAIR:
Christian Schuster
Hamburg University of Technology, Germany

Christian Schuster, Hamburg University of Technology, Germany (IEEE Fellow) received a Diploma degree in physics in 1996 and a Ph. D. degree in electrical engineering in 2000. Since 2006 he is a full professor at Hamburg University of Technology (TUHH), Germany. Prior to TUHH he was with the IBM T. J. Watson Research Center, Yorktown Heights, NY. His interests include signal and power integrity of digital systems, multiport measurement and calibration techniques, and development of physics-based as well as data-based modeling, simulation and optimization methods for EMC+SIPI. In the recent past, he has served as an Associate Editor for the IEEE Transactions on EMC as well as an Adjunct Associate Professor at the School of Electrical and Computer Engineering of the Georgia Institute of Technology. Currently, he is serving as President of the NIT Northern School of Technology Management at TUHH.

CO-CHAIR:
Francesco de Paulis
University of L'Aquila, L'Aquila, Italy

Francesco de Paulis, University of L'Aquila (IEEE Senior Member) received the M.S. degree in Electrical Engineering in May 2008 from Missouri University of Science and Technology (formerly University of Missouri-Rolla), USA, and the PhD degree in Electrical and Information Engineering in 2012 from the University of L'Aquila, L'Aquila, Italy. He is currently an Associate Professor at the Electromagnetic Compatibility and Signal Integrity Laboratory, University of L'Aquila, Italy, and an Adjunct Professor at the Missouri University of Science and Technology. His main research interests are in signal and power integrity, high speed channel design, electromagnetic compatibility, antenna design and measurement techniques, design of electronic devices and systems for space applications.

The following information is preliminary and subject to change.

CLAYTON R. PAUL GLOBAL UNIVERSITY

ADVANCE YOUR EMC KNOWLEDGE AND CAREER WITH IN-DEPTH CLASSES ON EMC AT THE IEEE EMC SOCIETY'S PREMIER EDUCATIONAL EVENT.

Chair: Arturo Mediano, *Professor, I3A, University of Zaragoza*

The topics for this year's Global University are those that have been proven to be valuable to participants in previous Symposia. The course provides attendees with a great learning experience, due to the ability for interaction between instructors and attendees, as well as providing networking opportunities.

This year's Global University will continue to honor Dr. Paul's efforts and dedication to the EMC Society as well as maintain his high standards in providing EMC educational opportunities!

Attendees may qualify for IEEE professional development hours (PDH) and continuing education units (CEU) certificates. Course size is limited and will be filled on first-come, first-served basis.

PLEASE NOTE: The Clayton R. Paul Global University course content is intended for engineers who have been working in EMC and/or SIPI for several years and wish to be able to deepen their understanding. It is suggested that those who would like to attend will have already participated in the "Fundamentals Tutorial" held on Monday during the annual IEEE EMC Society Symposium week.

*Attendees participating in Clayton R. Paul Global University must attend all 16 hours of the instruction to receive a participation certificate. Other Symposium sessions and activities can be attended outside of these hours.

RATES

Advanced Registration Price: $295

$345 (if registered after July 18, 2025)

Photo by Richard Georgerian

READ THE INSTRUCTOR BIOS:
https://emc2025.org/programs/technical-programs/global-university/

RALEIGH, NC
EMC+SIPI 2025

SPEAKERS AND TOPICS

The course begins with a short introduction followed by ten presentations that are designed to encourage attendees' questions. Attendees will have opportunities for discussions with the instructors.

SIGNAL SPECTRA
Dr. Flavia Grassi
Professor, Politecnico Milano

NON-IDEAL BEHAVIOR OF COMPONENTS
Dr. Anne Roc'h
Assistant Professor,
Eindhoven University of Technology

RADIATED EMISSIONS
Mr. Lee Hill
Founding Partner, SILENT Solutions LLC & GmbH, Amherst, NH, USA
MSEE, Missouri University of Science & Technology
Adjunct Faculty, Worcester Polytechnic Institute (WPI)
Associate Tutor, University of Oxford

CONDUCTED EMISSIONS
Dr. Arturo Mediano
Professor, I3A, University of Zaragoza
Professor, I3A, University of Zaragoza, Spain
Founder The HF Magic Lab
IEEE Senior Member
Chair, EMC Society Spain Chapter
Past Chair, MTT-S MTT-17 Committee
Recipient of the EMC Society's 2024 Excellence in Continuing EMC Engineering Education Award

PCB DESIGN FOR EMC COMPLIANCE
Dr. Todd Hubing
Professor Emeritus, Clemson University
IEEE Fellow, ACES Fellow
Past President, IEEE EMC Society

EMC FILTERS
Dr. Frank Leferink
Professor, Chair EMC, University of Twente, Enschede, The Netherlands
Director EMC, THALES Nederland
IEEE Fellow

SHIELDING
Karen Burnham
President and Chief Engineer of EMC United, Inc., Denver, CO, USA
2022 – 2023 Distinguished Lecturer on EMC.

CROSSTALK
Dr. Daryl G. Beetner
Professor, Missouri University of Science & Technology, Rolla, MO, USA
Director, Missouri S&T Electromagnetic Compatibility Laboratory
Director, NSF Center for Electromagnetic Compatibility

	TIME	TOPIC	PRESENTER
TUESDAY 1:00PM-5:00PM	1:00pm – 1:15pm	Registration and CRPGU Presentation	
	1:15pm – 3:00pm	Signal Spectra	Flavia Grassi (Politecnico Milano)
	3:30pm – 5:30pm	Non-Ideal Behavior of Components	Anne Roc'h (Eindhoven University of Technology)
WEDNESDAY 8:30AM-5:00PM	TIME	TOPIC	PRESENTER
	8:00am – 10:00am	Radiated Emissions	Lee Hill (SILENT Solutions LLC & GmbH)
	10:30am – 12:00pm	Conducted Emissions	Arturo Mediano (University of Zaragoza)
	1:00pm – 3:00pm	PCB Design for EMC	Todd Hubing (Clemson University)
	3:30pm – 5:30pm	EMC Filters	Frank Leferink (University of Twente)
THURSDAY 8:30AM-12:00PM	TIME	TOPIC	PRESENTER
	8:00am – 10:00am	Shielding	Karen Burnham (EMC United, Inc.)
	10:30am – 11:45am	Crosstalk	Daryl G. Beetner (Missouri University of Science & Technology)
	11:45am – 12:00pm	Closing Session	

The following information is preliminary and subject to change.

WT_A1 WORKSHOP

ADVANCED MATERIALS FOR AEROSPACE EMC AND OTHER EMI/EMC APPLICATIONS

8:30AM - 12:00PM

Room: 302C

Sponsored by TC-11 Nanotechnology and Advanced Materials

Chair:
Marina Koledintseva, *The Boeing Company, Saint Louis, MO*

In this workshop, presentations will focus on physics, technology, characterization, and EMC applications of new advanced materials, including nano-materials, metamaterials, and various composites. Such materials are used, in particular, for design of EMI shielding and filtering structures and various electromagnetic wave absorbers.

PLANNED SPEAKERS & TOPICS

Silicones for Highly Demanding Applications in Aerospace, Aviation and Defense
Julia Sunderland
The Dow Chemical Company, USA

Graphene-based Nanomaterials and Coatings for EMC Applications
Alessandro Giuseppe D'Aloia[1], Fabrizio Marra[2]
[1]DIAEE - Sapienza University of Rome, Italy; [2]Universita degli Studi di Roma La Sapienza, Italy

Advanced Electromagnetic Wave-absorbing Materials for Aerospace Application
Dandan Zhang
University of Michigan, USA

Characterization of Radar Absorber Materials and Coatings
Marina Y. Koledintseva
The Boeing Company, Saint Louis, MO, USA

Passive Intermodulation in the Contacts of Good Conductors at MHz and GHz Frequencies
Alexander Schuchinsky
University of Liverpool, United Kingdom

Vanadium and Other Redox Flow Batteries for Sophisticated Energy Storage for Aerospace Applications
Clifford M. Krowne
Ashlawn Energy LLC, USA

Photo by Karthik Vepuri

The following information is preliminary and subject to change.

WT_A2 WORKSHOP

MILITARY EMC

8:30AM - 5:00PM

Room: 303

Sponsored by TC-3 Electromagnetic Environment & TC-6 Spectrum Engineering

STANDARDS WEEK

Co-Chairs:

Robert Davis, *Lockheed Martin, Retired*
Carl Hager, *NSWC Dahlgren*

Achieving electromagnetic compatibility with military equipment, systems, and platforms requires significant expertise and effort. EMC must be considered at all lifecycle stages and involves first characterizing the operational electromagnetic environment (EME), then design/testing military systems at various stages of production, assembly and integration and coordination of Spectrum in operational environments. This tutorial will cover a broad range of Military EMC topics.

PLANNED SPEAKERS & TOPICS

Recent Updates to MIL-STD-461, Revision H
Finbarr O'Connor
Huntington Ingalls Industries Inc, USA

NATO AECTP 500 Land Platform Tests
Edwin van Bladel
Koninklijke Luchtmacht, Netherlands

E3 Aspects of MIL-HDBK-1763: Aircraft/Stores Compatibility
Joshua Ashley
United States Air Force, USA

High Frequency Radio Noise Characterization Using An Active Impedance-Matched Short Vertical Monopole Antenna
Robert Achatz
NTIA Institute for Telecommunications Sciences

The State of Clutter Modeling Within the ITU
William Kozma
NTIA Institute for Telecommunications Sciences, USA

Radar Spectrum Engineering Criteria (RSEC) and its Application to Federal Radar Regulations
Brian Nelson
NTIA Office of Spectrum Management, USA

Recent Results from a High Frequency Spectrum Survey Conducted In and Around McMurdo Station, Antarctica
Adam C. Hicks
NTIA Institute for Telecommunications Sciences, USA

Overview of Regulatory Considerations with Respect to Receiver Immunity
Bruce Jacobs
NTIA Office of Spectrum Management, USA

Advanced Interference Analysis Measurements of Real-World Spectrum Sharing Environments
Todd Schumann
NTIA Institute for Telecommunications Sciences, USA

Adjacent-Band Coexistence Between 5G Base Station Transmitters and Air Traffic Control Radar Receivers
Brian Nelson
NTIA Office of Spectrum Management, USA

Near Field Coupling Effects and Impact for HERO and External RF EME Testing
Mark Waller
U.S. Army Redstone Test Center

EMC Testing Complexity and Potential Risks to Military Personnel and Operations Caused by the Integration of Systems Onto the Soldier Platform
Alejandro Rodriguez
US Army Test & Evaluation Command, USA

The following information is preliminary and subject to change.

WT_A3 TUTORIAL

INTRODUCTION TO MODELING TECHNIQUES FOR EMC+SIPI PROBLEMS

8:30AM - 12:00PM

Room: 305A

Sponsored by TC-9 Computational Electromagnetics

Chair:
Giulio Antonini, *Universita degli Studi dell'Aquila*

This tutorial will introduce commonly used numerical modeling techniques for EMC+SIPI problems without the need for detailed math. Practicing modelers will also benefit from learning the fundamentals of modeling techniques they are currently not using. Each technique will be presented with strengths and weaknesses so engineers can decide which techniques are appropriate for their problems.

PLANNED SPEAKERS & TOPICS

Introduction to the Finite Element Method
Chuck Bunting
Oklahoma State University, USA

Modeling with the Method of Moments
Lijun Jiang
Missouri University of Science and Technology, USA

Introduction to FDTD
Bruce Archambeault
Missouri University of Science and Technology, USA

Introduction to the Partial Element Equivalent Circuit (PEEC) Approach Applied to EMC+SI/PI Problems
Jonas Ekman
Luleå University of Technology, Sweden

RALEIGH FUN FACT

Raleigh, North Carolina is a city rich in American history and is the start to many traditions or "firsts." Raleigh is home to the first historically black university in the South (Shaw University-1865), the first public park in North Carolina named Pullen Park (1887), the first state-supported symphony in the USA (The North Carolina Symphony- 1932), the first Krispy Kreme in Winston-Salem located a few hours away (1937), the first state art museum in the U.S. (North Carolina Museum of Art- 1947), the first shopping center between Washington D.C and Atlanta (Village District- 1947), and the first and only major league pro sports franchise (Carolina Hurricanes- 1997). Don't forget about First Night Raleigh (1990), the city's New Years Eve party featuring the "Acorn Drop" to honor the city nickname, "City of Oaks."

The following information is preliminary and subject to change.

WT_A4 WORKSHOP

WHEN OPEN SOURCE MEETS SIPI/EMC

8:30AM - 5:00PM

Room: 305B

Sponsored by TC-9 Computational Electromagnetics

Chair:
Yansheng Wang, *Rivos Inc.*
Co-Chair:
Giorgi Maghlakelidze, *NVIDIA Corp*

Open source is gaining increasing attention these days, with well-known projects like Linux and RISC-V leading the way. But how can the SIPI/EMC community contribute to and benefit from this growing open-source movement? Join us for this workshop to find out. We'll introduce several open-source projects and tools specifically developed for the SIPI/EMC community. Our invited speakers, who are maintainers, contributors, and users of open-source projects, will share their valuable insights. By the end of the workshop, we hope to inspire and motivate attendees to get involved in open-source initiatives and explore the opportunities they offer.

PLANNED SPEAKERS & TOPICS

Deep Learning Based Modeling and Optimization for Signal and Power Integrity
Ling Zhang
Zhejiang University, China

Open Source De-Embedding Tutorial and Best Practices
Jason Ellison
TE Connectivity, USA

OpenSIPI: An Open Source Platform to Automate S-para Extraction and Post-Processing
Yansheng Wang[1], Yuchu He[2]
[1]Rivos Inc., USA; [2]Google Inc, USA

OpenParEM - A Free Open-Source 2D & 3D Full-Wave FEM Electromagnetic Simulator
Brian Young
Independent Technology and Business Development, USA

From Toy to Tool, A Python Journey
David Banas
Keysight Technologies Inc, USA

Free S-parameter Viewers Anyone Can Use
Eric Bogatin
University of Colorado Boulder, USA

Developing an Open S-parameter Visualiser With Assistance From AI
Giorgi Maghlakelidze
NVIDIA Corp, USA

Removing Communications Barriers between CAD and Instrumentation Companies with Open-Source PCB
Ken Willis
Cadence Design Systems, USA

Panel Discussions
Yansheng Wang
Rivos Inc., USA

The following information is preliminary and subject to change.

WT_A5 TUTORIAL

HENRY W. OTT FUNDAMENTALS OF EMC

8:30AM - 5:00PM

Room: 306A

Sponsored by EdCom

Chair:
Jen Dimov, *NASA*
Co-Chair:
Patrick DeRoy, *Analog Devices Inc*

This tutorial is an overview of many of the major topics that need to be considered when designing an electronic product or system to meet signal and power integrity (SIPI) and electromagnetic compatibility (EMC) requirements. The tutorial will present the foundational ideas from physics and mathematics and will demonstrate the engineering approaches to help the attendees to successfully design, evaluate, diagnose, and/or solve EMI problems. The main objective of this tutorial is to provide a learning opportunity for those that are new to EMC as well as provide a review of the basics to those who already have some experience in this area.

PLANNED SPEAKERS & TOPICS

Introduction to Electric and Magnetic Fields
John C. McCloskey
NASA, USA

Transmission Lines
Eric Bogatin
University of Colorado Boulder, USA

Antennas
Lee Hill
SILENT Solutions LLC & GmbH, USA

Coupling Paths
Christoper J. Semanson
Renesas Electronics America Inc, USA

Grounding
Todd Hubing
LearnEMC, USA

Board Level Design
Niek Moonen
Universiteit Twente, Netherlands

Noise Mitigation At System Level
Karen Burnham
EMC United Inc., USA

Electrostatic Discharge
Daryl Beetner
Missouri University of Science and Technology, USA

Photo by Richard Georgerian

The following information is preliminary and subject to change.

WT_A6 TUTORIAL

EMC IN POWER ELECTRONICS: PRINCIPLES OF EMI GENERATION AND MITIGATION FOR ELECTRICAL SYSTEMS AND ELECTRICAL TRANSPORT

8:30AM - 5:00PM

Room: 306B

Sponsored by TC-7 Electrical System and Power Electronics EMC (formerly Low Frequency EMC)

Co-ChairS:
Niek Moonen, *University of Twente, Netherlands*
Daria Nemashkalo, *University of Twente, Netherlands*

Power electronic (PE) devices are at the core of modern energy conversion, enabling efficient distribution, regulation, and utilization of electrical energy across various applications, including electric transport. As global energy consumption shifts toward electrification and digitalization, power electronics play an increasingly important role. However, these systems inherently generate electromagnetic interference (EMI), which can disrupt the performance of nearby electronic devices and/or compromise system reliability. Managing EMI, generated by PE devices effectively is crucial to achieving electromagnetic compatibility (EMC), ensuring reliability, interoperability and safety of electrical systems. In this tutorial, we discuss EMC challenges driven by PE devices in different areas of their applications, the resulting consequences and requirements for EMC, as well as methods for controlling and mitigating EMI. Additionally, aspects of comprehensive EMI filter design and evaluation will be presented, with a focus on optimizing EMI filter weight, volume and performance, which are often seen as the bottlenecks for electric transport.

PLANNED SPEAKERS & TOPICS

Introduction to EMC in Power Electronics & EMI Mitigation
Niek Moonen
University of Twente, Netherlands

Sensitivity Analysis in Power Electronic Converters
Karol Niewiadomski
University of Twente, Netherlands

Aggregation of EMI in Multi-Converter Systems
Erjon Ballukja
University of Nottingham, United Kingdom

EMI Filter Design and Performance Evaluation for Power Electronics Applications
Daria Nemashkalo
University of Twente, Netherlands

EMI Filters: Emerging Solutions
Tom Hartman
University of Twente, Netherlands

The following information is preliminary and subject to change.

WT_A7 WORKSHOP

EMC REGULATIONS AND STANDARDS – PAST, PRESENT AND FUTURE

STANDARDS WEEK

8:30AM - 5:00PM

Room: 306C

Sponsored by TC-1 EMC Management

Chair:
Henry Benitez, *ElectroMagnetic Investigations*

This workshop will provide an overview of the evolution of electromagnetic compatibility dating back to the development of the Faraday's Laws. The process of EMC standards development will discussed. Actual Chairs of international and national EMC standards development committees will provide updates on some of the most significant standards. Regulatory representatives will present on behalf of the FCC, FDA, and NIST. The role of laboratory accreditation will be discussed by a representative of an Accrediting body. A former Chair of the USA Telecommunications Counsel will discuss its role in the radio certification process. An expert panel discussion will conclude the program to discuss past, present and future aspects of EMC regulations and standards.

PLANNED SPEAKERS & TOPICS

Historical Overview of EMC Regulations and Standards
Henry Benitez
ElectroMagnetic Investigations, USA

EMC Overview of FCC Regulations
William H. Graff
Mesa Community College, USA

Automotive Standards Development by CISPR/D Review of CISPR 12, CISPR 36, and CISPR 2
Craig Fanning
Elite Electronic Engineering, Inc., USA

Trends in Tel MRAs
Nathalie Rioux
NIST, USA

Role of Accreditation Bodies
Janneth Marcelo
NIST NVLAP, USA

CISPR A/CISPR H
Andy Griffin
Cisco Systems Inc, USA

CISPR I – CISPR 32/35
Ghery Pettit
Pettit EMC Consulting, USA

ANSI C63 Standards Overview
Zhong Chen
ETS-Lindgren, USA

IEC Industrial Standards Overview and Updates
Bill Morse
Schweitzer Engineering, USA

EMC Regulations and Standards for Medical Devices
Yasaman Ardeshirpour
US Food and Drug Administration, USA

Advisory Committee on Electromagnetic Compatibility SF-19197
Bernd Jaekel
Siemens, Germany

The following information is preliminary and subject to change.

WT_B1 WORKSHOP

NEW EMC MEASUREMENT METHODS FROM 18-40 GHZ

1:30PM - 5:00PM

Room: 302C

STANDARDS WEEK

Chair:
Martin Wiles, *MVG World*

The workshop focuses on the current standardization work to develop measurement methods from 18-40 GHz within both IEC/CISPR and ANSI. It brings together experts from both organisations directly involved in this work to explain the latest developments.

PLANNED SPEAKERS & TOPICS

IEC CISPR A Working Group Developments in 18-40 GHz
Martin A. Wiles
MVG World, United Kingdom

Is There a Future for Site VSWR?
Alexander Kriz
Seibersdorf Labor GmbH, Austria

ANSI C63.25-3 18-40 GHz: Overview of CATR, Reverberation Chamber and Semi-Anechoic Chamber
Nicholas Abbondante
Intertek USA Inc, USA

ANSI C63.25-3 18-40 GHz: Overview of Semi-Anechoic Chamber Validation Methods
Phillip Miller
RATLR, USA

Photo by Patrick Andre

The following information is preliminary and subject to change.

WT_B3 TUTORIAL

BASIC EMC MEASUREMENTS

1:30PM - 5:00PM

Room: 305A

Sponsored by TC-2 EMC Measurements

Chair:
Monrad Monsen, *Oracle America Inc*

There continues to be those entering the EMC field who are performing measurement activity for both emissions and immunity. In addition, there are practitioners who want to get a second opinion to support what they are doing. They are all at least familiar with basic EMC immunity measurements methods that cover a wide range of electromagnetic phenomena. This tutorial will cover both emissions and immunity by highlighting the latest amendment to a major multimedia emissions standard and a selection of immunity testing standards for transients that are more difficult to implement. The transient discussion will also delve into signals that are high power in a very short time. Also included: a description of emission and immunity test sites, the sites that are becoming popular and their validation requirements, as well as an overview of test setups in these facilities.

PLANNED SPEAKERS & TOPICS

Use of Basic Measurement Facilities, Methods and Associated Errors
Dave Arnett
Garmin International Inc, USA

CISPR 32 Edition 2, Amendment 1
Dave Arnett
Garmin International Inc, USA

Performing Immunity Testing to Transient Signals
Tom Braxton
TEB EMC-EMI Consulting, USA

Continuous Wave Immunity
Ross Carlton
Gibbs and Cox Inc, USA

High Power Electromagnetics Test Facilities and Measurement Methods
William A. Radasky
Metatech Corporation, USA

AUGUST 3-7
EMC+SIPI 2026
DALLAS, TEXAS

SAVE THE DATE

MARK YOUR CALENDAR
DALLAS, TEXAS
AUGUST 3 - 7, 2026

The IEEE EMC+SIPI 2026 Symposium leads the industry in providing state-of-the-art education on EMC and Signal Integrity and Power Integrity techniques. The Symposium features five full days of innovative sessions, interactive workshops & tutorials, "Ask the Experts" panel discussions, experiments and demonstrations, expansive technical exhibition, and social networking events.

Dallas is a leading hub for technological innovation, supporting the sixth-largest tech workforce and the most influential electronics and semiconductor companies in the United States. Downtown Dallas is a showcase of architectural brilliance and is home to thousands of restaurants for every palate.

The Kay Bailey Hutchison Convention Center Dallas, the venue for EMC+SIPI 2026, is located in the heart of downtown Dallas. It is one of the largest convention centers in the U.S., welcoming over one million visitors annually. The host hotel, Hilton Anatole Dallas, offers modern accommodation and an outdoor pool complex with slides and a lazy river for attendees that want to bring their families.

Like the Pritzker-prize-winning skyline, Dallas is skillfully pieced together by many strong hands, diverse culture, and innovative companies who make the city what it is today; representative of the technology, willpower, and intelligence of individuals who brought IEEE EMC+SIPI together to shape our world. We are excited to bring EMC+SIPI 2026 to Dallas to celebrate and share knowledge once more, linking together leading minds in the field.

The following information is preliminary and subject to change.

POSTER SESSION

POSTER SESSION
10:00AM - 12:00PM
Room: Exhibit Floor

Co-Chairs:
Samuel Connor, *International Business Machines Corp*
Jacob Dixon, *International Business Machines Corp*

PLANNED SPEAKERS & TOPICS

Measurement and Analysis of EMC Noise during Welding Operations.
Yena Lee, Kyungmo Sung
HD Hyundai Electric, Korea (the Republic of)

Impact of RF Coil Characteristics on 1.5T MRI RF-Induced Heating of Active Medical Implant Leads
Kyle Bond, Arash Dabir, Anasheh Avakians, Carolyn Kwok, Nowrin Chamok, Louai Al-Dayeh
Boston Scientific Neuromodulation, USA

Impact of Layer Spacing in a 3x3 Layered DD Coil Array for Efficient EV Wireless Power Transfer
Babatunde Soyoye, Indranil Bhattacharya, Webster O. Adepoju, Muhammad Bima, Trapa Banik
Tennessee Tech University, USA

Frequency Extrapolation and Scaling Transformation-Based ISAR Imaging Method
Xiongfei Long[1], Shuhui He[2], Xingbao Lin[1], Dan Yang[1], Kebing Meng[1], Zibin Weng[1]
[1]The National Key Laboratory of Radar Detection and Sensing, China; [2]Marine Design & Research Institute of China, China

Ferrite Core Optimization of Spiral Planar DD Coil for Efficient Wireless Power Transfer Applications
Tuan Kiet Le, Indranil Bhattacharya
Tennessee Tech University, USA

Planar Near-field Measurements Based on Kernel Ridge Regression
Xingbao Lin[1], Xumin Liu[2], Chen Liang[1], Xiongfei Long[1], Mengyao Hu[1], Zibin Weng[1]
[1]Xidian University, China; [2]Marine Design & Research Institute of China, China

Implicit FETD for Conformal FSS (C-FSS) Analysis with Sum Factorization
Yi-Yao Wang
Zhejiang University, China

Design and Optimization of a Miniaturized Spiral Antenna for Ultra-Wideband Applications
McKennan E. Starkey, Cody J. Goins, Victor Khilkevich, Daryl Beetner
Missouri University of Science and Technology, USA

Advanced Silicone Composites as Elastomeric Solutions for EMI/EMC Applications
Julia Sunderland[1], Dan Zhao[1], Shuangbing Han[1], Joe Sootsman[2]
[1]The Dow Chemical Company, USA; [2]Dow Silicones Corporation, USA

Development of Reverberation Chamber Characterization Techniques at Microwave Frequencies
Amin Aminaei
University of California Davis, USA

Parameterized Surrogate Models of Electromagnetic Systems through Decision Tree and Random Forest Models
Elia Mattucci[3], Daniele Romano[1], Fabio Antonini[2], Giulio Antonini[1]
[1]Universita degli Studi dell'Aquila, Italy; [2]TIESSE s.r.l., Italy; [3]Rete Ferroviaria Italiana S.p.A., Italy

Comparison of Conducted and Radiated Disturbance Between SiC MOSFET and Si IGBT
Tiebing Lu, Huazhen Huang
North China Electric Power University, China

Optimization of Horn Antenna Parameters using ANSYS HFSS Software
Petre-Marian Nicolae, Vasile Dumitru-Alexandru, Marian-Stefan Nicolae, Florentina Panait-Radu
University of Craiova, Romania

Co-Optimization of Floorplanning and Decap Placement for TI and PI Based on Machine Learning
Jisoo Hwang[1,2], SoYoung Kim[1]
[1]Sungkyunkwan University - Natural Sciences Campus, Korea (the Republic of); [2]Samsung Electronics Co Ltd, Korea (the Republic of)

The following information is preliminary and subject to change.

SC3_1 TECHNICAL PAPERS

MACHINE LEARNING BASED METHODS FOR EMC AND SIPI #1

10:30AM - 12:00PM

Room: 303

Sponsored by SC-3 Special Committee on Machine Learning and Artificial Intelligence in EMC and SIPI

Chair:
Lijun Jiang, *Missouri University of Science and Technology*

Co-Chair:
Alistair Duffy, *De Montfort University*

PLANNED SPEAKERS & TOPICS

ML-Based Approach for PCB Anomaly and Leakage Detection
Matthieu Leflon[1,2], Mohamed Kheir[1], Sadok Ben Yahia[3]
[1]SDU, Syddansk Universitet, Odense, Syddanmark, DK, academic, Denmark; [2]Ecole Nationale Superieure de l'Electronique et de ses Applications, France; [3]Syddansk Universitet, Denmark

Reinforcement Learning-Assisted Optimization of Power Plane and Placement of Decoupling Capacitors in Power Delivery Networks
Nima Ghafarian Shoaee[1], Baoyin Hua[1], Werner John[3], Ralf Brüning[3], Jürgen Götze[1]
[1]Technische Universitat Dortmund, Germany; [2]PYRAMIDE2525, Germany; [3]Technische Universitat Dortmund, Germany; [4]Zucken GmbH, Germany

Deep Reinforcement Learning (DRL) based Signal Integrity (SI) Performance Optimization Method for Low-Power Double Data Rate (LPDDR) Memory
Dongryul Park[1], Seonghi Lee[1], Seunghun Ryu[1], Hyunwoo Kim[1], Dongkyun Kim[1], Ducksoo Kim[2], Hyunsik Kim[2], Jongwook Kim[2], Seungyoung Ahn[1]
[1]Korea Advanced Institute of Science and Technology, Korea (the Republic of); [2]SK hynix Inc., Korea (the Republic of)

RALEIGH FUN FACT

HOW DID RALEIGH GET ITS NAME?

Raleigh was named after Sir Walter Raleigh, an explorer and nobleman who financed the first expeditions to the coast of present-day North Carolina. In the 1580s, he attempted to establish the first English colony in the New World.

Sir Walter Raleigh was one of the most renowned explorers of Elizabeth I's reign and quickly became the Queen's favorite. Because of his close relationship with the Queen, she initially forbade him from pursuing his plan to create English colonies in North America. However, being a rebellious spirit, he organized voyages in 1584, 1585, and 1587 that eventually led to the establishment of an English colony on Roanoke Island, now part of North Carolina.

The following information is preliminary and subject to change.

SS_1 SPECIAL SESSION

ELECTROMAGNETIC INFORMATION SECURITY AND ITS COUNTERMEASURES

10:30AM - 4:30PM

Room: 305A

Sponsored by TC-5 High Power Electromagnetics

Chair:
Yuichi Hayashi, *Nara Sentan Kagaku Gijutsu Daigakuin Daigaku*

Co-Chair:
William Radasky, *Metatech Corporation*

Information security has become a critical challenge in modern society, with physical-layer security gaining importance alongside upper-layer security measures. The proliferation of high-precision measurement equipment, advances in computing performance, practical implementation of large-capacity storage devices, and developments in AI technology have transformed sophisticated attacks, previously considered technically unfeasible, into realistic threats. These threats now extend beyond military and diplomatic domains to affect consumer devices.

This special session focuses on electromagnetic information security, a crucial aspect of physical layer security where attacks leave minimal traces and are difficult to detect. We will discuss security threats posed by both passive and active electromagnetic attacks and examine how conventional EMC evaluation techniques can be applied to assess and counter these threats, incorporating the latest research findings.

PLANNED SPEAKERS & TOPICS

Special Session on Emerging Security Threats from EM Information Leakage and IEMI
Yuichi Hayashi[1], William A. Radasky[2]
[1]Nara Sentan Kagaku Gijutsu Daigakuin Daigaku Joho Kagaku Kenkyuka, Japan; [2]Metatech Corporation, USA

Pixel Level Character Reconstruction by Background Profiling against TMDS Emanations
Taiki Kitazawa, Shohei Matsumoto, Yuichi Hayashi
Nara Sentan Kagaku Gijutsu Daigakuin Daigaku Joho Kagaku Kenkyuka, Japan

Integrating Advanced Signal Analysis and Deep Learning in TEMPEST Techniques
Taesik Nam, Dong-Hoon Choi, Euibum Lee, Jong-Gwan Yook
Yonsei University, Korea (the Republic of)

Anti-Phase Signal Approach to Echo TEMPEST Self-Interference Suppression Retaining a Two-Antenna Setup
Shugo Kaji, Daisuke Fujimoto, Yuichi Hayashi
Nara Institute of Science and Technology (NAIST), Japan

There's Waldo: PCB Tamper Forensic Analysis using Explainable AI on Impedance Signatures
Maryam Saadat Safa, Seyedmohammad Nouraniboosjin, Fatemeh Ganji, Shahin Tajik
Worcester Polytechnic Institute, USA

Simulation-Based Approach to Target EMI Attenuation for Meeting Required Power Side-Channel Attack Success Rate
Masaki Himuro, Rei Mitsuyasu, Kengo Iokibe, Yoshitaka Toyota
Okayama University, Japan

Mitigating IEMI Induced Faults in PLL-based Cryptographic Modules Through Narrow Loop Bandwidth
Hikaru Nishiyama[1,2], Daisuke Fujimoto[2], Yuichi Hayashi[2]
[1]National Institute of Advanced Industrial Science and Technology, Japan; [2]Nara Institute of Science and Technology (NAIST), Japan

Simulation and Analysis of Intentional EMI Attack Against Power Delivery Network of Ring Oscillator based True Random Number Generator
Youngwoo Kim
Sejong University, Korea (the Republic of)

The following information is preliminary and subject to change.

TC4 TECHNICAL PAPERS

ANALYSIS OF EMI COUPLING MECHANISMS

10:30AM - 12:00PM

Room: 305B

Sponsored by TC-4 Electromagnetic Interference Control

Chair:
Daryl Beetner, *Missouri University of Science and Technology*

Co-Chair:
Lirim Koraqi, *Katholieke Universiteit Leuven*

PLANNED SPEAKERS & TOPICS

Mutual Magnetic Coupling Between the Common Modes of Bifilar Windings in Equal-Delay Transformers
James McLean
TDK R&D Corp., USA

EMI-Related Common-Mode Noise Analysis of CMOS and CML Drivers
Guangyu Sheng[1], Hanzhi Ma[1], Zhanxi Pang[1], Jianquan Lou[2], Haiwen Lu[2], Alpesh Bhobe[3], ErPing Li[1]
[1]Zhejiang University, China; [2]Cisco Systems (China) R&D Co., Ltd., China; [3]Cisco Systems, Inc., USA

Extended S-Parameter Model of Power Distribution Network for Rapid Coupling Predictions
Cody J. Goins, Aaron Harmon, McKennan E. Starkey, Kristen M. Donnell, Victor Khilkevich, Daryl Beetner
Missouri University of Science and Technology, USA

Photo by Patrick Andre

The following information is preliminary and subject to change.

TC6 TECHNICAL PAPERS

SPECTRUM ENGINEERING

10:30AM - 11:00AM

Room: 306A

Sponsored by TC-6 Spectrum Engineering

Co-Chairs:

Sarah Seguin, *The Aerospace Corporation Chantilly*

Larry Cohen, *US Naval Research Laboratory*

PLANNED SPEAKERS & TOPICS

Selective RFID Gate - Use of Absorbing EMC Materials to Eliminate Interference with the Operation of Automatic Identification Systems

Krzysztof Sieczkarek[1,2], Adam Mackowiak[2], Tomasz Warzynski[2]

[1]EMC Pro, Poland; [2]Siec Badawcza Lukasiewicz - Poznanski Instytut Technologiczny, Poland

Photo by Richard Georgerian

The following information is preliminary and subject to change.

TC10_6 TECHNICAL PAPERS

APPLICATIONS OF AI AND OPTIMIZATION ALGORITHMS

10:30AM - 12:00PM

Room: 306B

Sponsored by TC-10 Signal and Power Integrity

Chair:
Ruihua Ding, *Meta Platforms Inc*

Co-Chair:
Ken Willis, *Cadence Design Systems, San Jose, CA, USA*

PLANNED SPEAKERS & TOPICS

Differential Via Modeling using Multilayer Perceptron-Sequential (MLP-SEQ) Neural Network
Hyunwook Park[1], Shruti Sawant[1], Bandi Sathvika[1], Arun Chada[2], Soumya Singh[2], Seema PK[2], Taein Shin[3], Haeseok Suh[3], Junyong Park[4], Bhyrav Mutnury[5], DongHyun (Bill) Kim[6]
[1]Missouri University of Science and Technology, USA; [2]Dell Inc Plano, USA; [3]Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of); [4]Dankook University, Korea (the Republic of); [5]Advanced Micro Devices Inc Austin, USA; [6]Missouri University of Science and Technology College of Engineering and Computing, USA

Multi-Objective Inverse Optimization of High-Speed Interconnects Using Cascaded Deep Neural Network
Yicheng Zhang[1], Ling Zhang[1], Hyunwook Park[2], Bo PU[2], Kevin Cai[3], Chulsoon Hwang[2], Bidyut Sen[3], Jun Fan[2], ErPing Li[1], James Drewniak[4]
[1]Zhejiang University, China; [2]Missouri University of Science and Technology, USA; [3]Cisco Systems, Inc, USA; [4]Missouri S&T EMC Laboratory, Missouri University of Science and Technology, USA

USB 3.0 IBIS-AMI Model Construction using Measurement and Neural Network
Jiahuan Huang[1], Wenchang Huang[1], Muqi Ouyang[2], Hank Lin[3], Bin-Chyi Tseng[3], Chulsoon Hwang[1]
[1]Missouri University of Science and Technology, USA; [2]Advanced Micro Devices Inc, USA; [3]ASUSTek Computer Inc., Taiwan

The following information is preliminary and subject to change.

TC10_7 TECHNICAL PAPERS

FILTER DESIGN FOR HIGH FREQUENCY CHANNELS

10:30AM - 11:30AM

Room: 306C

Sponsored by TC-10 Signal and Power Integrity

Chair:
Victor Khilkevich, *Missouri University of Science and Technology*

Co-Chair:
Giorgi Maghlakelidze, *NVIDIA Corp*

PLANNED SPEAKERS & TOPICS

Novel Parallel Coupled Microstrip Line-based Transition Structure Design in Narrow-Band SIW Filter Integration
Haojie Wu[1], Jiankan Weng[1], Yin Sun[3], Xinglin Sun[1]
[1]Zhejiang University, China; [2]Missouri University of Science and Technology, USA; [3]Ningbo Detool Technology Co. Ltd, China

Ultra-wideband Balanced-Line-Based Common-mode Rejection Filter with Dumbbell-Shaped Conductors for Over 64 Gb/s Digital Transmission
Byung cheol Min[1], Kang wook Kim[1], Mun Ju Kim[1], Jae Duk Han[2], Seok Min Yun[2], You Seng Jang[2]
[1]Kyungpook National University, Korea (the Republic of); [2]Hanyang University, Korea (the Republic of)

HAVE YOU CONSIDERED TAKING YOUR IEEE MEMBERSHIP TO THE NEXT LEVEL?

SENIOR MEMBER AND FELLOW ELEVATION EVENT

TUESDAY, AUGUST 19, 2025 • 2:30 – 4:00PM • ROOM 302B

Join us at this informal meeting where you can quickly learn about elevating your current IEEE membership to the Senior or Fellow category.

Being a Senior or Fellow Member is a prestigious honor within the IEEE community. It signifies your accomplishments and expertise in your field. But how do you apply for these elevations in membership? Do you qualify for the next level?

Join us to find out the next steps needed to enhance your career with an elevated IEEE membership. We will have experts on hand to answer any question you may have on these membership elevations, but were afraid to ask, or didn't know who to ask.

Refreshments will be served during the normal break time.

The following information is preliminary and subject to change.

SC3_2 TECHNICAL PAPERS

MACHINE LEARNING BASED METHODS FOR EMC AND SIPI #2

1:30PM - 4:30PM

Room: 303

Sponsored by SC-3 Special Committee on Machine Learning and Artificial Intelligence in EMC and SIPI

Chair:
Matteo Cocchini, *International Business Machines Corp*

Co-Chairs:
Ling Zhang, *Zhejiang University*
Hanzhi Ma, *Zhejiang University*

PLANNED SPEAKERS & TOPICS

Data Representation and Preprocessing Effects on S-parameter Modeling of High-speed Channels using Machine Learning
Hyunwook Park[1], Davit Kharshiladze[1], Yifan Ding[4], Ling Zhang[2], Natalia Bondarenko[3], Hanqin Ye[3], Kaushal S. Mhalgi[3], Brice Achkir[5], Chulsoon Hwang[1]
[1]Missouri University of Science and Technology, USA; [2]Zhejiang University, China; [3]Cisco Systems Inc, USA; [4]Google LLC, USA; [5]Cisco Systems, Inc., USA

Neural Equalizer Design based on Gated Recurrent Unit and Its Variants
Hanzhi Ma[1], Yiqin Xiang[1], Kaijun Zheng[1], Jiarui Qiu[1], Jose Schutt-Aine[2], ErPing Li[1]
[1]Zhejiang University, China; [2]University of Illinois at Urbana-Champaign, USA

XAI-based Sensitivity Analysis of High-Speed Link Considering Channel Operating Margin
Junghyun Lee, Joonsang Park, Keunwoo Kim, Taein Shin, Haeyeon Kim, Keeyoung Son, Kyungmook Kim, Joungho Kim
Korea Advanced Institute of Science and Technology, Korea (the Republic of)

RAG-EM: Retrieval-Augmented Generation for Electromagnetic System Design
Priyank Kashyap[1], Nirjhor Rouf[2], Yongjin Choi[1], Chris Cheng[1], Paul Franzon[2]
[1]Hewlett Packard Enterprise Co, USA; [2]NC State University, USA

ANN Based EMI Filter Optimization with Limited Data in Vehicle Power Systems
Soujun Maeta[2], Ryo Maekawa[2], Shohei Kan[1], Toshiki Mikura[1], Kengo Iokibe[2], Yoshitaka Toyota[2]
[1]Kabushiki Kaisha Aisin, Japan; [2]Okayama University, Japan

The following information is preliminary and subject to change.

TC4_TC8 TECHNICAL PAPERS

EMI CONTROL: SHIELDING, ANALYSIS, AND MEASUREMENT

1:30PM - 5:00PM

Room: 305B

Sponsored by TC-4 & TC-8 Electromagnetic Interference Control & Aeronautics and Space EMC

Co-Chairs:
Huadong Li, *Molex LLC*
John Kraemer, *Collins Aerospace*

PLANNED SPEAKERS & TOPICS

Analysis of Induced Common-Mode Voltage for Four-Wire Shielded Cable Considering Cable Imbalance
Nobuo Kuwabara[1], Tohlu Matsushima[2], Yuki Fukumoto[2]
[1]Kyushu Kogyo Daigaku, Japan; [2]Kyushu Instiute of Technology, Japan

Shielding Practice of HV Power Cable Lines
Rodolfo Araneo[1], Erika Stracqualursi[1], Marco Alvelli[2]
[1]Universita degli Studi di Roma La Sapienza, Italy; [2]G-Iron, Italy

Analysis and Simulation of Electromagnetic Interference in Computer Systems
Shun-Chia Tseng[1], Chiu-Chih Chou[1], Yi-Shang Huang[2], Kuan-Hsueh Tseng[2]
[1]National Central University, Taiwan; [2]Micro-Star International Co Ltd, Taiwan

Low-Frequency Shielding Characterization of Planar Materials Using the H-t Cell Set-up: 3D Full-Wave Simulations and Measurements Study
Lirim Koraqi[1], Pavithrakrishnan Radhakrishnan[2], Tim Claeys[1], Johan Catrysse[1], Davy Pissoort[1]
[1]Katholieke Universiteit Leuven, Belgium; [2]Flanders Make, Belgium

Coupling Path Analysis of Data Center SSD Storage Systems Based on Visualization Technique
Xiangrui Su[1], Haran Manoharan[1], Jihun Kim[1], Lalit Baghel[1], Heewon Kang[2], Chunghyun Ryu[2], Chulsoon Hwang[1]
[1]Missouri University of Science and Technology, USA; [2]Samsung Electronics, Korea (the Republic of)

Novel Approach to Spacecraft System Level Magnetic Test
Katherine Dang[1], Pablo Narvaez[1], Klaus Mehlem[2], John Trinh[1], Corey Cochrane[1]
[1]Jet Propulsion Laboratory, USA; [2]Astos Solutions, Germany

The following information is preliminary and subject to change.

TC2_1 TECHNICAL PAPERS

EMC MEASUREMENTS: MEDICAL & PROBES

1:30PM - 5:00PM

Room: 306A

Sponsored by TC-2 EMC Measurements

Chair:
Monrad Monsen, *Oracle America Inc*

Co-Chair:
Ahalya Srikanth, *Ford Motor Company*

PLANNED SPEAKERS & TOPICS

Comparative Assessment of RF-Induced Heating in Epicardial Implantable Electronic Devices During 0.55 T and 1.5 T MRI: Effects of Full Systems vs. Abandoned Leads
Bhumi Bhusal[2], Pia P. Sanpitak[1,2], Fuchang Jiang[1,2], Gregory Webster[3], Jacob Richardson[4], Nicole Sieberlich[4], Laleh Golestanirad[1,2]
[1]Northwestern University, USA; [2]Northwestern University Feinberg School of Medicine, USA; [3]Ann and Robert H Lurie Children's Hospital of Chicago Pediatric Cardiology and Heart Surgery, USA; [4]University of Michigan, USA

RF-Induced Heating in Orthopedic Implants : In Silico Assessment of Surgical and Healed Models under 1.5 T and 3 T MRI
Ananya Nandikanti, Jianfeng Zheng, Ji Chen
University of Houston, USA

Obstacles and Mitigations for an Accurate Low Impedance, Low Frequency Measurement
Faye E. Squires[1], Yifan Ding[1], Matthew S. Doyle[2], Matteo Cocchini[2], Samuel Connor[2], Francesco de Paulis[3], Albert E. Ruehli[1], Chulsoon Hwang[1], Lijun Jiang[1]
[1]Missouri University of Science and Technology, USA; [2]International Business Machines Corp, USA; [3]University of L'Aquila, Italy

RF-Induced Heating of Deep Brain Stimulation Devices During MRI: A Comparison Study of 1.5 T and 3 T Systems
Sana Ullah[1], Safa Hameed[2], Bhumi Bhusa[1], Giorgio Bonmassar[3], Laleh Golestanirad[1,2]
[1]Northwestern University Feinberg School of Medicine, USA; [2]Northwestern University, USA; [3]Harvard Medical School, USA

Comparison Study of Cuff Electrode Designs on RF-induced Heating under MRI
Yuhui Xu, Ebrahim Farshad, Lijina Yang, Qingyan Wang, Jianfeng Zheng, Ji Chen
University of Houston, USA

Effect of Leads Insertion Variations on the MRI Conditionality of AIMDs under 1.5T MRI
Farshad Ebrahimi, Tanvir Islam, Qingyan Wang, Jianfeng Zheng, Ji Chen
University of Houston, USA

The following information is preliminary and subject to change.

TC10_1 TECHNICAL PAPERS

HIGH-SPEED INTERCONNECTS #1

1:30PM - 5:00PM

Room: 306B

Sponsored by TC-10 Signal and Power Integrity

Chair:
Hanfeng Wang, *Google Inc*

Co-Chair:
Kinger Cai, *Arm Ltd*

PLANNED SPEAKERS & TOPICS

Interlaced Spoof Surface Plasmon Polariton for Improvement of Transmission Line Signal Integrity
Ming-Lung Kung[1,2], Zheng-yu Ke[2], Ken-Huang Lin[2,3]
[1]R.O.C. Air Force Academy, Taiwan; [2]National Sun Yat-sen University, Taiwan; [3]NSYSU Southern Taiwan Industry Promotion Center, Taiwan

IBIS Model Simulation Accuracy Improvement with Slew Rate Correction
Yifan Ding, Chulsoon Hwang
[1]Missouri University of Science and Technology, USA

Skew Characterization Analysis in CCL Fabrication
ChangChih Liu, Terry Kuo, KuoLiang Chao
TUC, Taiwan

Design Strategies for Skew Compensation in High-Speed PCB Strip Line Interconnects
Sathvika Bandi[1], Reza Asadi[1], Zhekun Peng[1], Mehdi Khaleghi[1], Srinivas Venkataraman[3], Granthana Rangaswamy[3], Santosh Pappu[3], Xu Wang[3], DongHyun (Bill) Kim[2]
[1]Missouri University of Science and Technology, USA; [2]Missouri University of Science and Technology College of Engineering and Computing, USA; [3]Meta Platforms Inc, USA

Optimized Modeling of PCB Vias with Non-Functional Pads and High-Frequency Behavior up to 150 GHz
Mehdi Mousavi[1], Kevin Cai[2], Sathvika Bandi[1], Manish K. Mathew[1], Mehdi Khaleghi[1], Shameem Ahmed[2], DongHyun (Bill) Kim[3]
[1]Missouri University of Science and Technology, USA; [2]Cisco Systems, Inc, USA; [3]Missouri University of Science and Technology College of Engineering and Computing, USA

Resonance Suppression in Microstrip to Grounded Coplanar Waveguide Transitions
Navid Elahi, Jian-Ming Jin
University of Illinois Urbana-Champaign, USA

The following information is preliminary and subject to change.

TC9_1 TECHNICAL PAPERS

ADVANCES IN ELECTROMAGNETIC MODELING AND PREDICTION

1:30PM - 5:00PM

Room: 306C

Sponsored by TC-9 Computational Electromagnetics

Chair:
Shengxuan Xia, *Missouri University of Science and Technology*

Co-Chair:
Wei Zhang, *Marvell Semiconductor Inc.*

PLANNED SPEAKERS & TOPICS

EXEMPLARY PAPER

Multiscale EMC Modeling, Simulation, and Validation of a Synchronous Step-Down DC-DC Converter
Presenting Author:
Jie Chen, *Texas Instruments Incorporated, Dallas, TX, USA*
Dipanjan Gope, *Department of Electrical Communication Engineering, Indian Institute of Science (IISc), Bengaluru, India*
R. Murugan, **J Chen**, A. Tripathi, B. P. Nayak, H. Muniganti, **D. Gope** (2023)
Citation: R. Murugan, J Chen, A. Tripathi, B. P. Nayak, H. Muniganti, D. Gope "Multiscale EMC modeling, simulation, and validation of a synchronous step-down DC-DC converter," in *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, vol. 8, pp. 269-280, doi: 10.1109/JMMCT.2023.3276358.

Radiated Emission Estimation of the Electric Vehicle Powertrain System using Hybrid Method
Jaehoon Kim[1], Jordi Soler[1], Philippe Le Marrec[1], Yun-kyoung Ko[2]
[1]Altair Engineering Inc, USA; [2]FEV, Germany

A Representative Contents Modeling Approach for Predicting Electronics Susceptibility
Jon Wallace, Ian Timmins
Sandia National Laboratories, USA

Comparison of Techniques for Predicting Statistical Distribution of Fields in Chaotic Enclosures
Evelyn A. Dohme[1], Zhen Peng[2], Paul Bremner[3], Thomas W. Hussey[4]
[1]Sandia National Laboratories, USA; [2]University of Illinois at Urbana-Champaign, USA; [3]Robust Physics, USA; [4]University of New Mexico, USA

Efficient Statistical Analysis of EM Coupling to PCB Power Planes in Complex Enclosures
Sangrui Luo[1], Shen Lin[1], Yang Shao[1], Thomas Antonsen[2], Zhen Peng[1]
[1]University of Illinois Urbana-Champaign, USA; [2]University of Maryland, USA

A Stable TDIE Method for Analyzing the Shielding Effectiveness of Typical Metallic Structures
Rongchuan Bai[1], Ming-Da Zhu[2], Hao-Xuan Zhang[1], Zhe Chen[1], Zheng-Wei Du[1], Wenyan Yin[1]
[1]Zhejiang University, China; [2]Xidian University, China

The following information is preliminary and subject to change.

SS_2 SPECIAL SESSION

ACHIEVING POWER INTEGRITY WITH AI/ML ALGORITHMS

8:30AM - 12:00PM

Room: 305A

Sponsored by TC-10

Chair:
Chulsoon Hwang, *Missouri S&T EMC Laboratory, Missouri University of Science and Technology*

Co-Chairs:
Ling Zhang, *Zhejiang University*

James Drewniak, *Missouri S&T EMC Laboratory, Missouri University of Science and Technology*

Achieving power integrity (PI) across PCB, package, and silicon for complex, multi-domain systems remains a major challenge, often relying on iterative design and expert experience despite mature post-layout tools. Modern PI demands—such as sub-milliohm impedance targets and space-constrained layouts—exceed the capabilities of traditional methodologies. Recently, AI/ML techniques have emerged as promising solutions for pre-layout PI design and decoupling capacitor optimization, offering the potential to reduce design cycles and enable advanced EDA tools. This special session will address AI/ML algorithms in PI design, which may contribute to new ideas and solutions to the above challenges.

PLANNED SPEAKERS & TOPICS

Fast and Simple Pre-Design of Decoupling Capacitors using Reinforcement Learning
Taein Shin[3], Keunwoo Kim[1], Junghyun Lee[1], Seonguk Choi[1], Haeseok Suh[3], Hyunah Park[3], Hyunwoo Kim[1], Jinwook Song[2], Seokwoo Hong[2], Youngjun Ko[2], Joungho Kim[3]
[1]Korea Advanced Institute of Science and Technology, Korea (the Republic of); [2]Samsung Electronics, Korea (the Republic of); [3]Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of)

Multiple PDN Design Optimization Using Deep Reinforcement Learning for Low PSIJ in PCIe Gen6.0 Interfaces
Chulhee Cho, Youngjun Ko, Hyunwoo Kim, Seokwoo Hong, Sungwoo Jin, Chorom Jang, Sungwon Roh, Hyeongi Lee, Sungjin Yoon, Youngjae Lee, Seonho Um, Jinwook Song, Kyungsuk Kim, Sunghoon Chun
Samsung Electronics Co Ltd, Korea (the Republic of)

Large Language Model-based Decoupling Capacitor Placement Optimization
Keunwoo Kim[2], Taein Shin[1,2], Hyunwook Park[3], Seonguk Choi[2], Haeyeon Kim[2], Junghyun Lee[2], Hyunjun An[1], Keeyoung Son[2], Haeseok Suh[2], Wooshin Choi[4], Joungho Kim[2]
[1]Korea Advanced Institute of Science and Technology, Korea (the Republic of); [2]Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of); [3]Missouri University of Science and Technology, USA; [4]Samsung Electronics Co. Ltd, Korea (the Republic of)

Homogeneous Multi-Chip PDN Optimization for DDR Memory Architecture using RL
Kyungmook Kim, Joungho Kim, Haeyeon Kim, Junghyun Lee, Jiwon Yoon, Joonsang Park, Keunwoo Kim
Korea Advanced Institute of Science and Technology, Korea (the Republic of)

Graph-Based Reinforcement Learning Approach for Multi-Power-Domain PCB PDN Shape and Stackup Synthesis
Haran Manoharan[1], Hanfeng Wang[2], Jingnan Pan[2] Yuchu He[2], Xu Gao[2], Jianmin Zhang[2], Chulsoon Hwang[1]
[1]Missouri University of Science and Technology, USA; [2]Google Inc, USA

Reinforcement Learning-based Via Placement Optimization in Package Substrate for Multiple Power Domain 3D-ICs
Seunghun Ryu[1], Seonghi Lee[1], Dongryul Park[1], Sanguk Lee[1], Hyunwoo Kim[1], dongkyun kim[1], jinwook lee[1], Seokbeom Yong[2], Sangsub Song[2], Seungyoung Ahn[1]
[1]Korea Advanced Institute of Science and Technology, Korea (the Republic of); [2]Samsung Electronics Co Ltd, Korea (the Republic of)

The following information is preliminary and subject to change.

TC5_SC1 TECHNICAL PAPERS

EVALUATION OF EM INTERFERENCE

8:30AM - 10:00AM

Room: 305B

Sponsored by TC-5 & SC-1 High Power Electromagnetics & Special Committee on Smart Grid

Co-Chairs:
Michael McInerney, *Consultant*
William Radasky, *Metatech Corporation*

PLANNED SPEAKERS & TOPICS

A Systematic Approach to Quantify Electromagnetic Interference Risk by Cloud Modeling
Parthib Khound, Omar Mohammed, Frank Gronwald
Universitat Siegen Fakultat IV Naturwissenschaftlich-Technische Fakultat, Germany

Electromagnetic Energy from Multiple Sources Within Perfect and Imperfect Faraday Shields
Robert Olsen, John Schneider
Washington State University, USA

Three-Dimensional Electromagnetic and Circuit Co-Simulation for Printed Circuit Boards Mounted Linear and Non-Linear Electric Elements
Soki Akutsu, Akio Ikeda, Hisashi Shimizu, Toshihiko Nishimori, Jun Yasui
Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Photo by Richard Georgerian

The following information is preliminary and subject to change.

TC2_2 TECHNICAL PAPERS

EMC MEASUREMENTS: EMISSIONS

8:30AM - 11:30AM

Room: 306A

Sponsored by TC-2 EMC Measurements

Chair:
Dave Arnett, *Garmin International Inc*
Co-Chair:
Monrad Monsen, *Oracle America Inc*

PLANNED SPEAKERS & TOPICS

An Omni-Directional Horizontally Polarized Antenna for 18-40GHz Site VSWR
Garret McKerricher, Yibo Wang, Ivan Morales, Zhong Chen
ETS-Lindgren, USA

Estimation of the Phase Center Position of a Hybrid Antenna for Radiated Emission Measurement from 30 to 1000 MHz
Fuminori Kanahara[1], Akira Murakami[2], Nobuo Kuwabara[3], Kunihiro Osabe[4], Hidenori Muramatsu[4]
[1]Sony Global Manufacturing and Operations Kabushiki Kaisha, Japan; [2]e-OHTAMA, LTD., Japan; [3]Kyushu Kogyo Daigaku, Japan; [4]VCCI Council, Japan

EMI Testing System Speed Optimization
Tobias Gross
Rohde & Schwarz GmbH & Co KG, Germany

Impact on Radiated Emission with EUT Mains Cable Termination by Balanced VHF-LISN
Kunihiro Osabe[1], Nobuo Kuwabara[2], Hidenori Muramatsu[1]
[1]VCCI Council, Japan; [2]Kyushu Kogyo Daigaku, Japan

Near Field Absorbers in Specific EMI Environments
Sergei Manuilov, Seong-Woo Woo, Taehoon Noh, Jeff Tostenrude, Shane White, Jungju Suh
3M, USA

RALEIGH FUN FACT

WHAT IS RALEIGH KNOWN FOR?

Raleigh, often referred to as the "City of Oaks," boasts an abundance of oak trees that line its roads and streets, creating a beautiful and lush green canopy throughout the city. This rich foliage includes white, red, and black oaks, as well as various hybrid varieties.

Additionally, Raleigh is known as the "Smithsonian of the South" due to the impressive quality and quantity of its free museums. The city is also part of "The Triangle," which includes Raleigh, Durham, and Chapel Hill, renowned for their vibrant cultural and educational offerings.

The following information is preliminary and subject to change.

TC10_2 TECHNICAL PAPERS

HIGH-SPEED INTERCONNECTS #2

8:30AM - 12:00PM

Room: 306B

Sponsored by TC-10 Signal and Power Integrity

Chair:
Daniel Commerou, *Missouri University of Science and Technology*

Co-Chair:
Yifan Ding, *Google LLC*

PLANNED SPEAKERS & TOPICS

EXEMPLARY PAPER

Beyond 200G: Brick Walls of 400G Links per Lane
Presenting Author:
Brandon T. Gore, *Samtec Inc., Colorado Springs, CO, USA*
B. Gore, A. Josephson, R. Mellitz, F. de Paulis, L. Boluna, J. Calvin, R. Rabinovich, M. Resso (2025)
Citation: B. Gore, A. Josephson, R. Mellitz, F. de Paulis, L. Boluna, J. Calvin, R. Rabinovich, and M. Resso, "*Beyond 200G: Brick Walls of 400G Links per Lane*," in *Proceedings of DesignCon 2025*, Santa Clara, CA, USA, January 29th – 30th, 2025.

Analysis Method for Curved Coupled Stripline with Triangular Tabs within Pin Field of High-Speed Channels
Yingcong Zhang[1], Kevin Cai[3], Kai Li[2], Yan Li[2], Dongxu Fu[2], Bidyut Sen[3], Guoan Wang[1]
[1]University of South Carolina, USA; [2]Cisco Systems Inc, China; [3]Cisco Systems Inc, USA

Suppression of Ground Resonances in a Transmission-Line Based Connector
Navid Elahi, Jian-Ming Jin
University of Illinois Urbana-Champaign, USA

224 Gbps High Speed Link Design and Measurement Correlation
Tao Wang, Jeff Mao, Benjamin Harding, Brian Brecht
DIS Tech, USA

Impact of Z^{ref} Estimation for Transmission Line Characterization based on 2x-thru Calibration
Feng-Ting He, Chiu-Chih Chou
National Central University, Taiwan

A Non-Destructive and Simple Setup Method for Dielectric Liquid Characterization in a Wide Frequency Range with Djordjevic-Sarkar Model
Reza Vahdani[1], Mehdi Mousavi[1], Reza Asadi[1], Xiaoning Ye[2], DongHyun (Bill) Kim[3]
[1]Missouri University of Science and Technology, USA; [2]Intel Corp, Hillsboro, OR, USA; [3]Missouri University of Science and Technology College of Engineering and Computing, USA

The following information is preliminary and subject to change.

TC9_2 TECHNICAL PAPERS

EMC CHALLENGES IN COMPLEX SYSTEMS AND REVERBERANT ENVIRONMENTS

8:30AM - 12:00PM

Room: 306C

Sponsored by TC-9 Computational Electromagnetics

Chair:
Shaohui Yong, *Missouri University of Science and Technology*

Co-Chair:
Patrick DeRoy, *Analog Devices Inc*

PLANNED SPEAKERS & TOPICS

Investigating the Impact of Antenna Directivity on Working Volume Equivalence in Reverberation Chambers Using Reconstructed Sensitivity Maps
Anett Kenderes[1,2], Péter Tamás Benko[2], Szabolcs Gyimóthy[1]
[1]Budapesti Muszaki es Gazdasagtudomanyi Egyetem, Hungary; [2]Robert Bosch Kft, Hungary

The Impact of Connector Brackets on the CS114 Performance of Digital Interconnects
David Norte
BAE Systems, Inc., USA

The Impacts of RE102 Exceedances on a Received BPSK Satellite Signal
David Norte
BAE Systems, Inc., USA

Statistics of Electromagnetic Fields within Reverberant Nested Cavities when Coupled by Slotted Apertures
Marshall D. Sowell, Carl Hager
Naval Surface Warfare Center Dahlgren Division, USA

Radiation Coupling Between Reverberant Cavities through Cables
Weitao Dai, Paul Bremner
Robust Physics, USA

Simple Model to Predict RS103 Responses from Single UTP Circuits
David Norte
BAE Systems, Inc., USA

The following information is preliminary and subject to change.

TC12 TECHNICAL PAPERS

WIRELESS EMC ADVANCES: RFI MITIGATION, IMMUNITY, AND COEXISTENCE TESTING

10:30AM - 12:00PM

Room: 303

Sponsored by TC-12 EMC for Emerging Wireless Technologies

Chair:
Harry Skinner, *Intel Corporation*

Co-Chair:
Gang Feng, *Christie Digital Systems Canada Inc*

PLANNED SPEAKERS & TOPICS

RFI Mitigation System for Smart Phones by Automatic Calibration of MIPI Data Rate
Akihiro Tsukioka[1], Kotaro Fujimori[2], Yasuhiro Ochiai[1]
[1]Sony Semiconductor Solutions Kabushiki Kaisha, Japan; [2]Sony Kabushiki Kaisha, Japan

ARVTDNN-Based Digital Predistortion for High-Power Amplifier Nonlinearity Compensation in Broadband Radiated Immunity Test
GyeongRyun Choi[1], Hanyang Li[1], Hongsik Keum[2], Hyeongtae Kim[3], GeunHo Kim[3], Wansoo Nah[4]
[1]Sungkyunkwan University - Natural Sciences Campus, Korea (the Republic of); [2]E&R, Korea (the Republic of); [3]Rohde&Schwarz Korea, Korea (the Republic of); [4]Sungkyunkwan University, Korea (the Republic of)

Wireless Immunity Enhancement using Waveguiding Techniques for High Voltage Battery Packs
Saranraj Karuppuswami, Aseim Elfrgani
General Motors Company, USA

Photo by Richard Georgerian

The following information is preliminary and subject to change.

TC5_1 TECHNICAL PAPERS

HEMP TEST METHODS

10:30AM - 12:00PM

Room: 305B

Sponsored by TC-5 High Power Electromagnetics

Co-Chairs:
William Radasky, *Metatech Corporation*
Michael McInerney, *Consultant*

PLANNED SPEAKERS & TOPICS

Application of D dot Sensor in HEMP Shielding Effectiveness Measurement
Rakesh Kichouliya, Sandeep M. Satav
Reserach Centre Imarat, India

Insertion Loss Requirement and Low Level PCI Testing of HEMP Power Line Filter
Rakesh Kichouliya, Sandeep M. Satav
Reserach Centre Imarat, India

Proposal of HEMP Conducted Disturbance Test Method for Semi-Conductor Protective Devices on Electronic Circuit
Takuya Hoshino
NTT Advanced Technology Kabushiki Kaisha, Japan

Photo by Patrick Andre

The following information is preliminary and subject to change.

WT_C2 WORKSHOP

TEST AND MEASUREMENT FUNDAMENTALS OF EMC

1:30PM - 5:00PM

Room: 303

Chair:
John McCloskey, *NASA*
Co-Chair:
Vignesh Rajamani, *Rohde & Schwarz USA, Inc.*

EMI/C testing is crucial for ensuring that electronic devices perform reliably in their intended electromagnetic environment, and don't interfere with other devices. Optimizing such tests involves improving efficiency, reducing cost and most importantly understanding of the test equipment and its capabilities to ensure the robustness of the testing process. In this workshop, we will cover some fundamental concepts of testing accompanied by live demonstrations showcasing proper usage of oscilloscopes, spectrum analyzers, and EMI receivers for EMC measurements and debugging.

PLANNED SPEAKERS & TOPICS

Introduction to General Test and Measurement Concepts
John C. McCloskey
NASA, USA

Hands-On Demonstrations
Vignesh Rajamani
Rohde & Schwarz USA, Inc., USA

The following information is preliminary and subject to change.

WT_C1 WORKSHOP

EFFECTIVELY NAVIGATING THE COMPLEXITIES OF MEASUREMENT UNCERTAINTY IN EMC TESTING

1:30PM - 5:00PM

Room: 302C

Co-Chairs:

Janet O'Neil, *ETS-Lindgren*

Dennis Lewis, *The Boeing Company*

This workshop brings together leading experts in the field of measurement uncertainty, focusing on its critical role in electromagnetic compatibility (EMC) testing. The session will delve into essential concepts of measurement uncertainty, providing practical methodologies for conducting calculations in commercial test labs, including data gathering techniques and efficient calculation methods. Another presentation will address estimating uncertainty specifically for antenna measurements, aligning with the Guide to Uncertainty in Measurements, while a discussion will cover the complexities of measuring uncertainties within a multipurpose robotic antenna test system. Insights will also be provided on measurement uncertainties associated with high-altitude electromagnetic pulse (HEMP) and high-power electromagnetic (HPEM) testing, including various test sites, instrumentation, and the assessment of normative specifications against civil and military standards. Finally, the workshop will introduce Polynomial Chaos Theory as a method for uncertainty propagation and sensitivity analysis in power electronic circuit design, demonstrating how stochastic simulations can effectively incorporate uncertainties from various sources. This workshop aims to equip participants with the knowledge and tools necessary to navigate the complexities of measurement uncertainty in EMC testing, fostering a deeper understanding of its implications in both commercial and research settings.

PLANNED SPEAKERS & TOPICS

Practical Considerations Related to Measurement Uncertainty for EMC Test Labs
Nicholas Abbondante
Intertek USA Inc, USA

Estimating Uncertainty for Antenna Measurements in Accordance with the Guide to Uncertainty in Measurements
Zhong Chen
ETS-Lindgren, USA

Evaluation of Complex Measurement Uncertainties in a Multipurpose Robotic Antenna Test System
Dennis Lewis
The Boeing Company, USA

Measurement Uncertainty of HEMP and Other HPEM Testing Procedures
Sven Fisahn
Bundeswehr Research Institute for Protective Technologies and NBC Protection, Germany

Uncertainty Propagation and Sensitivity Analysis Using Polynomial Chaos Theory
Karol Niewiadomski
Universiteit Twente, Netherlands

The following information is preliminary and subject to change.

WT_C63 TUTORIAL

TUTORIAL ON MACHINE LEARNING

1:30PM - 5:30PM

Room: 305A

Sponsored by SC-3 Special Committee on Machine Learning and Artificial Intelligence in EMC and SIPI

Chair:
Lijun Jiang, *Missouri University of Science and Technology*
Co-Chair:
Alistair Duffy, *De Montfort University*

Machine learning is profoundly impacting the landscape of every technology domain, including signal integrity, power integrity, EMC, and EMI engineering. This tutorial is for entry-level audiences who are interested in machine learning. The topics in this tutorial will practically guide audiences through the fundamentals of machine learning methods, resources needed for using machine learning methods, and successful application examples for EMC society. This tutorial could be repeated with updated state-of-the-art technology and demands from EMC society in the following two years. The invited speakers are frontier experts who have practical experience in machine learning method development and applications. This tutorial will aim to draw broader attention and guide hands-on experiences of machine learning for EMC/EMI, SI and PI technologies.

PLANNED SPEAKERS & TOPICS

Popular Machine Learning Methods and Their Typical Applications in EMC/SIPI
Ling Zhang
Zhejiang University, China

Outlook of AI- and ML-Assisted Signal Integrity and Power Integrity
Matteo Cocchini
International Business Machines Corp, USA

Machine Learning Assisted Power Integrity Solutions
Chulsoon Hwang
Missouri University of Science and Technology, USA

AI/ML Augmentation of Hardware Compliance Processes
Samuel Connor
International Business Machines Corp, USA

Physics-Informed Machine Learning Techniques for Different EMI Applications
Mohamed Kheir
SDU, Syddansk Universitet, Odense, Syddanmark, DK, Academic, Denmark

Compressed Sensing for EMC Applications
Zhong Chen
ETS-Lindgren, USA

Mathematical and Physical Thinking Behind Machine Learning
Lijun Jiang
Missouri University of Science and Technology, USA

The following information is preliminary and subject to change.

WT_C4 TUTORIAL

WORLDWIDE RADIO BACKGROUND NOISE

1:30PM - 5:00PM

Room: 305B

Sponsored by TC-3 Electromagnetic Environment

Chair:
Kimball Williams, *IEEE*

This session will provide an overview of the current work to document RFI on this planet.

PLANNED SPEAKERS & TOPICS

The Problem With Controlling EMI Through Product Limits
Kimball Williams[1,2]
[1]IEEE, USA; [2]American Radio Relay League, USA

IEEE P4006 (RFI Impact for Space-Based Remote Sensing)
Roger Oliva
European Space Agency, Spain

The following information is preliminary and subject to change.

WT_C5 TUTORIAL

LESSONS LEARNED CREATING RELIABLE COMPUTATIONAL MODELS FOR SI, PI AND EMC APPLICATIONS

1:30PM - 5:00PM

Room: 306A

Sponsored by TC-9 Computational Electromagnetics

Co-Chairs:

Scott Piper, *Dassault Systemes Americas Corp*
Patrick DeRoy, *Analog Devices Inc*

This tutorial will expose the attendees to the lessons learned by a number of industry experts over the years. The goal being that the attendees will benefit from the, sometimes painful, learning experiences of the presenters. Computational tools are very powerful and simulation is invaluable to the modern design engineer but there is still an art to using these tools effectively. In all disciplines, hindsight is perfect and the opportunity to learn from others is a valuable resource. This tutorial will not only show lessons learned but also expose the attendees to fundamental ways of thinking through their models to better ensure success. Examples relevant for Signal Integrity, Power Integrity and Electromagnetic Compatibility design will be shared.

PLANNED SPEAKERS & TOPICS

What I Wish I Knew About EMC Simulation When I First Started
Scott Piper
Dassault Systemes Americas Corp, USA

Trying to Simulate EMI in Power Converters | Lessons from the Field
Albert Dunford
Altair Engineering Inc, USA

What Did I Learn and Why Did I Learn It?
Colin Brench
IEEE, USA

Everything Should Be Simulated ASAP (As Simple As Possible), But No Simpler
Patrick DeRoy
Analog Devices Inc, USA

Photo by Patrick Andre

The following information is preliminary and subject to change.

WT_C6 WORKSHOP

P2855, A CHARACTERIZATION OF SHIELDING CCA FROM DC TO 40 GHZ

1:30PM - 5:00PM

Room: 306B

Sponsored by TC-4 Electromagnetic Interference Control

STANDARDS WEEK

Chair:
Charles Jullien, *Safran Electrical and Power*
Co-Chair:
Huadong Li, *Molex LLC*

This workshop will give a general introduction to the future standard in construction P2855 about cable/connector assembly shielding effectiveness characterization from DC to 40GHz. This standard provides recommended measurement techniques for evaluating, and methods for specifying, the capabilities or effectiveness of shielding on cable/connector assemblies for the control of Electromagnetic Interference (EMI) to allow product compliance to common Government, regulatory, and customer requirements, and for achieving system Electromagnetic Compatibility (EMC). This standard also provides measurement techniques to evaluate, and methods to specify, cable/connector assemblies shielding capabilities for reducing the coupling of electromagnetic energy between cable/connector assemblies. Emphasis is placed on measurement techniques that have been adopted through incorporation into standards, both commercial and military, or that have been used extensively. A set of novelties will be presented on the methods that will be present in the standard.

PLANNED SPEAKERS & TOPICS

Cable/Connector Assembly Shielding Effectiveness Characterization from DC to 40 GHz, The New STD P2855
Charles Jullien[1], Huadong Li[2]
[1]Safran Electrical and Power, France; [2]Molex LLC, USA

Parallel Plate Box [PPB] Method for EMC
Gary Biddle, Michael Cieslak
Samtec Inc, USA

Shielding Effectiveness Test Methods Using Semi-Anechoic Chamber and the Gigahertz Transverse Eletro-Magnetic (GTEM) Cell
Jack McFadden
ETS-Lindgren, USA

Localized Injection Up to 20 GHz, New Transfer Parameter
Charles Jullien, Thomas Colleter
Safran Electrical and Power, France

Measurands of Cable and Connector Shielding Effectiveness and Their Applications
Huadong Li
Molex LLC, USA

Reverberation Chamber Results of Connector/Cable Assemblies
Michael Cieslak, Gary Biddle
[1]Samtec Inc, USA

The following information is preliminary and subject to change.

WT_C7 WORKSHOP

AUTOMOTIVE EMC — STANDARDS, MEASUREMENT AND SIMULATION FOCUSING ON EVS

1:30PM - 5:00PM

Room: 306C

STANDARDS WEEK

Chair:
Martin Wiles, *MVG World*

Co-Chair:
Marco Klingler, *Klingler International Consulting Services*

This workshop covers different aspects of Automotive EMC looking at Simulation, Measurement and Standardisation, focusing primarily on Electric Vehicles.

PLANNED SPEAKERS & TOPICS

Overview of Automotive EMC Standardisation Work
Martin A. Wiles
MVG World, United Kingdom

Contribution of Cabling to EMC Issues in EVs
Karen Burnham
EMC United, Inc.

Modeling of Conducted Emission Tests of EV On-Board Powertrain Chargers - Comparisons Between Measurement and Simulation Results on Table and on Vehicle
Marco Klingler
Klingler International Consulting Services, France

EMC Simulations for Power Electronics in EVs
Tyler Dodge
Dassault Systemes Americas Corp, USA

Automotive Virtual EMC Testing in Reverberation Chambers Using the Method of Moments with Poisson Acceleration for MIM Solution
Faik G. Bogdanov[1], Roman Jobava[2]
[1]EMCoS ltd., Georgia; [2]EMCoS LLC, Georgia

Simulation Strategies to Evaluate Functional Safety in Automotive EMC
C.J. Reddy
Altair, USA

Photo by Patrick Andre

SS_3 SPECIAL SESSION

ADVANCES IN HIGH ALTITUDE ELECTROMAGNETIC PULSE (HEMP) ENVIRONMENTS AND PROTECTION

8:30AM - 12:00PM

Room: 305A

Sponsored by TC-5 High Power Electromagnetics

Chair:
William Radasky, *Metatech Corporation*

Over the last 10 years the IEC has updated the understanding of HEMP through a series of standards, which have been tailored to the protection of commercial facilities and equipment. The main improvements that have been made recently are to make the standards even more applicable for commercial rather than military purposes. One of the major changes is to avoid relying only on worst-case electromagnetic fields, but rather to show the variability of the HEMP fields in the IEC standards, which generally result in lower levels of the electromagnetic environments, and consequently on more modest protection techniques, such as those found in typical EMC applications. It is noted that individuals with more than 40 years of experience have been invited to describe recent advancements in the HEMP environments. Also those active in the work of the IEC have been invited to discuss important aspects of protection for commercial applications.

PLANNED SPEAKERS & TOPICS

Update of IEC 61000-2-9: Description of the HEMP Radiated Environment
William A. Radasky, Edward B. Savage
Metatech Corporation, USA

Database of E1 HEMP Shielding Effectiveness of Various Building Types
Edward B. Savage, William A. Radasky
Metatech Corporation, USA

Validating the HEMP Protection Capabilities of Power Filters
Sergio Longoria
ETS-Lindgren, USA

Techniques for Generating the Geographical Distribution of Early-time HEMP Coupling to Horizontal Lines and Antennas
James L. Gilbert
Metatech, USA

Update of IEC 61000-5-6 and Discussion of the Application of Resilience for HEMP Protection
Richard Hoad[2], William A. Radasky[1], Barney Petit[2]
[1]Metatech Corporation, USA; [2]QinetiQ Group Plc, United Kingdom

Calculational Techniques for the Late-time HEMP Effects on Power Distribution Systems
James L. Gilbert
Metatech, USA

The following information is preliminary and subject to change.

TC7_1 TECHNICAL PAPERS

EMC OF ELECTRICAL SYSTEMS

8:30AM - 11:00AM

Room: 305B

Sponsored by TC-7 Electrical System and Power Electronics EMC

Co-Chairs:
Flavia Grassi, *Politecnico di Milano*
Cong Li, *GE Global Research*
Shuo Wang, *University of Florida*

PLANNED SPEAKERS & TOPICS

System Level EMI Diagnostic by Terminated Loop Antenna Concept
Scott Lee, Ken Su, Kyle Lin, Hill Wu
Google LLC, Taiwan

CAE Based Electromagnetic field (EMF) Exposure Assessment in an Electrified Vehicle
Nitin Parsa[1], Ahalya Srikanth[2], Varittha Sanphuang[2] Ronald Missier[2]
[1]Ford Motor Co Research and Innovation Center Dearborn, USA; [2]Ford Motor Company, Canada

Study on Radiation Interference from Pantograph-Catenary Detachment Arc in AC Electrified Railway Considering the Influence of Train Speed
Ke Huang, Feng Zhu
Southwest Jiaotong University, China

EMI from Rear-View Mirror LCDs: Impact on GNSS Sensitivity
Ali Attaran, Varittha Sanphuang, Ronald Missier, Nicholas Hare, Ervin Larashi
Ford Motor Company, USA

RALEIGH FUN FACT

RALEIGH'S MANY PARKS

Did you know Raleigh boasts over 200 parks across the city? The parks accommodate a variety of classes and programs, art, athletic facilities, lakes, nature preserves, dog parks, playgrounds, swimming pools, greenway trails, and historic sites- a tribute to their nickname, "the City of Oaks." Raleigh is home to Pullen Park, the first public park in North Carolina and oldest operating amusement park in the U.S named Pullen Park, founded in 1887. Pullen Park features a historic carousel and miniature train, rentable pedal boats, playgrounds, and grilling and picnic areas, sports fields, and tennis courts within 5 minutes of downtown.

The following information is preliminary and subject to change.

TC2_3 TECHNICAL PAPERS

EMC MEASUREMENTS: DESIGN RELATED

8:30AM - 12:00PM

Room: 306A

Sponsored by TC-2 EMC Measurements

Chair:
John Kraemer, *Collins Aerospace*
Co-Chair:
Monrad Monsen, *Oracle America Inc*

PLANNED SPEAKERS & TOPICS

Measurements of Bonding and Faying Resistances for Stacked Bonds
David Norte
BAE Systems, Inc., USA

Mitigating Optical Module EMI using Common- and Differential-Mode Filters
Fnu Shivali, Victor Khilkevich
Missouri University of Science and Technology, USA

Analysis of Noise Current from an Inverter at High Frequency by a Spectrum Analyzer
Yu-Sheng Li[1], Chiu-Chih Chou[2], Ying-Fan Chen[3], Tzong-Lin Wu[1]
[1]National Taiwan University, Taiwan; [2]National Central University, Taiwan; [3]Delta Electronics Inc, Taiwan

A Numerical Investigation Comparing Boresighting and Linear Scanning Methods for EMC Emissions Measurements
Yibo Wang, Zhong Chen
ETS-Lindgren, USA

Conducted and Radiated Emissions of Power Chips with High Temperature Environment
Jean Marc Dienot[1,2]
[1]Laboratoire SIAME, E2S-UPPA, France; [2]Universite de Toulouse, France

Bridging the Gap: A Comprehensive Analysis of Power Supply EMI Performance Under Active Load Conditions
Bala S. P
Intel Technology India Pvt Ltd, India

The following information is preliminary and subject to change.

TC10_3 TECHNICAL PAPERS

HIGH-SPEED INTERCONNECTS AND NOISE COUPLING

8:30AM - 12:00PM

Room: 306B

Sponsored by TC-10 Signal and Power Integrity

Chair:
Wei Zhang, *Marvell Semiconductor Inc.*
Co-Chair:
Chaofeng Li, *Qualcomm Inc*

PLANNED SPEAKERS & TOPICS

A Transceiver using Mode-Division-Multiplex-Transmission method for a Single-Ended Cable
Ryoma Sakida[1], Hayato Yatabe[2], Yuki Fukumoto[2], Tohlu Matsushima[2] Takefumi Yoshikawa[1]
[1]Toyama Kenritsu Daigaku, Japan; [2]Kyushu Kogyo Daigaku, Japan

Frequency Domain-based Signal Integrity Evaluation Metrics for High-Density Interconnection (HDI) Systems
Hyunwoo Kim[1], Dongryul Park[1], Changmin Lee1, Seunghun Ryu[1], Seonghi Lee[1], Sanguk Lee[1], Dongkyun Kim[1], Jinwook Lee[1], Jongwook Kim[2], Seungyoung Ahn[1]
[1]Korea Advanced Institute of Science and Technology, Korea (the Republic of); [2]SK hynix Inc, Korea (the Republic of)

UCIe D2D High-speed Bus Performance Analysis: SES NRZ, ENRZ, E7, and CNRZ-5
Sherman S. Chen[1], Nithin VM[2], Tim Wang Lee[3], Mike Resso[3], Francesco de Paulis[4]
[1]Kandou Bus, United Kingdom; [2]Keysight Technologies Inc, USA; [3]Keysight Technologies, USA; [4]University of L'Aquila, Italy

Signal Integrity Analysis-Based Channel and Equalizer Co-Design Methodology for High-speed Serial Links
Seonghi Lee[1], Sanguk Lee[1], Seunghun Ryu[1], Dongryul Park[1], Hyunwoo Kim[1], Yongho Lee[2], Jiyoung Park[2], Seungki Nam[2], Sungwook Moon[3], Jiseong Kim[1], Seungyoung Ahn[1]
[1]Korea Advanced Institute of Science and Technology, Korea (the Republic of); [2]Samsung Electronics Co., Ltd., Korea (the Republic of); [3]Foundry Business Division, Samsung Electronics Co. Ltd., Korea (the Republic of)

RX Front-end Noise Analysis: ENRZ Versus NRZ Versus PAM4
Sherman S. Chen[1], Nithin VM[1], Zhifei Xu[2], Nitin Garg[1], Mark Venneboerger[1], Francesco de Paulis[3]
[1]Kandou Bus, United Kingdom; [2]Kandou Bus, Switzerland; [3]University of L'Aquila, Italy

The Sensitivity to Common/Differential/Pseudo-Differential Mode Noise: ENRZ Versus NRZ
Sherman S. Chen[1], Siping Gao[2], Zhifei Xu[3], Tim Wang-Lee[4], Mike Resso[4], Francesco de Paulis[5]
[1]Kandou Bus, United Kingdom; [2]Nanjing University of Aeronautics and Astronautics, China; [3]Detool Technology, China; [4]Keysight Technologies Inc, USA; [5]University of L'Aquila, Italy

TC9_3 TECHNICAL PAPERS

ELECTROMAGNETIC EFFECTS IN POWER SYSTEMS AND MEDICAL DEVICES

8:30AM - 12:00PM

Room: 306C

Sponsored by TC-9 Computational Electromagnetics

Chair:
Scott Piper, *Dassault Systemes Americas Corp*
Co-Chair:
Shubhankar Marathe, *Amazon*

PLANNED SPEAKERS & TOPICS

A Comprehensive In-Silico Study on MRI Safety of Pedicle Screw Systems Using Bone-Inclusive Phantom
Jiarui Lu, Lijian Yang, Zhongrui Wang, Lingfei Zhang, Jianfeng Zheng
University of Houston Cullen College of Engineering, USA

Low-Frequency EMI Prediction by Electromagnetic FEA and Machine Learning in Consumer Electronics Devices with PCBs
Jingchen Liang, Peng Han, Pavani Gottipati
Ansys, Inc., USA

EMP Surge Simulation on Inductors in Power Systems Using Adaptive Time-Stepping FEM
Zhe Chen, Hao-Xuan Zhang, Zheng-Wei Du, Rongchuan Bai, Yi-Yao Wang, Wenyan Yin
Zhejiang University, China

Multi-Physics Simulation Workflow for PCB Acoustic Vibrations Induced by Components
Jingsong Wang
Dassault Systemes Americas Corp, USA

A Study on RF-Induced Heating of Passive Implantable Medical Devices at 5T MRI
Mir Khadiza Akter, Ao Shen, Md Zahidul Islam, Lingfei Zhang, Jianfeng Zheng, Ji Chen
University of Houston, USA

Impact of Transfer Function & E-Field Spatial Resolution on AIMD RF-Induced Voltage
Nowrin Chamok[1], Carolyn Kwok[1], Kyle Bond[1], Arash Dabir[2], Anasheh Avakians[1], Louai Al-Dayeh[1]
[1]Boston Scientific Neuromodulation, USA; [2]Boston Scientific Corporation, USA

The following information is preliminary and subject to change.

TC5_2 TECHNICAL PAPERS

HEMP AND ESD DESIGN AND MODELING

1:30PM - 4:00PM

Room: 305A

Sponsored by TC-5 High Power Electromagnetics

Co-Chairs:

Michael McInerney, *Consultant*
William Radasky, *Metatech Corporation*

PLANNED SPEAKERS & TOPICS

Designing a Sensitive Compartmented Information Facility
Sergio Longoria
ETS-Lindgren, USA

E1 Incidence Modeling Response of Solid-State Transformer Transistors
Tyler Bowman, Mihai Negoita
Sandia National Laboratories, USA

4-Leg Inverter Modeling for E2 Mitigation in Solid-State Transformers
Tyler Bowman, Ronald Matthews, Lee Rashkin
Sandia National Laboratories, USA

Comprehensive Computational Simulations of ESD Analysis for Complex Devices
Shahid Ahmed
Ansys, Inc., USA

Photo by Richard Georgerian

The following information is preliminary and subject to change.

TC7_2 TECHNICAL PAPERS

POWER ELECTRONICS EMC

1:30PM - 3:00PM

Room: 305B

Sponsored by TC-7 Electrical System and Power Electronics EMC

Co-Chairs:

Flavia Grassi, Politecnico di Milano
Niek Moonen, *Universiteit Twente*
Cong Li, *GE Global Research*
Shuo Wang, *University of Florida*

PLANNED SPEAKERS & TOPICS

Radiated Immunity (ISO 11452-2) Failure Debugging of a High-Side Driver Using EMI Modeling
Jie Chen[1], Rajen M. Murugan[1], Madison Eaker[1], Rakesh Panguloori[1], Bibhu P. Nayak[2], Harikiran Muniganti[2], Dipanjan Gope[2]
[1]Texas Instruments, Inc., USA; [2]Simyog Technology, India

Impact of Non-Contact Magnetic Field Surge Interference on IGBTs in Inverter Circuits
Zheng-Wei Du, Zhe Chen, Rongchuan Bai, Wenyan Yin
Zhejiang University, China

High Voltage Cable and Load Termination Effect Study to Improve EMC Testing of an Inverter
Varittha Sanphuang, Nitin Parsa, Ali Attaran, Ronald Missier
Ford Motor Company, USA

Photo by Richard Georgerian

The following information is preliminary and subject to change.

TC2_4 TECHNICAL PAPERS

EMC MEASUREMENTS: IMMUNITY & SHIELDING

1:30PM - 4:30PM

Room: 306A

Sponsored by TC-2 EMC Measurements

Chair:
Ahalya Srikanth, *Ford Motor Company*

Co-Chair:
Monrad Monsen, *Oracle America Inc*

PLANNED SPEAKERS & TOPICS

EXEMPLARY PAPER

An Overview of the IEEE P2715 Guide for the Characterization of the Shielding Effectiveness of Planar Materials
Presenting Author: Davy Pissoort, *ESAT-WaveCoRE, Mechatronics Group (M-Group), KU Leuven, Bruges Campus, Bruges, Belgium*
A. Suarez Zapata, J. F. Dawson; Y. Ariën; J. Catrysse; **D. Pissoort**; A. C. Marvin (2023)
Citation: A. Suarez Zapata, J. F. Dawson, Y. Ariën, J. Catrysse, D. Pissoort, A. C. Marvin "An overview of the IEEE P2715 guide for the characterization of the shielding effectiveness of planar materials," in *IEEE Electromagnetic Compatibility Magazine*, vol. 12, no. 2, pp. 78-88, doi: 10.1109/MEMC.2023.10201434.

Analysis of Capacitive Touchscreen Electrodes Design Patterns from an EMI/EMS Perspective
Subramaniam S. Sankar[1], Stanislav Kovar[2], Michael Galda[3]
[1]Univerzita Tomase Bati ve Zline, Czechia; [2]Univerzita Tomase Bati ve Zline Fakulta Aplikovane Informatiky, Czechia; [3]NXP Semiconductors NV, Czechia

Application of Time Reversal Techniques for Identifying Shielding Effectiveness in Complex Electronic Systems
Mohammad Abedi[2], Oameed Noakoasteen[2], Sameer D. Hemmady[1,2], Christos Christodoulou[2], Edl Schamiloglu[2]
[1]Verus, USA; [2]University of New Mexico, USA

Radiated Susceptibility Testing Using Near-Field Scanning
McKennan E. Starkey, Aaron Harmon, Cody J. Goins, Kristen M. Donnell, Victor Khilkevich, Daryl Beetner
Missouri University of Science and Technology, USA

Effect of Chamber Loading in Reverberation Chamber Testing
Leela K. Manepalli[1], Nitin Parsa[2], Chingchi Chen[1], Hui Zhou[1], Varittha Sanphuang[2], Yuqing Tang[1], Aaron Verellen[3], Alberto Jimenez[3], Alexander Foreman[3]
[1]Ford Motor Company, USA; [2]Ford Motor Co Research and Innovation Center Dearborn, USA; [3]Vitesco Technologies GmbH, USA

TC10_4 TECHNICAL PAPERS

POWER DISTRIBUTION NETWORKS AND DECOUPLING

1:30PM - 4:30PM

Room: 306B

Sponsored by TC-10 Signal and Power Integrity

Chair:
Tao Wang, *DIS Tech*
Co-Chair:
Ji Zhang, *Waymo, San Jose, CA, USA*

PLANNED SPEAKERS & TOPICS

Impact of Voltage Regulator Modules on Power Distribution Network Impedance
Hanyu Zhang[1], Zhiping Yang[2], Alvis Hsu[3], Ryan Hou[3], Chulsoon Hwang[1]
[1]Missouri University of Science and Technology, USA; [2]PCB Automation Inc, USA; [4]Google LLC, USA

SPICE-Compatible Nonlinear Macromodels for Fast Power Integrity Verification
Antonio Carlucci, Stefano Grivet-Talocia
Politecnico di Torino, Italy

Noncausality of AR-extrapolated S-parameters
Chia-Cheng Huang, Chiu-Chih Chou
National Central University, Taiwan

CVRM with Feedback for Platform PDN PI Design
Kinger Cai, Yimajian Yan, Dong Zhong, Sumant Srikant
Arm Ltd, USA

Efficient Decoupling Capacitor Impact Calculation
Faye E. Squires[1], Yifan Ding[1], Matthew S. Doyle[2], Matteo Cocchini[2], Samuel Connor[2], Francesco de Paulis[3], Albert E. Ruehli[1], Chulsoon Hwang[1], Lijun Jiang[1]
[1]Missouri University of Science and Technology, USA; [2]International Business Machines Corp, USA; [3]University of L'Aquila, Italy

The following information is preliminary and subject to change.

TC10_5 TECHNICAL PAPERS

SIMULATION AND MODELING TECHNIQUES

1:30PM - 5:00PM

Room: 306C

Sponsored by TC-10 Signal and Power Integrity

Chair:
Baolong Li, *Cadence Design Systems Inc*

Co-Chair:
Zhenggang Cheng, *Ampere Computing*

PLANNED SPEAKERS & TOPICS

Layout Parasitics Extraction of DC–DC Converters for Virtual Reference Designs in InfineonSpice
Thomas F. Landinger[1,2], Marius-Andrei Voicu[3]
[1]Infineon Technologies AG, Germany; [2]Technische Hochschule Rosenheim, Germany; [3]Infineon Technologies Romania SCS, Romania

Comparison of Three Macromodeling Methods
Yi-Hsiang Huang, Chiu-Chih Chou
National Central University, Taiwan

EXEMPLARY PAPER
Machine Learning for EMC/SI/PI – Blackbox, Physics Recovery, and Decision Making
Presenting Author: Lijun Jiang, *Missouri University of Science and Technology Rolla, MO, USA*
Citation: L. Jiang "Machine learning for EMC/SI/PI – Blackbox, physics recovery, and decision making," in *IEEE Electromagnetic Compatibility Magazine*, vol. 12, no. 4, pp. 65-75, doi: 10.1109/MEMC.2023.10466473.

Error Bound and Implementation of a Simplified Causality Assessment Method
Chung-Tzu Hsu, Chiu-Chih Chou
National Central University, Taiwan

Causality of Microstrip Models in Simulation Tools
Chien Lee, Chia-Cheng Huang, Chiu-Chih Chou
National Central University, Taiwan

Termination with Absorbers for Far-end Crosstalk Measurements
Daniel L. Commerou[1], Reza Asadi[1], Bandi Sathvika[1], Seyedmostafa Mousavi[1], Xiaoning Ye[2], DongHyun (Bill) Kim[3]
[1]Missouri University of Science and Technology, USA; [2]Intel Corp, Hillsboro, OR, USA; [3]Missouri University of Science and Technology College of Engineering and Computing, USA

The following information is preliminary and subject to change.

TC11 TECHNICAL PAPERS

NANOTECHNOLOGY AND ADVANCED MATERIALS

4:30PM - 5:00PM

Room: 306A

Sponsored by TC-11 Nanotechnology and Advanced Materials

Chair:
Marina Koledintseva, *The Boeing Company, Saint Louis, MO*

PLANNED SPEAKERS & TOPICS

Design and Fabrication of Graphene-based Absorbing Textiles for 5G Applications
Alessandro Giuseppe D'Aloia
DIAEE - Sapienza University of Rome, Italy

Photo by Patrick Andre

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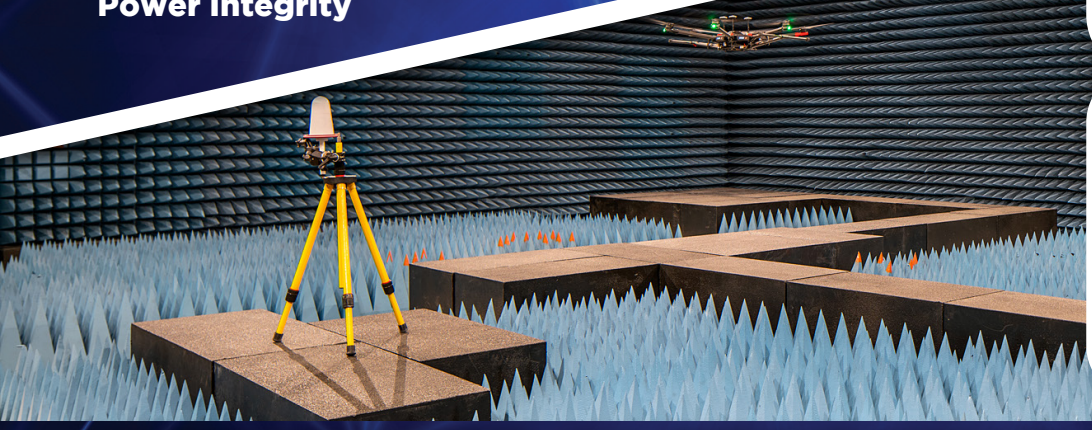

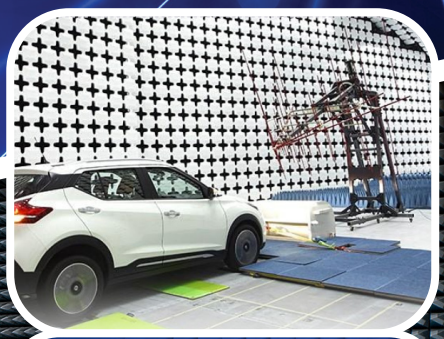

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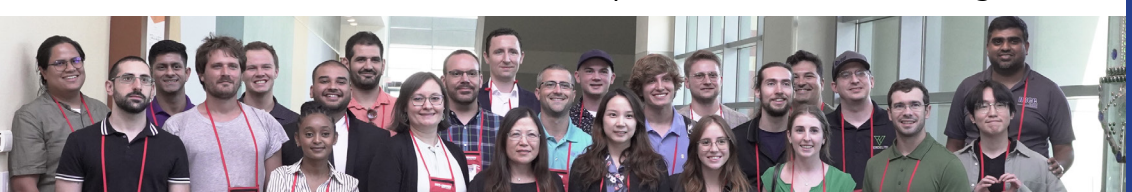

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The following information is preliminary and subject to change.

WT_D1 TUTORIAL

"MORE, BETTER, FASTER" — THE RAPID EVOLUTION OF AUTOMOTIVE EMC DESIGN AND TEST

8:30AM - 12:00PM

Room: 302C

Co-Chairs:

Garth D'Abreu, *ETS-Lindgren*
Craig Fanning, *Elite Electronic Engineering, Inc.*
Janet O'Neil, *ETS-Lindgren*

The automotive industry is rapidly evolving with electric propulsion and advanced driver assistance systems, often leading the requirements of current standards. This tutorial will address the testing of vehicle components related to communications, control and propulsion, demonstrating how in some cases, measured S-parameters of automotive high-speed cable assemblies (HSCA) can predict immunity to radiated electric fields. Measurements taken using a time domain reflectometer or vector network analyzer, can be used to analyze performance metrics like the eye diagram. We will explore various in-vehicle communication technologies, including automotive Ethernet and SerDes (Serializer/Deserializer) with PAM2, PAM3, and PAM4 techniques. The rise of Electric Vehicles (EVs) introduces significant EMC testing challenges due to their high-voltage architecture, which traditional low-voltage methods cannot adequately address. This tutorial will also discuss the unique transients generated by the HV bus and the additional emissions and immunity testing required by ISO 7637-4 and 21498 standards. Additionally, we will compare antenna calibration methods in CISPR 25 5th Ed., referencing SAE ARP 958D and ARP 958E for 1-meter radiated emissions measurements.

PLANNED SPEAKERS & TOPICS

Addressing the Complexities of the New ISO 11451-5, Reverberation Annex G, Close Loop Leveling with Power Control (Part 1)
Jack McFadden
ETS-Lindgren, USA

Addressing the Complexities of the New ISO 11451-5, Reverberation Annex G, Close Loop Leveling with Power Control (Part 2)
Garth D'Abreu
ETS-Lindgren, USA

Measured Link Segment Data Use in SI Simulation to Predict Immunity Performance of In-Vehicle Networks
Rich Boyer
Aptiv Plc, Ireland

Challenges in Testing Electric Vehicle High Voltage Components for Electromagnetic Compatibility
Ronald Missier
Ford Motor Company, USA

Additional Powerline Emissions and Immunity Requirements for Automotive Modules Connected to a Vehicle's High Voltage Bus
Craig Fanning
Elite Electronic Engineering, Inc., USA

Update on SAE ARP 958D vs. ARP 958E for 1 Meter Antenna Calibrations
Leon N. Enriquez
ETS-Lindgren, USA

The following information is preliminary and subject to change.

WT_D2 TUTORIAL

EMC AND HAM RADIO

8:30AM - 12:00PM

Room: 303

Sponsored by TC-1 EMC Management

Chair:
Kimball Williams, *IEEE*
Co-Chair:
Tom Braxton, *TEB EMC-EMI Consulting*

Ham Radio has led the technology for locating and resolving radio interference. We will also explore some other aspects of Ham Radio.

PLANNED SPEAKERS & TOPICS

EMC & Ham
Tom Braxton
TEB EMC-EMI Consulting, USA

Organizing a Ham Radio Class
Connie Kelly
American Radio Relay League, USA

Recent POTA Activities
Charles Bunting
American Radio Relay League, USA

RALEIGH FUN FACT

RALEIGH'S CITY MARKET

First established in 1914, the Raleigh City Market is a tourist attration with a rich history, right in the heart of Downtown.

Originally built for only $23,386.06, the market accomodated horse drawn carriages from farmers bringing produce, seafood, poultry and flowers.

When grocery stores became more popular, the City Market no longer drew the crowds it once did. But in the 1980's the city placed it on the National Registry of Historic Places and began renovating it.

When the 1990's rolled around, City Market opened shops, bars and restaurants from around the world instead. It quickly became a popular go-to spot again for tourists and locals alike.

WT_D3 TUTORIAL

ELECTROMAGNETIC SHIELDING IN ELECTRIC MOBILITY

8:30AM - 3:00PM

Room: 305A

Sponsored by TC-4 Electromagnetic Interference Control

Co-ChairS:

Anne Roc'h, *Technische Universiteit Eindhoven*
Lirim Koraqi, *Katholieke Universiteit Leuven*
Davy Pissoort, *Katholieke Universiteit Leuven*
Subramaniam Sankar, *Univerzita Tomase Bati ve Zline*

To meet the growing demands for sustainability and innovation, mobility is set to undergo several significant transformations in the coming decade. Two closely connected developments are (1) the rise of fully electric vehicles and (2) autonomous cars. On the one hand, fully electric vehicles will inevitably rely heavily on power electronics. On the other hand, autonomous cars will depend extensively on sensors, actuators, and programmable electronics. Both fully electric vehicles and autonomous systems generate electromagnetic disturbances, both at low and high frequencies. These disturbances are of particular concern, as the systems in autonomous cars are becoming increasingly sensitive to them. The coexistence of these systems within compact vehicle architectures makes electromagnetic shielding a critical design consideration.
In this two-part tutorial, we will provide a comprehensive overview of the principles of electromagnetic shielding in electric mobility. We will begin by examining how shielding can be optimized for connected and autonomous vehicle systems, offering insights into electromagnetic compatibility (EMC) challenges and solutions for modern transportation. Additionally, we will explore how the Safe-and-Sustainable-by-Design (SSbD) approach can be integrated into shielding solutions for electric mobility, focusing on key factors such as electromagnetic safety, weight, volume, mechanical strength, and cost. For electric vehicles, low-frequency magnetic shielding is particularly important, and we will discuss strategies for addressing this challenge. This tutorial will also showcase the contributions of the Doctoral Network PARASOL project, funded by the Marie Skłodowska-Curie Actions (MSCA) under the Horizon Europe (HE) framework, as a multidisciplinary initiative that bridges EMC, materials engineering, system safety engineering, and the SSbD approach in developing innovative shielding solutions for electric mobility.

PLANNED SPEAKERS & TOPICS

Overview of Recent IEEE Shielding Standards
Davy Pissoort[1,2]
[1]Katholieke Universiteit Leuven, Belgium; [2]Flanders Make, Belgium

Areas of EMI/EMS Improvements That Can Be Applied for Capacitive Touch Applications
Subramaniam S. Sankar
Univerzita Tomase Bati ve Zline, Czechia

Understanding EMC Challenges in Electric Mobility: Shielding and High-Frequency Noise
Karen Burnham
EMC United, Inc.

Low-Frequency Shielding Characterization of Planar Materials
Lirim Koraqi[1]
[1]Katholieke Universiteit Leuven, Belgium; [2]Flanders Make, Belgium

Simulation and Measurement Based Study of the Asymptotic Low-Frequency Electric and Magnetic Shielding Effectiveness for Board Level Applications
Pavithrakrishnan Radhakrishnan
Oklahoma State University, USA

Applying the SSbD Approach Into Electromagnetic Shielding
Anne Roc'h
Technische Universiteit Eindhoven, Netherlands

Optimized Shielding for Aeronautical Applications
Charles Jullien, Mackenzie Pandaleon
Safran Electrical and Power, France

The following information is preliminary and subject to change.

WT_D4 TUTORIAL

OPTIMIZATION OF SYSTEM LEVEL ESD AND SIGNAL INTEGRITY WHEN USING EXTERNAL ESD PROTECTION DEVICES

8:30AM - 12:00PM

Room: 305B

Sponsored by TC-5 High Power Electromagnetics

Chair:
Andreas Hardock, *Nexperia*

By applying SI and ESD simulations, the selection of the ESD risk itself as well as the right choice of suitable ESD protection components can already be made in the concept phase of hardware development, resulting in significant time and resource savings and lowering the risk of a failure to a minimum. This topic is explored in this tutorial in the context of the impact of external ESD protection on SI, and using SEED simulations of transient ESD events.

PLANNED SPEAKERS & TOPICS

Introduction to ESD in Automotive and Mobile Applications

Part 1: Optimization of Signal Integrity
Andreas Hardock[1], Sergej Bub[2]
[1]Nexperia, Germany; [2]Nexperia BV, Netherlands

Part 2: Optimization of System Level ESD
Sergej Bub
Nexperia BV, Netherlands

Photo by Karthik Vepuri

WT_D5 WORKSHOP

UNDERSTANDING, DEBUGGING, AND MODELING ENOISE – A CRUCIAL SYSTEM PERFORMANCE INDICATOR FOR CONSUMER ELECTRONIC DEVICES

8:30AM - 12:00PM

Room: 306A

Sponsored by TC-9 Computational Electromagnetics

Chair:
Jianmin Zhang, *Google Inc*

Co-Chairs:
Gemin Li, *Google Inc*
Mingfeng Xue, *Google Inc*

eNoise, an unwanted acoustic noise, is one of the crucial system performance indicators for consumer electronic devices including smart phones, watches, earbuds and tablets etc. Mobile system companies have spent lots of efforts in the area by putting research resources and building engineering teams to concur the challenges and improve the performances of their products. However, not too many studies were reported or published in academia. This workshop will share the research and engineering practices achieved in the area.

PLANNED SPEAKERS & TOPICS

eNoise Introduction
Gemin Li
Google Inc, USA

eNoise Debugging, Layout Practicing, and Measurement Technologies
Jianmin Zhang
Google Inc., USA

EM and Multiphysics Modeling Flow for eNoise Simulation
Mingfeng Xue
Google Inc, USA

Singing Capacitor EIMO Souce Model Library Development
Yifan Ding
Google Inc, USA

System Level Acoustic Noise Prediction by Using EIMO Model
Chulsoon Hwang[1], James Drewniak[2]
[1]Missouri University of Science and Technology, USA; [2]Missouri S&T EMC Laboratory, Missouri University of Science and Technology, USA

The following information is preliminary and subject to change.

WT_D6 WORKSHOP

AEROSPACE EMC

8:30AM - 5:00PM

Room: 306B

Sponsored by TC-8 Aeronautics and Space EMC

Chair:
Jim Lukash, *Lockheed Martin Space Systems*
Co-Chair:
Dennis Lewis, *The Boeing Company*

This workshop discusses topics in Aerospace EMC, including design, development, and test for airplanes, helicopters, missiles, and spacecraft.

PLANNED SPEAKERS & TOPICS

Overview of Aeronautics and Space EMC
Jim Lukash
Lockheed Martin Space Systems, USA

Aeronautical Power Chain / Aircraft Power Systems
Charles Jullien
Safran Electrical and Power, France

How To Do Simulation-Based Design for System Level EMC
Paul Bremner
Robust Physics, USA

Introduction to Major Spacecraft Electronics and Electromechanical Systems and EMC Implications
Reinaldo Perez
Jet Propulsion Laboratory, USA

EMC for Missiles
Christopher F. Lawrence
Lockheed Martin Space Systems Co, USA

Tailoring MIL-STD-461 RE02
Karen Burnham
EMC United, Inc.

Radio Cosite Principles and Practices for Airborne Platforms
John G. Kraemer
Kraemer EMC, USA

Some Topics on E3 Safety Requirements for Military Aircraft
Kin S. Sze[2], L. Gregory Hiltz[1]
[1]Quality Engineering Test Establishment, Canada;
[2]Department of National Defense - Canada, Canada

Lightning Protection of Aircraft
Eric Cramer
Northrup Grumman, USA

Comprehensive EMC Design of Military Helicopters
Ken Lynch
Sikorsky, USA

EMC Airworthiness of Navy Aircraft
John LaSalle
Northrup Grumman, USA

Spacecraft System Level EMC Test Planning
Angela Adams
Lockheed Martin, USA

The following information is preliminary and subject to change.

WT_D7 TUTORIAL

PSES TUTORIAL: PRODUCT SAFETY COMPLIANCE AND GLOBAL MARKET ACCESS

8:30AM - 12:00PM

Room: 306C

WORKSHOP FROM IEEE PSES Product Safety Engineering Society SISTER SOCIETY OF IEEE EMCS

Chair:
Grant Schmidbauer, *British Columbia Institute of Technology*

The goal of most companies is not to only design products to be safe, perform according to customer demands, and to meet regulatory requirements, it is to sell those products globally. While your product must comply with the EMC and SIPI requirements, there are a myriad of other technical requirement that must also be considered to facilitate the sale of the product. The plan for this tutorial is to delve into some of the "other technical requirements" that products must comply with, including product safety requirements (ie, concepts such as fire, shock, mechanical, temperature, and radiation); and then once your products are compliant, we will discuss the commercialization of the product through obtaining the many country approvals that are needed in order to legally sell the product around the world. This tutorial should be attended by product realization managers, design engineers, test technicians, product regulatory personnel, project managers, marketing personnel, and others interested in learning more about product safety and global market access requirements.

PLANNED SPEAKERS & TOPICS

Compliance 101
Ken Kapur
University of the Pacific, USA

Compliance 201
John Allen
Southern Illinois University, USA

Global Market Access
Grant Schmidbauer
British Columbia Institute of Technology, Canada

Panel Discussion - Open Q&A
John Allen[1], Ken Kapur[2], Grant Schmidbauer[3]
[1]Southern Illinois University, USA; [2]University of the Pacific, USA; [3]British Columbia Institute of Technology, Canada

The following information is preliminary and subject to change.

WT_E1 WORKSHOP

APPLICATION OF REVERB CHAMBERS

1:30PM - 5:00PM

Room: 302C

Chair:
Vignesh Rajamani, *Rohde & Schwarz USA, Inc.*

This half-day tutorial will provide an introduction to recent applications of reverberation chambers. It is designed for both academics and people from industry who will be involved in radiated emission or immunity testing of commercial or military systems using reverberation chambers and will be valuable to personnel evaluating the use of reverberation chambers as a complement to or replacement for other types of radiated test facilities and for personnel who are trying to use statistical methods to characterize the electromagnetic environments.

PLANNED SPEAKERS & TOPICS

Introduction and Overview of Reverberation Chamber Theory
Vignesh Rajamani
Rohde & Schwarz USA, Inc., USA

History of the Below-Deck EME Characterizations, and How it is Addressed in the MIL-STD's
Carl Hager
NSWC Dahlgren, USA

What Does ISO 11451-5 Mean For You?
Garth D'Abreu
ETS-Lindgren, USA

Flexible Testing - Shaken, Not Stirred
Frank Leferink
'Thales & University of Twente, Netherlands

Photo by Richard Georgerian

WT_E2 WORKSHOP

ACHIEVING CAB RECOGNITION: TEL MRA BEST PRACTICES, FCC & ISED LAB/CB REQUIREMENTS, AND KEY CYBERSECURITY INSIGHTS

STANDARDS WEEK

1:30PM - 5:00PM

Room: 303

Sponsored by TC-1 EMC Management

Co-ChairS:
Daniel Hoolihan, *Hoolihan EMC Consulting*
Ramona Saar, *NIST*

This workshop brings together key stakeholders from the U.S. TEL MRA community, including Designating Authorities (DAs) and Accreditation Bodies (ABs), to exchange practical insights and best practices for implementing TEL MRAs. Additionally, it will provide updates on the evolving requirements for cybersecurity conformity assessment bodies (CABs) under both the EU Radio Equipment Directive (RED) and the U.S. Federal Communication Commission (FCC) Cyber Trust Mark Program.

PLANNED SPEAKERS & TOPICS

Introduction to Telecommunications(TEL) MRAs
Nathalie Rioux
NIST, USA

United States Federal Communications Commission (FCC) Recognized Test Lab and TCB Requirements
Megan McConnell
American Association for Laboratory Accreditation, USA

Canada ISED Recognized Test Lab and CB Requirements
Randy Long
ANSI, USA

Accreditation and Designation of Non-MRA Labs to the FCC and ISED
Amanda McDonald
NIST, USA

EU RED Cyber - Notified Body (NB) Requirements
Ramona Saar
NIST, USA

UL Solutions Introduce United States FCC Cyber Trust Mark PRogram and provide overview of Lead Administrator (LA) Role
Chante W. Maurio
UL Solutions, USA

A2LA Role and CyberLABS Requirements
Megan McConnell
American Association for Laboratory Accreditation, USA

ANAB Role and CYBER Labeling Administrator
Keith Mowry
ANSI, USA

The following information is preliminary and subject to change.

WT_E3 WORKSHOP

DIRECT-TO-PIN COMPONENT-LEVEL ESD TESTING USING SYSTEM-LEVEL ESD STANDARDS AND EQUIPMENT

1:30PM - 5:00PM

Room: 305B

Sponsored by TC-5 High Power Electromagnetics

Chair:
Hans Kunz, *Texas Instruments Inc*
Co-Chair:
John Kinnear, *ESDA*

The IEC 61000-4-2 Electrostatic discharge immunity test applies to electrical and electronic equipment exposed to static electricity discharges, either directly or to adjacent objects. While it is unclear if the standards body ever intended for the test to be applied in a way that would deliver the discharge current directly to an electronic component inside the equipment, it is clear that doing so is quite prevalent in the industry today. Datasheet entries for electronic components citing ESD immunity to IEC 61000-4-2 are quite common and numerous standards and recommend-practice documents have been written expressly to define how a component should be exposed to this equipment test. Unfortunately, the application of an equipment-level test to a single component is difficult, and such tests are widely deemed to be unrepeatable and unreproducible, with a significant number of existing publications supporting this view. Beyond the difficulty of applying the test, there are also questions regarding how to apply the results of a single component's immunity to the overall immunity of the final electronic equipment using it.

PLANNED SPEAKERS & TOPICS

Direct-to-Pin Component-Level ESD Testing Using System-level ESD Standards and Equipment, Part 1
Hans Kunz
Texas Instruments Inc, USA

Direct-to-Pin Component-Level ESD Testing Using System-level ESD Standards and Equipment, Part 2
John Kinnear
ESD Association, USA

The following information is preliminary and subject to change.

WT_E5 WORKSHOP

INDUSTRY BEST PRACTICES IN COMPUTATIONAL EMI AND EMC

1:30PM - 5:00PM

Room: 306A

Sponsored by TC-9 Computational Electromagnetics

Chair:
ErPing Li, *Zhejiang University*

Participants will gain practical knowledge of computational tools and techniques for both EMC and EMI applications. The workshop will facilitate networking and knowledge exchange among professionals in the field. Attendees will leave with insights into incorporating computational approaches to enhance EMC/EMI design and testing processes.

PLANNED SPEAKERS & TOPICS

Transforming Electromagnetic Engineering through Advanced Computation, Simulation, and Visualization
Shahid Ahmed
Ansys, Inc., USA

AI-Enabled Computational EM for EMI
ErPing Li
Zhejiang University, China

Python for Automation
Aishah Shahid
Princeton University, USA

HFSS 3D Modeling for Filtered Connectors
Bin Lin
TE Connectivity, USA

Photo by Richard Georgerian

The following information is preliminary and subject to change.

WT_E7 WORKSHOP

SELLING EMC TO THOSE WHO NEED IT

1:30PM - 5:00PM

Room: 306C

Sponsored by TC-1 EMC Management

Chair:
Tom Braxton, *TEB EMC-EMI Consulting*

EMC engineers often deal with skepticism and misunderstanding from non-EMC engineers, managers, and non-technical customers. This is especially true when troubleshooting an interference or non-compliance issue with a device. Those not familiar with EMC and RF behavior may look on this work as dark magic. The challenge is how to explain the phenomenon and the necessity of the steps being taken.

This workshop will describe EMC challenge scenarios and how they were resolved, both technically and in how they raised the customer's EMC awareness.

PRESENTATION TOPICS
Speakers will discuss the challenges and rewards of EMC work, especially the process of explaining to developers, managers, and customers both why the work is necessary and what steps are required. Among the topics to be presented and discussed are those that deal with working in a product-development environment:

- Initiating and sustaining an early EMC design-review process.
- Establishing an early prototype-testing schedule.
- Preparing for regulatory testing and developing a test plan.
- Allowing a margin of development time for EMI mitigation work.
- In addition, the workshop will discuss the need to inform the non-EMC technical community and the non-technical public of the need for EMC. As our lives depend on increasingly complex devices, good EMC practice grows ever more important for reliability and public safety.

Among the topics to be presented and discussed dealing with EMC awareness:

- The importance of educating a broader audience on EMC as a vital technology and not a dark-magic mystery.
- The need for EMC standards and regulations and their origins.
- Examples that demonstrate the growing need for good EMC practice as a matter of public safety.

PLANNED SPEAKERS & TOPICS

Working EMC with Project Managers
Tom Braxton
TEB EMC-EMI Consulting, USA

Addressing EMC Problems as an Outside Consultant
Karen Burnham
EMC United, Inc.

Dealing with EMC Issues and Explaining Them to Customers
Jeffrey Blum
Verdelite Consulting, USA

The following information is preliminary and subject to change.

TUESDAY, AUGUST 19, 2025 • 10:00AM - 11:30AM

LATEST CHALLENGES FOR HIGH SPEED SERDES SYSTEMS

AtE Stage

Organizer:

Stephen Scearce, *Cisco Systems*

With the latest drive for faster AI training systems, the electronics industry is being pushed to advance at a much faster pace. These GPU clusters require communication at extremely high data rates with minimal latency. Companies are now shipping 224Gbps SerDes in large volumes and are actively exploring the next generation of 400Gbps per lane systems. As data rates continue to climb, the challenges in signal and power integrity are pushing the limits of what is achievable in PCBs, packages, and cable backplanes. Our panel of experts from the industry and academia will each address a current challenge related to SerDes systems and provide an extended Q&A session to share their extensive experience.

Planned Panelists Include:

Francesco De Paulis, *U. L'Aquila*
Quinn Gaumer, *Cisco Systems*
Scott Huss
Bhyrav Mutnury, *AMD*
Todd Westerhoff, *Siemens*
Xiaoning Ye, *Intel*

TUESDAY, AUGUST 19, 2025 • 2:00PM - 3:30PM

AUTOMOTIVE HYBRID, ELECTRIC AND AUTONOMOUS – ADDRESSING THE COMPLEXITY OF MODERN VEHICLES

AtE Stage

Organizer:

Janet O'Neil, *ETS-Lindgren*

Today's complex vehicle platforms include propulsion, entertainment and safety related systems all having to function reliably without impacting safety or the legacy communications infrastructure. The increased interest in autonomous vehicles is also driving the need for more sophisticated automotive EMC design and test scenarios, such as those addressing EMC, sensors (including radar) and wireless considerations. This impacts both component level and full-vehicle level emissions and immunity. Our Automotive "Ask the Experts" panelists represent a diversity of automotive related organizations, including full vehicle manufacturers, an integrated circuit (IC) test specialist, members of the ISO/CISPR D Automotive EMC Committees, an automotive test chamber and instrumentation manufacturer, and a commercial automotive EMC test lab. These experts will share their knowledge on current and future automotive EMC design and test considerations. Bring your questions or simply listen and learn.

Planned Panelists Include:

Rich Boyer, *Aptiv, Warren, OH, USA*
Garth D'Abreu, *ETS-Lindgren, Cedar Park, TX, USA*
Craig Fanning, *Elite Electronic Engineering, Inc.*
Robert Kado, *Stellantis, Auburn Hills, MI, USA*
Ron Missier, *Ford Motor Company, Dearborn, MI, USA*
Bob Mitchell, TUV Rheinland, Littleton, MA, USA

The following information is preliminary and subject to change.

THURSDAY, AUGUST 21, 2025 • 10:00AM - 11:30AM

ASK A PRACTITIONER: A PANEL OF EMC LAB COORDINATORS AND ASSESSORS

AtE Stage

Organizer:
Jacob Dixon, *IBM*

When theory becomes practice. This panelist discussion will allow attendees, both new and experienced, to ask direct questions and listen to discussion from leaders in the EMC community from a practitioner point of view.

The format of the panel will be 8 speakers. Four lab coordinators coming from diverse DUT backgrounds. Four lab assessors/assessor managers; two from NVLAP, and two from A2LA, to give their perspective from a quality assessment point of view.

Planned Panelists Include:
Dan Hoolihan, *NVLAP*
Victor Kuczynski, *NVLAP*
Megan McConnell, *A2LA*
Bob Mitchell, *TUV Rheinland*
David Schaefer, *Element*
Dave Zimmerman, *A2LA*

ASK THE EXPERTS SPONSORED BY:

Photo by Patrick Andre

The following information is preliminary and subject to change.

EXPERIMENTS & DEMONSTRATIONS

You will not want to miss the popular Experiments and Demonstrations program that will be held in the Exhibition Hall. This hands-on activity provides a unique learning experience that complements the technical presentations at the symposium. It is traditionally one of the educational highlights of the annual symposium!

TUESDAY, AUGUST 19, 2025

ED_A1
Modeling of High-Altitude Electromagnetic Pulse (HEMP) Threat, Test Setup, and Its Effects for Aid in the Design of Airborne Equipment

Presenters:
Dr. CJ Reddy, *Altair, USA*
Henry Soekmadji, *Collins Aerospace, USA*
Location: E&D Booth 1
Time: 9:30 AM – 11:30 AM

HEMP phenomenon can be broken down into two types, radiated and conducted emissions. This demo showcases the modeling and simulation to analyze the problem when an airborne equipment is tested per MIL-STD-461 RS105 method. During the demo, we will use the airborne equipment, an Integrated Drive Generator (IDG) with apertures and cabling. We simulate the effects of the penetrated radiated EMP into the IDG's cavity and its resonant cavity mode coupling to the internal wiring. This method/workflow will be demonstrated using Altair Feko to aid the design of the IDG and its controller against HEMP. We will illustrate computationally efficient combined Method of Moment (MoM) and Multi Transmission Line (MTL) technology solution for the analysis of emissions. This demonstration will highlight several simulation challenges and solutions for modeling High-Altitude Electromagnetic Pulse (HEMP) threat to aid the design of IDG for airborne application.

ED_A2
Using Simulated EMC Instruments to Develop, Edit, and Validate EMC Test Routines – Including Evaluation of Test Data for Boresight and Alternate Antenna Height Scan Measurements as per ANSI C63.4

Presenters:
Jack McFadden, *ETS-Lindgren, USA*
Bob Mitchell, *TUV Rheinland AG, Germany*
Location: E&D Booth 2
Time: 9:30 AM – 11:30 AM

Automating the EMC test process has the benefits of improving measurement accuracy and repeatability while also increasing test throughput. EMC testing is complex and requires multiple instruments to work in unison so that data gathered is coherently assembled to determine compliance of a device under test. Integrity of the test setup is typically done with system checks where a known signal is injected at some point in the system and compared with expected results. This approach is great for validating the entire hardware/software signal chain. Using virtual instruments, the software side of the system can be validated before assembling the instrumentation. This is a significant time saver and allows for scenario testing without tying up test equipment and chamber time.

This demonstration will show how instrument simulation can be used to setup system checks as well as validate actual EMC emissions and immunity tests.

In addition, as an example, actual test data using automated EMC test software will be shown comparing boresight measurements (currently per C63.4) and alternate antenna height scan measurements (under consideration for C63.4) taken during a recent live demonstration in the new 10meter chamber at TUV Rheinland, Boxborough, MA.

Photo by Patrick Andre

The following information is preliminary and subject to change.

ED_A3
Modern Automated Test Techniques to Address ISO 11451-5, Annex G
Presenters:
Garth D'Abreu, ETS-Lindgren, USA
Location: E&D Booth 3
Time: 9:30 AM – 11:30 AM

Annex G of ISO 11451-5 Road Vehicles – Vehicle Test Methods for the Electrical Disturbances from Narrowband Radiated Electromagnetic Energy – Part 5: Reverberation Chamber Edition 2022 included new techniques to expand the scope of testing to this standard. This hardware demonstration describes a highly efficient test and measurement system meeting Annex G, Reverb Method with Closed-Loop Power Control, for fast data acquisition.

The speaker will review the essential instrumentation required for improved testing, namely high-speed field probes and high-speed tuner(s), as well as enhanced software to automate the test process.

Demonstration attendees will learn about the advantages of a novel ISO 11451-5 test and measurement system solution, including:

- Lower useable frequency — (LUF) may be extended
- Higher efficiency — Simultaneous calibration loading and test measurements
- Higher accuracy — Less field variations with high-speed tuner(s)
- Greater test control

ED_A4
Automotive Electrical Transients on Power Bus Mitigation to Protect Sensitive Electronics
Sponsored by TC-7
Presenters:
Scott Carlson, Element Materials Technology, USA
Location: E&D Booth 4
Time: 9:30 AM – 11:30 AM

A practical comparison of protection methods for sensitive electronics connected to the automotive power buss. This will be a demonstration of the transients specified in ISO 7637-2 and ISO 16750-2 applied to a various protection circuits and measuring the amplitude of the transient that escapes pass the protection circuits into the sensitive electronics. The protection circuits will be made and designed with components readily available at any electronics supplier.

The premise of this experiment is that the voltage that makes it beyond the transient protection may destroy the devise under test.

ED_A5
Delve into Software Gating: Flexibility Meets Performance!
Presenters:
Yibo Wang, ETS-Lindgren
Andrew Shyne, The Boeing Company, USA
Garret McKerricher, ETS-Lindgren
Location: E&D Booth 5
Time: 9:30 AM – 11:30 AM

Time-domain gating is a well-known technique for isolating responses and is commonly integrated into commercial vector network analyzers (VNAs). However, once data is downloaded, users often have limited options for further processing. To address this limitation, we have developed a versatile gating library that offers enhanced flexibility and seamless integration with popular programming environments. A key issue in time-domain gating is the band edge effect caused by limited measurement bandwidth. To address this, the library incorporates standard edge treatment techniques and introduces the patented Spectrum Extension Edgeless Gating (SEEG) method, which significantly reduces edge artifacts. Beyond time-domain applications, the library also excels in spatial and spectral analyses. The demonstration will feature real-time gating, with parameters adjustable via MATLAB, Python and C. We will compare outputs from conventional edge renormalization techniques and SEEG, showcasing the advantages of the latter. We will demonstrate the gating library using a low-cost hobbyist NanoVNA, which is included in the IEEE EMC Society Inductance Testing PCB Kit. A small tool will be demonstrated to read NanoVNA data and enable time-domain processing. Both the tool and a free version of the gating library will be provided to attendees. This demonstration will highlight the practical applications of the newly developed gating library and provide attendees with hands-on experience in real-time processing.

ED_B1
Absorbing Materials and Specialty Silicone Composite, Materials as Terminations for FEXT and NEXT Measurements
Sponsored by TC-10
Presenters:
Daniel L. Commerou, Missouri University of Science and Technology, USA
Julia Sunderland, The Dow Chemical Company, USA
Location: E&D Booth 1 (Exhibit Hall)
Time: 2:30 PM – 4:30 PM

Numerous types of materials, including metallic, polymeric composites and electrically conductive silicones, can be utilized to mitigate and control electromagnetic shielding interference. In this demonstration, absorbing materials and specialty silicone composite materials will be demonstrated for use in signal integrity termination for FEXT and/or NEXT measurements as an alternative to screw on SMA terminations.

The following information is preliminary and subject to change.

ED_B2
Computational Modeling and Characterization for Signal Integrity and Power Integrity: A Comprehensive Approach for the IEEE EMC/ SIPI Conference Software Demonstration

Sponsored by TC-10
Presenters:
Shahid Ahmed, Ansys, Inc., USA
Location: E&D Booth 2
Time: 2:30 PM – 4:30 PM

Signal Integrity and Power Integrity are critical in the design of high-speed, high-frequency, and power-sensitive electronic circuits. SI refers to the quality and reliability of the signals transmitted across PCB traces and interconnects, while PI ensures that the power distribution network within the system operates without significant noise or fluctuations that could affect the performance of sensitive components. With the rising complexity of designs and higher operational frequencies, SI and PI become increasingly difficult to manage using traditional design methods.
Objective:

- Highlight the utility of the modeling framework in adhering to EMC regulations and achieving design compliance.
- Demonstrate the capabilities of a comprehensive computational modeling framework that integrates SI and PI simulations.
- Provide a software demonstration that highlights the accuracy and effectiveness of these simulations in identifying and mitigating issues such as signal distortion, crosstalk, power noise, and EMI.
- Showcase the integration of computational techniques for optimizing the SI and PI performance of high-speed and power-sensitive electronic systems.

ED_B3
EMC Compliance Out of the Box, Inside a Metal Box

Presenters:
Scott Piper, Dassault Systemes, USA
Location: E&D Booth 3
Time: 2:30 PM – 4:30 PM

Electronic devices are designed to meet EMC requirements on their own, but in many cases the device needs to be inside a metal box for one reason or another which then becomes a major aspect of their EMC compliance. While these metal boxes are generally helpful, housing material, apertures, and pesky wiring can wreak havoc being a liability for both radiated emissions and susceptibility therefore the importance of knowing the impact of these boxes is clear! In this demonstration, we will examine typical housing features using both hardware and electromagnetic simulation to explain the effects of these features and impact on EMC compliance.

ED_B4
Hardware Demonstration: Time Domain vs. Frequency Domain

Sponsored by TC-8
Presenters:
John C. McCloskey, Jen Dimov, NASA, USA
Location: E&D Booth 4
Time: 2:30 PM – 4:30 PM

The two primary “domains” we have for observing electrical signals are the time domain, as observed with an oscilloscope, and the frequency domain, as observed with a spectrum analyzer. A solid understand of both domains, along with a solid understanding of how the two domains relate to each other through the Fourier Transform and Fourier Series Expansions, is crucial for a complete understanding of the behavior of electrical signals.

This demonstration will provide an overview of the Fourier Transform and Fourier Series Expansions followed by measurements of representative signals in both the time and frequency domains in order to show agreement with theoretical models. Once this relationship is demonstrated, these theoretical models provide useful and powerful analytical tools that can come in handy especially in situations in which direct measurements may not be feasible.

The following information is preliminary and subject to change.

ED_B5
Demonstrating Proper Probe Placement is Paramount in Practical Systems

Presenters:
Christopher J. Semanson, Renesas Electronics America Inc., USA
Location: E&D Booth 5
Time: 2:30 PM – 4:30 PM

The proposed experiment will illustrate how probe loading can present challenges when measuring signals in electrical systems. The demonstration will employ a Curl-E box, which comprises:

- An AM Ferrite Road Antenna
- A project box equipped with measurement hooks
- A signal generator

This setup will highlight how a common oscilloscope probe can inadvertently create a loop during measurement — formed by the probe tip and the pigtail or reference clip. By orienting two probes in opposite directions the result will be as shown below. The flux generated by the ferrite rod antenna will intersect the surface area of each probe and the circuit, inducing a voltage.

Due to the specific orientation of the probes, one will display a sine wave while the other will show a phase-shifted waveform resembling a cosine wave (nearly 180° out of phase with the first), caused by the magnetic flux passing through the probe loop. This demonstration and explanation are crucial because many early to mid-career engineers have yet to learn proper probing techniques. Often, they simply attach their leads to a test point and leave them in the circuit, which can result in erroneous measurements.

Additionally, the lecture will provide an overview of probe non-idealities and probe construction, further underscoring the importance of proper measurement techniques.

WEDNESDAY, AUGUST 20, 2025

ED_C1
Mastering Shielding Cabinet: A Hands-On on Cavity Resonance

Sponsored by TC-4
Presenters:
Victor Martinez Garcia, Wurth Elektronik eiSos GmbH & Co KG, Germany
Jared Quenzer, Würth Elektronik, USA
Location: E&D Booth 1 (Exhibit Hall)
Time: 9:30 AM – 11:30 AM

As electronic components become increasingly compact on printed circuit boards (PCBs), the risk of electromagnetic interference (EMI) due to unintended coupling rises. To optimize the performance of integrated circuits (ICs) and ensure electromagnetic compatibility (EMC), board-level shields (BLS) are crucial in mitigating EMI in PCB designs. The shielding cabinet, or shielding can, is the most common BLS component. By connecting to the PCB's reference plane, it forms five of the six walls needed for a Faraday cage. While effective in shielding, it can cause undesired cavity resonance issues.

Join this tutorial for exploring the impact of cabinet dimensions on cavity resonance frequency for knowing how to face this issues in your projects.

ED_C2
Aircraft Lightning Induced Transient Susceptibility: A Novel Method for Power Pins Testing

Presenters:
Adrian Matoi, EMC Partner AG, Switzerland
Patrick Bolliger, HV Technologies, Inc., USA
Location: E&D Booth 2
Time: 9:30 AM – 11:30 AM

In order to perform as intended, electric and electronic systems from aircraft require, among others, testing against lightning induced transients. There are two main types of tests described in RTCA DO-160 and similar standards: pin injection and cable induction tests. This demonstration introduces a novel method to performing tests on power pins, and focuses on the relevance of power source protection elements and their influence on calibration results.

ED_C3
Measuring Differential and Common Mode Conducted Emissions from DC-DC Converters

Presenters:
Michael Schnecker, Rohde & Schwarz, USA
Location: E&D Booth 3
Time: 9:30 AM – 11:30 AM

DC-DC converters are commonly used to supply power to high speed GPUs and other processors. The high currents delivered to these devices often produces large wideband conducted emissions. This experiment will demonstrate how to use a 2-channel DC LISN and an oscilloscope to measure the common mode and differential mode conducted emissions and the proper use of input filtering to mitigate these effects.

The following information is preliminary and subject to change.

ED_C4
Simulation of Radiated Emissions for EV Powertrain
Sponsored by TC-9
Presenters:
Jaehoon Kim, C.J. Reddy, Altair Engineering Inc., USA
Location: E&D Booth 4
Time: 9:30 AM – 11:30 AM

An electric vehicle (EV) powertrain is a traction power system providing moving power to an EV by converting electric energy into mechanical motion. The powertrain is basically composed of a battery system, DC/AC inverter, an electric motor, and DC/AC power buses. The battery is a high DC voltage source and the inverter is designed to accomplish the DC-to-AC conversion which is needed to operate the electric motor. The DC bus connects between the battery and the inverter, whereas the AC bus exists between the inverter and the electric motor in the form of a three-phase line. Since the inverter is a fast switching device to generate a high power oscillating signal, the inverter is known as a significant electromagnetic(EM) interference source. Furthermore, it is easily anticipated that the high power signal is mainly radiated from the AC power bus next to the inverter. Therefore, it is highly required to set up the radiated emission (RE) procedure of the EV powertrain in the early EV design stage with capable simulation tools.

This software demonstration introduces a hybrid method, combining the circuit analysis of the EV inverter system (using Altair PSIM) and the EM simulation (using Altair Feko) to estimate the RE of the EV powertrain system. The powertrain system is represented by its equivalent circuit models to calculate the electric signals generated in the system, which are used as the source of the main radiated field evaluation with the CISPR 25 RE setup. Additionally, an integrated electric drive module (EDM) is presented in terms of how effectively the module reduces the RE of the EV powertrain.

ED_C5
Low Cost Tools for EMC Troubleshooting
Sponsored by TC-3
Presenters:
Karen Burnham, EMC United, Inc.
Location: E&D Booth 5
Time: 9:30 AM – 11:30 AM

This demonstration will show off some low cost tools that can assist with EMC troubleshooting. You don't need tens of thousands of dollars worth of equipment to get a sense of what's in the RF environment, either in terms of radiation surrounding a piece of equipment or conducted noise on cabling. The main focus will be on low cost software defined radio (SDR) devices that are easily available, along with some accessories that can make them more illuminating when tracking down EMC issues.

ED_D1
Speed Up Your RC: Closed-Loop E-Field Control in Reverberation Chambers
Presenters:
Samuel Hildebrandt, LUMILOOP GmbH, Germany
Location: E&D Booth 1 (Exhibit Hall)
Time: 2:30 PM – 4:30 PM

The demo session will start with a brief introduction on the basics of reverberation chambers (RCs). Validation and radiated immunity testing are discussed.

We will bring a small, but fully working, stirred RC to the stage. Eight fast, synchronized electric-field probes will showcase real-time E-field strength measurements and closed loop E-field control based on statistics. LUMILOOP's LSProbe E-field Probes enable accelerated measurements according to ISO 11451-5.

The reverb chamber basics will also be visualized using live measurements, helping to quickly grasp how the invisible electric field behaves.

Learn on how to improve your EMC measurement. Save time and money while testing!

ED_D2
Good Idea? Ground Planes Under a CMC.
Presenters:
Jared Quenzer, Würth Elektronik, USA
Location: E&D Booth 2
Time: 2:30 PM – 4:30 PM

Ground planes under a common mode choke (CMC) can create a path for electrical noise to bypass the CMC. Let's investigate what causes this and diagnose what variables affect noise coupling to the ground plane:

(A) What layer is acceptable to use on a 4 layer PCB (Z direction)?
(B) How far away from the CMC in the X,Y direction should the keepout zone be?

Let's test with a real PCB and also do some Finite Element Analysis simulations to find empirical answers to these questions.

The following information is preliminary and subject to change.

ED_D3
Microstrip Pulse Propagation Experiments with the NanoVNA in Transient Mode

Sponsored by Education Committee
Presenters:
Robert Olsen, Washington State University, USA
Location: E&D Booth 3
Time: 2:30 PM – 4:30 PM

In this demonstration Nano VNA (in transient mode) will be used to study some characteristics of pulse propagation on four microstrip boards. Designs for the four boards will be available to anyone who is interested.

The four boards have:

1. Two lengths of microstrip line (Z0 = 50 ff and 100 ff)
2. A single length of microstrip line (Z0 = 50 ff) with a 90 degree angle
3. A single length of microstrip line (Z0 = 50 ff) with a short circuited stub connected at the center
4. A set of two parallel (closely coupled) microstrip lines (Z0 = 50)

This equipment will be used to demonstrate:

1. Propagation time and velocity factor of the dominant quasi-TEM microstrip mode
2. Reflections at junctions with discontinuities in impedance
3. Model attenuation
4. Path of ”ground” currents for microstrip lines with bends
5. The impact of stubs and excitation and differences in propagation speeds of differential and common modes.

ED_D4
The Challenges of Commodity Product Design with Capacitive Touch

Presenters:
Christopher J. Semanson, James Page, Renesas Electronics America Inc., USA
Location: E&D Booth 4
Time: 2:30 PM – 4:30 PM

Interfacing with devices such as smartphones, appliances, and cars has become the cornerstone of high-end industrial design. Smooth, polished interfaces that were once limited to premium devices like smartphones are now finding their way into the everyday products we use. The motivation for this includes numerous benefits, all stemming from eliminating mechanical buttons from the user interface.

However, with this innovation come product design challenges due to the nature of the sensing methods used. Depending on the sensing technology, measurements can be easily disturbed by electrical disturbances that closely follow IEC 61000-4-6 standards. This is a common design challenge when evaluating white goods, as false actuations resulting from immunity problems often violate system requirements. Each technology addresses this problem differently by implementing various features. This experiment will explain voltage sensing technology and compare it with current sensing technology, showcasing the drawbacks and operation of each method with and without electrical noise.

This demonstration will cover:

- How capacitive touch works, and the various ways of implementing it.
- How the parasitic nature of surrounding copper can disrupt electrostatic field measurements, potentially leading to false actuations.
- How spread spectrum techniques can influence the measurement and sensing method.
- How different sensing technologies have weaknesses when subjected to conducted immunity testing, focusing on IEC 61000-4-6 tests.

The following information is preliminary and subject to change.

ED_D5
FFT-Time Domain Scan in EMI Receivers and Key Benefits
Presenters:
Bill Koerner, Keysight Technologies Inc., USA
Location: E&D Booth 5
Time: 2:30 PM – 4:30 PM

EMC testing is required for just about any product that has digital and radio components. With the growth of those products, time to complete EMC testing typically takes longer, due to competition for lab time, and for the surprises in tracking down short-burst or impulse-type emissions. The automotive industry, for example, requires exacting methodologies to measure all emissions accurately. Long test times impact test facility availability and potentially reduces the number of devices that are certified. It's also easy to miss intermittent disturbance signals with conventional scans since an extended dwell time must occur at each frequency.

With the implementation of a Short Time FFT (STFFT) engine, EMI Receivers include Time Domain Scan (TDS) and Accelerated TDS capabilities that enable independent compliance test laboratories and in-house certification labs to shorten their overall test time.

This presentation will provide an overview of TDS and Accelerated TDS capabilities to meet EMI measurement requirements and comply with EMC standards such as CISPR 16-1-1 and MIL-STD-461 and highlight how you can easily reduce receiver scan and test time from multiple hours to seconds.

THURSDAY, AUGUST 21, 2025

ED_E1
MIL-STD-461 G/H Receiver Scan Demonstration
Sponsored by TC-4
Presenters:
Sean R. Lynch, Rohde & Schwarz, USA
Location: E&D Booth 1 (Exhibit Hall)
Time: 9:30 AM – 11:30 AM

The purpose of this demonstration is to discuss and demonstrate the differences between traditional stepped scan and time-domain/FFT scan using EMI Test Receivers and industry software due to the proposed changes in 461H that disallows spectrum analyzers.

The demonstration will introduce about the MIL-STD receiver measurement requirements, then dive into the fundamental differences in stepped vs time-domain. The physical demonstration will have a vector signal generator with varying signals that can cause receivers difficulty without taking care of measurement time, and how to overcome these challenges.

ED_E2
Fullwave Simulations for Shielded Tents
Sponsored by TC-9
Presenters:
Clint Patton, GoEngineer, USA
Shawn DeCook, V Technical Textiles, USA
Location: E&D Booth 2
Time: 9:30 AM – 11:30 AM

Shielded tents are commonly used in the EMC world for testing. CST Microwave Studio can be utilized to find the Q of the cavity, especially when the tent is not a perfect box. The shielding effectiveness of the tent can be simulated, and the material parameters can be used to develop boundary conditions for a simulation. The location in the tent and proximity to the wall of the tent may influence the measurement results, however CST Microwave Studio provides the capability to quantify these unknowns.

The following information is preliminary and subject to change.

ED_E3
Effective, Fast and Reliable EMI Measurements with Modern EMI Test Receivers

Presenters:
Tobias Gross, Rohde & Schwarz GmbH & Co KG, Germany
Location: E&D Booth 3
Time: 9:30 AM – 11:30 AM

This workshop starts with an introduction to the basics of the EMI test receiver. Characteristics, differences to oscilloscopes or spectrum analyzers, as well as important parameters for a successful EMI measurement are highlighted. This serves as a basis for the following topics of the workshop and offers participants with different levels of knowledge the opportunity to attend this workshop.

The technological development of EMI measurement technology and the outstanding advantages of modern instruments will be demonstrated. Modern EMI test receivers rely on the Fast Fourier Transform (FFT), which was only made possible by modern signal processing and high computing power. Large bandwidths not only ensure enormous measurement speed improvements, but also increase reliability, repeatability and offers unprecedented possibilities for analyzing the measurement objects. This will be examined in a practical way on the instrument as well as with external automation software.

In addition, the workshop shows current measurement methods in practice that highlights the problem of high input levels and solutions to avoid false measurements or even costly damages to the device. The teaching of theory in this workshop is always supported by practical measurements and demonstrations directly on the instrument.

ED_E5
Wireless Coexistence Testing According to ANSI C63.27 Standard

Sponsored by TC-9
Presenters:
Bill Koerner, Keysight Technologies Inc., USA
Location: E&D Booth 5
Time: 9:30 AM – 11:30 AM

As the use of connected medical devices and internet of things (IoT) devices continue to increase, the challenges associated with wireless coexistence also increases. Furthermore, the growing use of connected medical devices in mission-critical applications (operating rooms, remote health, implanted devices) means that the consequences of poor coexistence are more severe than ever before. It is crucial for medical device manufacturers to guarantee a seamless user experience and reliability of the device operating in environments with numerous competing wireless signals and to comply with ANSI C63.27 standard or guidance. Neglecting to consider unforeseen usage scenarios can expose vulnerabilities in the performance and resilience of the wireless devices. The absence of defined testing parameters and unambiguous pass/fail benchmarks leads to irregular assessment, impeding the efficiency of quality evaluation. In this session, attendees will learn the challenges of wireless coexistence testing, and understand the key guidance and standards associated with wireless coexistence testing.

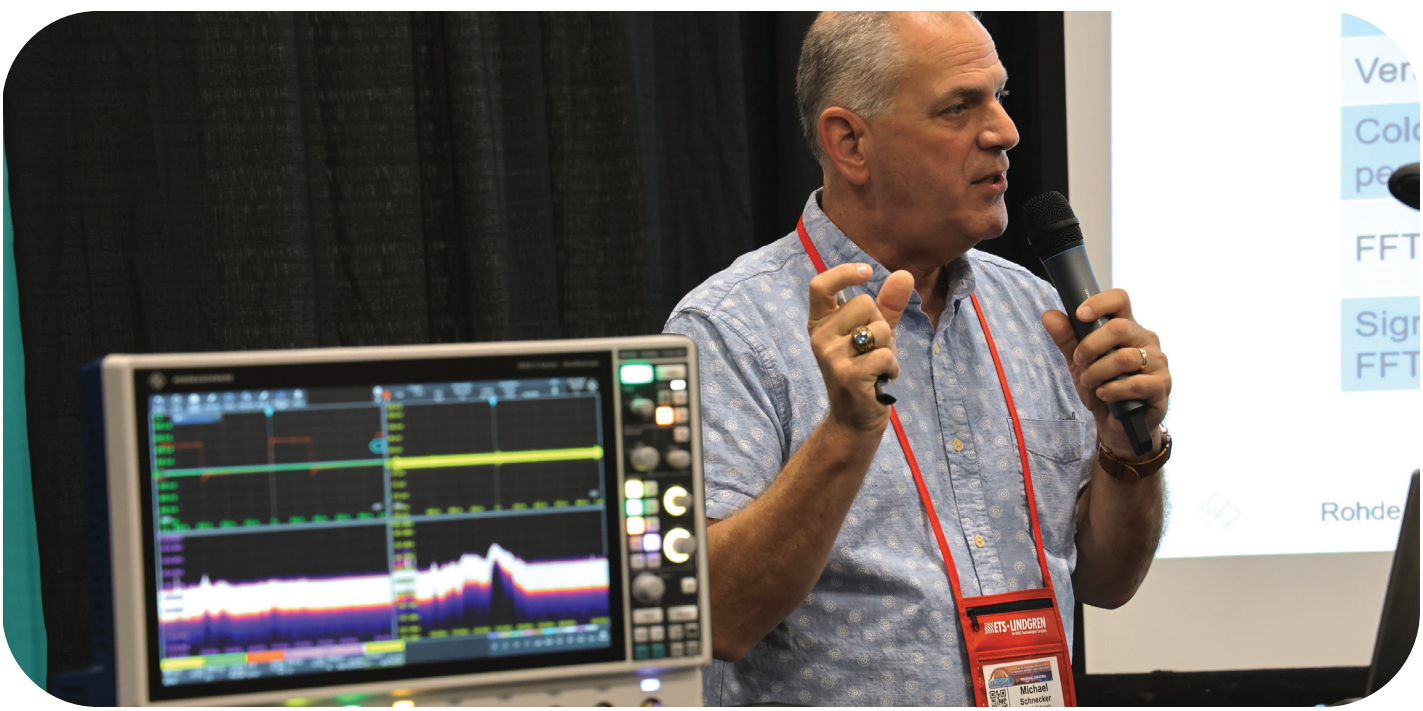


Photo by Patrick Andre

STANDARDS WEEK 2025 TECHNICAL PROGRAM

The following information is preliminary and subject to change.

"STANDARDS WEEK" is a combination of talks, tutorials, workshops, panel sessions, and demonstrations that will inform us about new developments in international EMC and Signal Integrity/Power Integrity (SIPI) standards. You can also attend one of the many standards committee meetings and/or working group meetings during the Symposium week to learn more about the standards process, and how you can get involved.
These meetings are open to all. Step up and serve your community and share your expertise!

Sam Connor
IBM, EMC+SIPI 2025 Technical Program Chair

Photo by Jamie Ramie

DON'T MISS THE EMC+SIPI 2025 STANDARDS WEEK SESSIONS

(WT_A2) Military EMC

(WT_A7) EMC Regulations and Stds

(WT_B1) New EMC Measurement Methods

(WT_E6) P2855

(WT_C7) Automotive EMC

(WT_E2) CAB Recognition

Photo by Karthik Vepuri

STANDARDS HAPPY HOUR

THURSDAY AUGUST 21, 2025
4:00 – 6:00 PM
Location: 301B

Open to all who join us for one of the Standards Meetings this week, while supplies last.

Come join us for a chance to mingle and network with professionals who care about standards and technical excellence just as much as you do. As thanks to everyone who sits around a U-shaped conference table for an hour or two, we'd like to provide you with a more relaxed and informal setting to chat. Drinks and heavy appetizers will be available with ticket.

Meeting Name	Date	Start Time	End Time	Room
Standards Advisory and Coordination Committee Meeting	Monday, August 18	12:00 PM	1:30 PM	302B
Shielding Standards Continuity Group Meeting (with focus on IEEE 299 and 299.1)	Tuesday, August 19	8:00 AM	11:00 AM	302B
IEEE 1560 Power Line Filters Working Group	Tuesday, August 19	9:00 AM	12:00 PM	304
P2855 Working Group (cables, connectors, and their assembies' shielding effectiveness) Monthly Meeting	Tuesday, August 19	12:00 PM	2:00 PM	304
Managing functional safety risks caused by EMI - IEEE 1848-2020 Continuity Working Group	Wednesday, August 20	8:00 AM	11:30 AM	302A
PAR 2838 WG Aerospace Components Lightning Direct Effects Qualification	Thursday, August 21	9:30 AM	11:00 AM	402
EMC-S PerCom Meeting	Thursday, August 21	2:00 PM	3:00 PM	302A
Standards Development and Education Committee	Thursday, August 21	2:00 PM	4:00 PM	302B
Standards Reception	Thursday, August 21	4:00 PM	6:00 PM	301B
IBIS summit	Friday, August 21	8:00 AM	12:00 PM	304

ANSC C63®

COMPLIANCE TESTING OF WIRELESS DEVICES AND UNINTENTIONAL RADIATORS

(Visit www.c63.org for more information)

This workshop provides an overview of the current changes to the standard C63.10 for unlicensed transmitter testing and the proposed changes to the standard C63.26 for licensed transmitter testing. In addition, there will be an overview of C63.30:2021 for wireless power transfer devices. There will be specific emphasis on new procedures. C63.10 and C63.26 capture most of the procedures for testing unlicensed and licensed wireless devices to show compliance with FCC and ISED Canada requirements. Group discussions will be a highlight of the wireless workshop. A demonstration will supplement the lecture material. The instructors are members of ANSC C63®; they have an intimate knowledge of the technology and contributed directly to the development of these procedures.

This 1.5 day workshop will cover many of the traditional and updated procedures in C63.10-2020 and in C63.26-201X including:

- Instrumentation requirements
- Average value of pulse emissions
- Antenna requirements
- Test site requirements
- RF output power measurements
- Modulation measurements
- Occupied bandwidth procedures
- Band-edge procedures
- Direct and signal substitution radiated emission measurements
- Frequency stability measurements
- Conducted tests at antenna port
- Smart antenna system tests
- Revised MIMO procedures
- Annexes covering example of OOB masks, consumer booster requirements, ERP/EIRP guidelines, path loss characterization, sample test report, compliance tests verses regulatory requirements and other informative guidance

Who Should Attend

Those responsible for determining compliance with FCC Rules and Regulations, including:

- Product managers and developers
- EMC engineers and test technicians
- Regulatory compliance managers
- Test instrumentation developers
- Calibration and measurement accreditation bodies
- Lab quality assessors
- Test instrumentation and chamber manufacturers

Date and Location

Friday, August 15 (all day) and Saturday, August 16 (morning)
UL Solutions - 2800 Perimeter Park Drive, Morrisville, NC 27560

Expert Instructors

Mark Briggs, UL Director, Wireless Certification Program
Bob DeLisi, UL Principal Engineer
Travis Thul, Vice President for Student Success & Engagement, Minnesota State University

Speaker bios are available at: https://www.c63.org/workshops.htm.

Fee Includes

Continental breakfast and refreshment breaks will be provided on both days; lunch will also be provided on Friday. A completion certificate and soft copy only of the workshop notes will be provided.

Agenda

C63.10/C63.26/C63.30 Wireless Workshop - August 15 and 16
Registration: 8:30 am August 15
Class: 9:00 am to 5:00 pm on Friday and 9:00am to Noon on Saturday

REGISTRATION FORM

Contact: Janet O'Neil, *ETS-Lindgren* **Telephone: +1 512-531-2676** **Email: j.n.oneil@ieee.org**

(Please print legibly or type)

Ms./Mr._____
Company_____
Address_____
City_____State_____Zip_____
Daytime Phone_____
Email_____

C63.10/26/30 Workshop:

By July 7* $1,100 USD _____
Add $200 if registered after July 7 $200 USD _____

Total ** $ _____ USD

*Please do not mail after August 1, 2025.
**A 20% discount applies to ANSC C63® main committee and subcommittee paid members.

NOTE: *You are not registered until you receive confirmation. On site or "at the door" registrations can only be accepted with prior telephone or email confirmation.*

PAYMENT OPTIONS:

ON LINE: To pay on line, send an email to j.n.oneil@ieee.org along with a scan of this completed registration form. An invoice will be returned to you via email which you can use to pay on line with your credit card.

CHECK: Make check payable to U.S. EMC Standards Corporation in U.S. dollars drawn on a U.S. bank. Mail to:

US EMC Standards Corp.
P.O. Box 13
St. Croix Falls, WI 54024

Please visit **https://www.c63.org/workshops.htm** for more information on ANSC C63®, this workshop, and speaker biographies.

The organizing committee reserves the right to substitute speakers, modify the program (or lecture notes), restrict attendance or to cancel the workshop. In the event the workshop is canceled, registration fees will be refunded. No refunds will be made to individuals who cancel after July 7, 2025. Substitutions are allowed. Workshops without a minimum of six attendees registered by June 18, 2025 will be cancelled and registration fees returned. It is suggested that you book refundable travel arrangements as appropriate if the workshop is canceled.

The following information is preliminary and subject to change.

WORKING GROUPS, COLLATERAL MEETINGS & SOCIAL EVENTS

Times are subject to change. Please confirm the meeting schedule on the website, in the final program, and on the mobile app closer to the symposium start date.

SUNDAY, AUGUST 17

Meeting Name	Room Assigned	Start Time	End Time	Type	Attendees
EMC Board Meeting	Marriott Raleigh	9:00 AM	5:00 PM	Other	Pre-Registration

MONDAY, AUGUST 18

Meeting Name	Room Assigned	Start Time	End Time	Type	Attendees
Speaker Breakfast	301AB	7:00 AM	8:30 AM	Other	Speakers Only
Technical Advisory Committee (TAC) Meeting #1	302A	7:00 AM	8:30 AM	Technical Services	
EMC Society Chapter Chair Training	302A	12:00 PM	1:30 PM	Member Services	
Standards Advisory and Coordination Committee Meeting	302B	12:00 PM	1:30 PM	Standards Services	
SC-1 Smart Grid and EMC Issues Committee Meeting	302B	5:30 PM	6:30 PM	Technical Services	
"Speed Networking" with EMC+SIPI Experts	Raleigh Marriott City Center-Rye Bar and Southern Kitchen	6:00 PM	10:00 PM	Social Event	Pre-Registration

TUESDAY, AUGUST 19

Meeting Name	Room Assigned	Start Time	End Time	Type	Attendees
Speaker Breakfast	301AB	7:00 AM	8:30 AM	Other	Speakers Only
TC-2 EMC Measurements Committee Meeting	302A	7:00 AM	9:00 AM	Technical Services	
Shielding Standards Continuity Group Meeting (with focus on IEEE 299 and 299.1)	302B	8:00 AM	11:00 AM	Standards Services	
IEEE 1560 Power Line Filters Working Group	304	9:00 AM	12:00 PM	Standards Services	
TC-8 Aeronautics and Space EMC Committee Meeting	302B	12:00 PM	1:00 PM	Technical Services	
TC-4 Electromagnetic Interference Control Committee Meeting	302A	12:00 PM	1:30 PM	Technical Services	
TC-9 Computational Electromagnetics Committee Meeting	402	12:00 PM	1:00 PM	Technical Services	
P2855 Working Group Monthly Meeting (cables, connectors, and their assembies' shieling effectiveness)	304	12:00 PM	2:00 PM	Standards Services	
TC-7 Electrical Systems and Power Electronics EMC Committee Meeting	302C	12:00 PM	1:30 PM	Technical Services	
Senior Member Elevation and IEEE Fellow Class of 2025 - Taking Your EMCS Membership to the Next Level	302B	2:30 PM	4:00 PM	Member Services	
Welcome Reception	Exhibit Hall A&B	5:00 PM	6:30 PM	Social Event	
"After the Welcome Reception" Social Event	Wye Hill Kitchen and Brewing	6:30 PM	9:00 PM	Social Event	Pre-Registration

COLLATERAL MEETINGS

The following information is preliminary and subject to change.

WEDNESDAY, AUGUST 20

Meeting Name	Room Assigned	Start Time	End Time	Type	Attendees
Speaker Breakfast	301AB	7:00 AM	8:30 AM	Other	Speakers Only
Education Committee Information Session	402	7:00 AM	8:30 AM	Technical Services	
TC-1 EMC Management Committee	302A	7:30 AM	9:00 AM	Technical Services	
TC-12 EMC for Emerging Wireless Technologies Committee Meeting	302B	8:00 AM	9:00 AM	Technical Services	
Managing Functional Safety Risks Caused by EMI - IEEE 1848-2020 Continuity Working Group	304	8:00 AM	11:30 AM	Standards Services	
Past Presidents Lunch	301A	12:00 PM	1:30 PM	Social Event	Invitation Only
2025 Youth Technical Program	301B	12:00 PM	1:30 PM	Other	
TC-5 High Power Electromagnetics (HPEM) Technical Committee Meeting	304	12:00 PM	1:30 PM	Technical Services	
TC-11 Nanotechnology and Advanced Materials Committee Meeting	302B	12:00 PM	1:30 PM	Technical Services	
TC-10 Signal and Power Integrity Committee Meeting	402	12:00 PM	1:30 PM	Technical Services	
Women In Engineering Event	301A	4:00 PM	5:30 PM	Member Services	Pre-Registration
Gala Dinner	Ballroom BC	7:00 PM	10:00 PM	Social Event	Pre-Registration

THURSDAY, AUGUST 21

Meeting Name	Room Assigned	Start Time	End Time	Type	Attendees
Team EMC Bike Ride	Raleigh Marriott City Center	6:45 AM		Other	Pre-Registration
Speaker Breakfast	301AB	7:00 AM	8:30 AM	Other	Speakers Only
SC-3 Special Committee on Machine Learning and AI in EMC and SIPI Committee Meeting	304	7:00 AM	8:30 AM	Technical Services	
Speaker Breakfast	301AB	7:00 AM	8:30 AM	Other	Speakers Only
Technical Advisory Board (TAC) meeting 2	302A	7:00 AM	8:30 AM	Technical Services	
TC-6 Spectrum Engineering	402	7:00 AM	9:00 AM	Technical Services	
TC-3 Electromagnetic Environment Committee Meeting	302A	8:00 AM	9:30 AM	Technical Services	
T-EMC, T-SIPI, L-EMCPA Associate Editor Meeting	302B	8:00 AM	10:00 AM	Communication Services	
IBIS summit	304	8:00 AM	12:00 PM	Standards Services	
PAR 2838 WG Aerospace Components Lightning Direct Effects Qualification	402	9:30 AM	11:00 AM	Standards Services	
Third Division IV Inter-Society Technology Panel (ISTP)	304	10:00 AM	11:30 AM	Other	
Awards Luncheon	Ballroom BC	12:30 PM	2:00 PM	Social Event	Pre-Registration
EMC-S PerCom Meeting	302A	2:00 PM	3:00 PM	Standards Services	
Standards Development and Education Committee	302B	2:00 PM	4:00 PM	Standards Services	
Standards Reception	301B	4:00 PM	6:00 PM	Standards Services	Invitation Only
EMC Board Meeting	402	6:00 PM	8:00 PM	Other	Pre-Registration

FRIDAY, AUGUST 21

Meeting Name	Room Assigned	Start Time	End Time	Type	Attendees
Speaker Breakfast	301AB	7:00 AM	8:30 AM	Other	Speakers Only
Technical Advisory Board (TAC) Meeting 2	302A	7:00 AM	8:30 AM	Technical Services	
IBIS Summit	304	8:00 AM	12:00 PM	Technical Services	

The following information is preliminary and subject to change.

EMC SOCIETY TECHNICAL COMMITTEES – BUILD YOUR EXPERTISE AND YOUR CAREER

No matter where you are in the industry, at some point you will deal with an EMC issue. Maybe a device is causing interference or maybe it's vulnerable to radio-frequency fields. Maybe a device crashes or resets after an electrostatic discharge. Maybe you've been looking for help explaining an EMC problem to your customer or your boss. All of these things happen. **Become part of the solution.**

The **IEEE EMC Society's Technical Committees (TCs)** convene to set EMC standards & practices and develop tools for success. Covering topics ranging from professional development to nanotechnology, the TCs are volunteer consensus groups that build our industry's foundations. Join remotely or in-person and help form important technical practices.

Find your place among these forward-looking committees. Join a TC today and set standards, explore emerging technology and help develop programs and create the tools that you and your industry need.

If you are interested in joining a committee, please complete the TC/SC Interest form.
www.emcs.org/technical-committees/tc-sc-interest-form

WORKING GROUPS AND TECHNICAL COMMITTEE MEETINGS

The EMC Society has many working groups and committees that are tackling the wide range of functions of the society's mission. The working groups primarily come out of the EMC Society Standards activities developing new EMC Standards and revising existing standards. Standing and special committees are formed to address a broad range of needs, ranging from interfacing with other industry organizations to dealing with the administration of the society. All of these meetings are open to everyone (unless listed otherwise). Join them for breakfast, breaks, lunch or dinner. Learn what other EMC members are working on and influence how the society operates.

COLLATERAL MEETINGS

With so many people attending this pinnacle event from across the globe, it's a perfect opportunity for groups other than the EMC Society to hold meetings in parallel to the Symposium. Be sure to check out the schedule to find out about the numerous collateral meetings and who can participate. The EMC Society is neither responsible for nor endorses any of these collateral meetings and discourages any meetings from conflicting with the technical and networking programs of the Symposium.

If you would like to schedule a meeting, please contact:
Michelle Measel - m.measel@ieee.org

Photo by Richard Georgerian

TECHNICAL COMMITTEES

The following information is preliminary and subject to change.

TC 1 EMC Management	This committee is concerned with the development and dissemination of Best Practices and Methodologies for the successful leadership, supervision and guidance of EMC related activities. These Best Practices and Methodologies shall be structured so as to provide assistance to all managers, and engineers. Appropriate and convenient tools shall serve as a foundation to these Best Practices and Methodologies.
TC 2 EMC Measurements	The committee reviews the adequacy of measurement procedures and measurement instrumentation specifications for radiated and conducted emission and immunity tests. Also discussed is the rationale for product emission limits and immunity test levels including performance requirements. The committee also supports EMC standards and procedures that deal with measurements and their uncertainty and how they are interpreted and applied.
TC 3 Electromagnetic Environment	The charter of TC3, the Technical Committee on Electromagnetic Environment is to encourage research on the: • electromagnetic environment (EME) • development of standards for EME measurement and characterization • natural and man-made sources of electromagnetic environment that comprise this environment • effects of noise (unwanted portions of EME) on systems performance • effects of international civil and military standards intended to control man-made intentional and unintentional emissions of electromagnetic energy.
TC 4 Electromagnetic Interference Control	This committee is concerned with design, analysis, and modeling techniques useful in suppressing interference or eliminating it at its source. Bonding, grounding, shielding, and filtering are within the jurisdiction of this committee. These activities span efforts at the system, subsystem, and unit levels
TC 5 High Power Electromagnetics	This committee is concerned with the effects and protection methods for electronic equipment and systems for all types of high power and other electromagnetic threat environments. These environments include electromagnetic pulse (EMP), intentional EMI environments (i.e., narrowband and wideband), lightning electromagnetic currents and fields, electrostatic discharge and geomagnetic storms. In addition this committee deals with the commercial data security issue through electromagnetic information leakage activities. Interactions with subsystems, systems and platforms are included.
TC 6 Spectrum Engineering	This committee is concerned with the analysis, design, and measurement techniques for intentional RF transmitting and receiving equipment to prevent interference and promote efficient spectrum use through technology and operational based approaches,such as software design, dynamic spectral allocation, waveform control, as well as frequency coordination and management procedures.
TC 7 Electrical Systems and Power Electronics EMC	This technical committee is concerned with low-frequency EMC including Power Quality in electric power systems. The committee is focusing on application of fundamental EMC concepts also to low frequency conducted disturbances. EMC in power systems is expected to be increasingly important. This is due to increased use of electronics in renewables, electric vehicles, energy efficient technologies and Smart Grid applications.

The following information is preliminary and subject to change.

TC 8 Aeronautics and Space EMC

This committee is concerned with EMI/EMC issues in aircraft, spacecraft & space launch vehicles, robotic and crewed. The space environment provides unique challenges in the design, development, test and operation of space systems to avoid EMI and achieve EMC. Aeronautics & space EMC covers a wide range of topics on the part, board, box, system, multi-system, planetary and interplanetary levels. The harshness of the atmospheric, launch and space environments necessitates a broader view of EMC issues than traditional terrestrial projects, often leading to creative methods and solutions that can benefit our society's efforts elsewhere on Earth.

TC 9 Computational Electromagnetics

This committee is concerned with broad aspects of Applied Computational Electromagnetic techniques which can be used to model electromagnetic interaction phenomena in circuits, devices, and systems. The primary focus is with the identification of the modeling methods that can be applied to interference (EMC) phenomena, their validation and delineating the practical limits of their applicability. Included are low and high frequency spectral-domain techniques and time-domain methods.

TC 10 Signal and Power Integrity

This committee is concerned with the design, analysis, simulation, modeling and measurement techniques useful in maintaining the quality of electrical signals and power distribution network in printed circuit boards, ICs and within systems. These activities encompass all aspects of signal and power integrity from the integrated circuit level to the system level.

TC 11 Nanotechnology and Advanced Materials

Concerned with modelling, simulation and experimental characterization of nanomaterials and nanodevices for EMC applications. Nanotechnology is the understanding and controlling of matter at atomic and molecular scale.
Nanotechnology has already found its way into various EMC applications. New materials such as single- and multi-phase composites filled with nanoparticles, nanotube and/or nanofibres have been designed and tested for gaskets and absorbing screens with outstanding performance and capabilities. Innovative nanostructured shields have shown multifunctional properties and higher efficiency than commonly used materials. Nanowires for high speed interconnects and high density integrated systems, could replace copper in the near future, but require adequate modelling and simulation approaches for signal integrity and also to avoid electromagnetic interference problems.

TC 12 EMC for Emerging Wireless Technologies

This committee is concerned with the EMC design, analysis, modeling, measurement, and testing aspects of emerging wireless products, such as Internet of Things and 5th Generation of Wireless Communication. The committee encourages research including but not limited to the following areas:

- Innovative Wireless Component Design for System Integration: wireless component design with integrated EMC functions and/or meeting certain EMC specifications
- Radio-Frequency Interference and De-sense: characterization and mitigation of interference from digital circuits to wireless antennas
- EMC and OTA Measurement & Testing of Wireless Systems: development of methods and standards for wireless performance and compliance testing
- Wireless Coexistence: interference control/mitigation among various wireless radios, as well as related testing methods and standard development
- Wireless Product or Subsystem EMC: wireless-specific EMC design for Autonomous cars, Phased Array, and others.

SC 1 Smart Grid Support and EMC Issues

This special committee is concerned with coordinating the EMC Society activity on providing EMC principles for those organizations and associated documentation and specifications that address the efficient use of the AC power grid including the control of power entering a house or building. Such control may be from a meter at the point of power entry into these facilities to control incorporated into appliances and other electronic devices in these facilities. Such controllers may be sources of undesirable RF emissions and at the same time vulnerable to the RF environment which speaks to the need for EMC. It is expected that the coordination aspect of this special committee will involve several EMCS Technical Committees.

The following information is preliminary and subject to change.

SC 3 Machine Learning and Artificial Intelligence in EMC and SIPI

This special committee is concerned with all aspects of machine learning, artificial intelligence and deep learning as it applies to the Society's Field of Interest (FoI). It is not limited to any specific aspect of the Society but recognizes that machine learning and related approaches have relevance across the entire spectrum of Society activities.

Standards Advisory and Coordination Committee (SACCom)

The IEEE EMC Society Standards Advisory and Coordination Committee is responsible for providing technical liaison between the IEEE EMC Society Standards Development Committee and various non-IEEE entities involved with EMC standards activities.

In particular, the SACCom will include the following:

- Propose to the EMCS board of directors (BOD), the appointment of representatives to various non-IEEE standards developing entities.
- To monitor the activities of various non-IEEE standards developing organizations with a view toward making recommendations to the EMCS board of directors on any required coordination of those activities within the society.
- To communicate and coordinate with non-IEEE standards developing activities and the EMCS Standards Development Committee on matters relating to the development of EMC related standards.

Standards Development and Education Committee (SDECom)

The IEEE EMC Society Standards Development and Education Committee is responsible for guiding the development of IEEE EMC Standards, the training of those involved in the standards making process and the education of the EMC Society community on all aspects of EMC Standards. The IEEE EMC Society is the primary international developer of fundamental test, measurement and verification standards for EMC.

Education Committee (EdCom)

This committee's mission is to promote EMC education related activities of the IEEE EMC Society. Our vision is to provide opportunities for individuals and organizations involved with electrotechnology and products to become aware of EMC at levels consistent with their needs, and our goals are to establish an awareness of EMC fundamentals throughout industry and academia as well as to enhance EMC education through the development of improved education techniques, materials, opportunities, and communications.

The following information is preliminary and subject to change.

MEET AND NETWORK WITH LIKE-MINDED INDIVIDUALS AT OUR SOCIAL EVENTS

The following information is preliminary and subject to change.

WELCOME RECEPTION

The EMC+SIPI 2025 Welcome Reception will be held in the Exhibit Hall at the Phoenix Convention Center on Tuesday.

One ticket to this event is included in all 5-Day technical registrations, Companion Program and exhibit hall registrations. All others may purchase a ticket to the Welcome Reception as an add-on to your registration.

Photo by Patrick Andre

Location: Exhibit Hall
Raleigh Convention Center
Date: Tuesday, August 19, 2025
Time: 5:00 – 6:30 PM
Cost: No Charge

SOCIAL EVENTS

RALEIGH, NC
EMC+SIPI 2025

The following information is preliminary and subject to change.

Network with your peers and other top industry professionals throughout the week during numerous planned events!

Photo by Patrick Andre

EVENING GALA EVENT

The Gala is our symposium celebration that is traditionally a sit-down dinner event with entertainment.

One ticket to this event is included in all 5-Day technical registrations EXCEPT student registrations. This is a change from previous years, made to keep student registration costs down. Extra tickets to the Gala may be purchased as an add-on to your registration.

Location: Raleigh Convention Center, Ballroom B&C
Date: Wednesday, August 20, 2025
Time: 7:00 – 10:00 PM
Cost: $110 if registered by July 18, 2025
$120 after July 18, 2025

Photo by Richard Georgerian

AWARDS LUNCHEON

The Awards Luncheon is a wonderful opportunity to recognize achievements and network with families and EMC professionals from academia, industry, government, military, and retired sectors. The event will start off with a catered sit-down meal. Afterwards, the EMC Society will take time to recognize members and non-members for their contribution to the Society and for professional excellence.

Location: Raleigh Convention Center, Ballroom B&C
Date: Thursday, August 21, 2025
Time: 12:30 – 2:00 PM
Cost: $60 if registered by July 18, 2025
$70 after July 18, 2025

SOCIAL EVENTS

The following information is preliminary and subject to change.

CHAPTER CHAIR TRAINING SESSION AND LUNCHEON

The Chapter Chair Training Session provides a forum for focused training to the Chapter Chairs, the opportunity to discuss chapter issues and get group feedback. Additionally, the session gives the Chapter Chairs the opportunity to meet other Chapter Chairs from around the world and for the Chapter Coordinator to disseminate important information from IEEE headquarters and the EMC Society Board of Governors.
A Social Session will precede the Luncheon to give the Chapter Chairs the opportunity to socialize with the other Chapter Chairs and their Angels.

The Luncheon will be served at the end of the Social Session. Besides a great meal, each Chapter Chair or their representatives will have the opportunity to share what their chapter has been doing for the past year. After the Luncheon, an interactive brainstorming session will conclude the meeting. This session is intended to allow participants to exchange information and new ideas for effective chapter management, as well as to discuss best practices and suggestions for future development and growth of the EMC chapters.

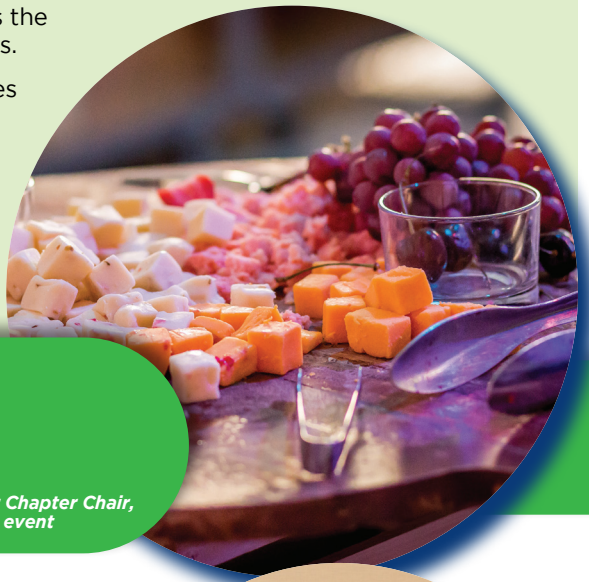


Photo by Karthik Vepuri

Location: 302A
Date: Monday, August 18, 2025
Time: 12:00 - 1:30 PM
Cost: Free for Chapter Chairs
This is a free event open to Chapter Chairs or their representatives. Please check with your Chapter Chair, as you can be that representative for your chapter if your Chapter Chair cannot attend this event

PAST PRESIDENTS LUNCHEON

The Luncheon is open to Past-Presidents of the EMC Society, and current members of the Board of Directors. The luncheon is a chance for the old and the new to mix, exchanging experiences of the past and challenges of the future relative to the EMC profession. A sit down lunch is provided. Past-Presidents should inform the Chair of the History Committee (danhoolihanemc@aol.com) of their interest in attending so there will be seating and food available for all.

Photo by Jerry Ramie

Location: 301A- Raleigh Convention Center
Date: Wednesday, August 20, 2025
Time: 12:00 – 1:30 PM

TEAM EMC

Ready to explore Raleigh on two wheels with your fellow EMC Members? We're excited to announce that the plans for our 12th Annual TEAM EMC Bike Ride are officially underway!

This fun, leisurely morning ride is open to riders of all skill levels. It's the perfect opportunity to get some exercise, enjoy the fresh air, and experience the beautiful area in a whole new way.

Photo by Richard Georgerian

Meeting Location: Meet at the main entrance of Raleigh Marriott City Center by 6:45 AM
Date & Time: Thursday, August 21 • 6:45 AM

The following information is preliminary and subject to change.

IEEE EMC SOCIETY WOMEN IN ENGINEERING (WIE) EVENT

IEEE Women in Engineering (WIE) is a global network of IEEE members and volunteers dedicated to promoting women engineers and scientists, and inspiring girls around the world to follow their academic interests in a career in engineering and science. Our goal is to facilitate the recruitment and retention of women in technical disciplines globally. We envision a vibrant community of IEEE women and men collectively using their diverse talents to innovate for the benefit of humanity.

Let's meet for a networking and enrichment event during the Raleigh Symposium and share experiences. We, the IEEE WIE and the IEEE EMC Society, invite you to attend this free event. Refreshments are provided. Join us for a festive celebration at the end of the presentation.

Location: 301A
Date: Wednesday, August20, 2025
Time: 4:00 – 5:30 PM
Cost: Free

Photo by Richard Georgerian

Everyone is welcome - men and women - to attend the special presentations!

WIE AGENDA

WELCOME PRESENTATION

Navigating a Professional Career as a Woman in the Engineering Field

Ms. Tara Kellogg, *ETS-Lindgren, EMC Society WIE Chair, Americas, IEEE EMC Chapter Chair, Central Texas*

Tara Kellogg is Global Director of Business Development with ETS-Lindgren, where she brings over 18 years of global experience in IEMI, RF, EMP, and EMC applications across the test and measurement, governmental, industrial, and medical sectors. She specializes in turnkey chamber solutions and shielding technologies. Tara also serves as IEEE EMC Society WIE Coordinator for North America and Chair of the IEEE Central Texas EMC Chapter, championing diversity and professional development for women in STEM. She is a proud member of AFCOM (Association for Computer Operations Management) and can be reached at tara.kellogg@ieee.org.

GUEST PRESENTATION

Spark the Chain Reaction — Mentorship and Outreach in STEM

Stephanie Zajac, *Johns Hopkins Applied Physics Laboratory*

What does it mean to be a mentor? How do you find a mentor? How do we become better mentors? Join your peers in Raleigh at the 2025 IEEE International Symposium on EMC+SIPI for an interactive Women in Engineering presentation that will discuss the impact of mentoring and K-12 outreach on recruiting and retention of under-represented groups. Together, we will explore why mentoring matters, how to get the most out of our mentoring relationships, and how we can all be better mentors to one another.

About the Speaker: Stephanie Zajac is a Radiation Effects Engineer at the Johns Hopkins Applied Physics Laboratory in Laurel, Maryland. She specializes in ionizing radiation effects on electronics and modeling natural space environment phenomena. Stephanie's love of physics, mathematics, and astronomy motivated her undergraduate and graduate studies, and she has maintained a passionate involvement in STEM outreach activities over the years. She is currently serving in her first year as an Officer at Large on the EMC Society Board of Governors. Stephanie also serves the EMC Society as the Awards Committee Chair. She can be reached at stephzajac@ieee.org.

YOUNG PROFESSIONALS

The following information is preliminary and subject to change.

EMC Society would like to invite all Young Professionals (BS within 15 years) and Undergraduates to our Networking Events at the 2025 EMC+SIPI.

"SPEED NETWORKING" WITH EMC+SIPI EXPERTS

All YPs (BS within 15 years) are invited for dinner and socializing at our "Speed Networking" event (location TBD). We'll have a handful of seasoned EMC, SI and PI Experts for the YPs to network with in three-minute sessions. We'll also be highlighting the Best Student Paper Candidates and announcing the Call for 2026 EMC Society YP Ambassadors at this event. Get to know the other young members of EMC Society and comingle with seasoned experts as well!

Meeting Location: Raleigh Marriott City Center (Rye Bar and Southern Kitchen)
Date & Time: Monday, August 18, 2025 • Time: 6:00-10:00 PM
Fee: $40 registration (Includes dinner and 1 drink)

"AFTER THE WELCOME RECEPTION" SOCIAL EVENT

This is a great opportunity to continue the conversations and fun from the Welcome Reception into the rest of the evening. Relationships formed in the EMC Society can lead to future collaborations and will provide valuable contacts when you need a friend to bounce ideas off!

Meeting Location: Wye Hill Kitchen and Brewing
Date & Time: Tuesday, August 19, 2025 • Time: 6:30 - 9:00 PM
Fee: $25 registration (Includes 2 drinks & shared appetizers

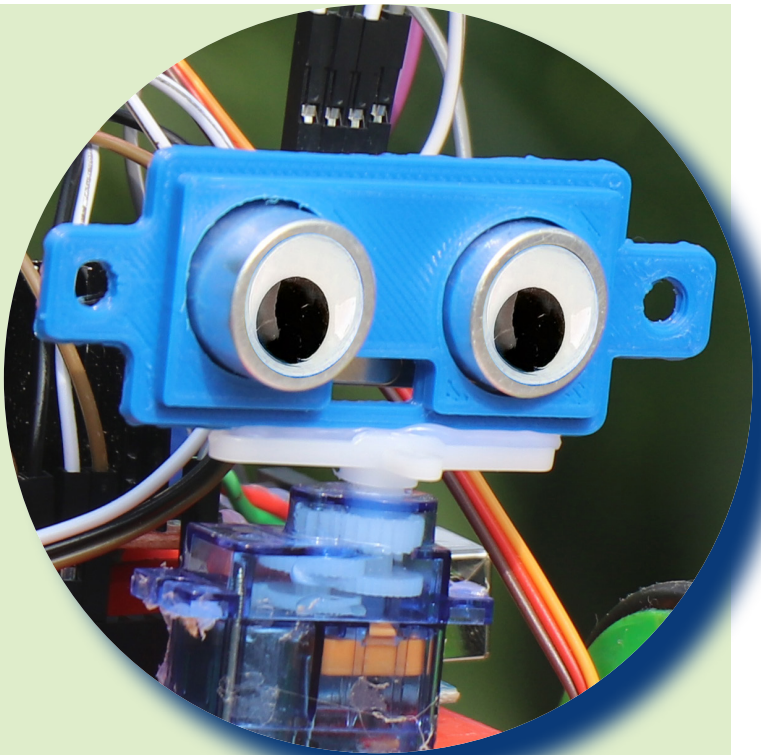
YOUTH TECHNICAL PROGRAM

RALEIGH, NC
EMC+SIPI 2025

The following information is preliminary and subject to change.

BIOMEDICAL ENGINEERING: ROBOTICS IN REAL LIFE

Engineering offers the processes, methods, and mindsets to create practical changes and innovations in the physical world around us, from designing and building bridges, making airplanes more fuel efficient, or masterminding the electronics in our cars! Biomedical engineering applies these principles to medicine and healthcare, creating solutions that improve people's health and daily lives, engineering devices such as hearing aids, artificial joints, and heart monitors.



Join us on August 20 from 1:00 – 3:30pm for the 2025 Youth Technical Program of the IEEE EMC+SIPI Symposium in Raleigh, NC, where we'll learn about the intersection of engineering and medicine and create our own precursor to real-life prosthetics — a robotic arm model!

Open to children ages 6-19. Younger participants are welcome if accompanied by an older sibling or parent. Please sign up via the registration portal.

Location: 301 B
Date: Wednesday, August 20, 2025
Time: 1:00-3:30 PM
Registration Fee: FREE

COMPANION CLUB

The following information is preliminary and subject to change.

The Companion Club is your chance to meet new people and catch up with old friends. You may register for the Companion Club as a part of the technical attendee's registration or separately.

Paid Companion Club members are welcome to visit the beautiful Companion Suite where a delicious breakfast will be served Monday to Thursday, from 7:00 to 10:00 am.

This year, the EMC+SIPI Symposium offers four attractive group Companion Tours/Events. However, you don't have to be registered for the Companion Club to participate in a tour/event.

If you register for the Companion Club, you may sign up for the tours with your own registration. Otherwise, you may purchase tours through the technical attendee's registration; there will be a drop down space to add your name.

Join your technical attendee at any of our Social Events for more fun and to meet more people. We have special prices for companions under the age of 18. Tickets to the Welcome Reception, a great networking time for all, are included in all Companion Club registrations. The Evening Gala is also a fun event, and companions are invited to register for this event separately in their Companion Club or technical attendee's registration.

For the younger crowd, our ever popular Youth Technical Program is back once again to amaze all companions and guests aged 8 to 17. This program will again be free of charge, but please register early to be assured a project kit. Registration for each young person can be made either through your own Companion Club registration or the technical attendee's registration. Your children don't have to be registered in the Companion Club to sign up for the Youth Technical Program, but an adult must accompany them to the session since this is a hands-on project.

JOIN THE BREAKFAST CLUB

Would you like to invite your technical attendee to join you for breakfast in the Companion Suite? **"Breakfast Club"** tickets may be purchased by the technical attendee as an option for each day breakfast is desired. Tickets must be purchased at a minimum 24 hours in advance to ensure adequate seating and catering.

New for this year, on Tuesday and Wednesday, from 9 – 10AM, the Breakfast Club will feature a guest speaker, who will be talking about Interior Decorating. Jill Vitek, owner of "Romancing the Home" will be the speaker.

Join fellow Companions at the symposium by registering for the Companion Club. This is an excellent opportunity to meet new people and reconnect with old friends! Adult or youth (ages 8 to 17) companions who are pre-registered may go directly to the registration desk located in the Convention Center to obtain their Companion Registration Badge.

Breakfast Club tickets will include:

- Name badge that will allow you access to the Companion Suite and Exhibit Hall (during regular hours)
- Gift bag with goodies
- One ticket to the Tuesday evening Welcome Reception
- Any tour/event or social event tickets you may have purchased

Youths (ages 8-17) who are registered for the Junior Companion Club are welcome in the Companion Suite with an adult Companion Club member. Children under age 8 do not receive a gift bag but will be admitted free if accompanied by a registered adult Companion Club member.

Your ticket to the Welcome Reception is an opportunity to enjoy another great event with your technical attendee where everyone can have more fun and meet new people. It is a great networking time for all. The Wednesday night Gala Banquet is also a fun event; however, companions must purchase tickets separately for that event.

Discounted prices are available for youth under age 18, and children under age 8 will be admitted for free if accompanied by a registered adult.

COMPANION CLUB RATES:

Adult, age 18+:
Advance Rate: $240 / Regular Rate: $270 (After July 18, 2025)
Junior, age 8-17 (PG):
Advance Rate: $75 / Regular Rate: $85 (After July 18, 2025)
Children under 8: No charge

A LA CARTE TOURS ARE AVAILABLE

www.emc2025.org/programs/companions-tours

COMPANION TOURS/EVENTS

RALEIGH, NC
EMC+SIPI 2025

The following information is preliminary and subject to change.

RALEIGH & DURHAM, NC: A DAY IN THE CITY OF OAKS & MEDICINE

A 5-hour, professionally guided bus tour of the cities of Raleigh and Durham, with a stop for lunch (lunch is not included in the cost of the tour).

The Raleigh tour visits the North Carolina State Capital, legislative, Governor's Mansion, Historic Mordecai, Warehouse District, Pullen Park Fayetteville Street districts and you will be introduced to Sir Walter Raleigh & Shimmer Wall, plus more.

The Durham tour visits the Historic American Tobacco Campus, Main St Major the Ball, Parrish Street or Black Wall Street, the Hill and Blackwell building and a visit to the Duke Campus and Duke Chapel.

Location: Raleigh Convention Center, Ballroom B&C
Date: Monday, August 18, 2025
Time: 9:00AM – 2:00PM
Cost: $70

ENGLISH TEA PARTY

We have a Formal English Tea Party event in the afternoon. It will be a hands-on cooking class and tea party. Attendees will be making tea sandwiches, cold strawberry soup, scones with topping, short breads and miniature cakes. After cooking, we will eat and have a tea party, where we will have a discussion on various English teas.

Location: Raleigh Marriott City Center
Date: Tuesday, August 19, 2025
Time: 2:00PM – 4:00 PM
Cost: $75

PAINT & SIP

This will be our "Pinot Palette", paint and drink wine event. Everyone in the class will paint and personalize their painting with the help of a dedicated artist instructor and assistants, while drinking wine and listening to music. We will be serving veggies, fruit and cheese.

Location: Raleigh Marriott City Center
Date: Wednesday, August 20, 2025
Time: 2:00PM – 4:00 PM
Cost: $60

VIDERI CHOCOLATE FACTORY

The event will start with coffee and pastries followed by a tour of the factory, while the factory is making chocolate candies. Each attendee will receive a box of chocolate bars and bonbons. The tour guide will talk about how you pair chocolates with different wines.

Location: Videri Chocolate Factory- 327 W Davie St
Date: Thursday, August 21, 2025
Time: 10:00AM – 12:00 PM
Cost: $70

EXHIBIT HALL

The following information is preliminary and subject to change.

EXPLORE THE EXHIBIT HALL AND LEARN ABOUT NEW TECHNOLOGIES, INSTRUMENTATION AND SOLUTIONS THAT SERVICE THE INDUSTRY

WHAT'S HAPPENING IN THE EXHIBIT HALL?

- Explore and learn from top suppliers
- Attend "Ask the Experts" panels and get your questions answered
- Enjoy Experiments, Demonstrations and Poster Sessions
- Visit exhibitor booths to participate in raffles and daily prizes
- Student Hardware Competition

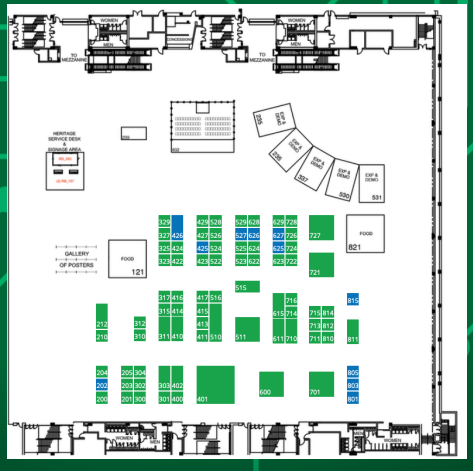
INTERESTED IN EXHIBITING?

We welcome the opportunity to have your organization join us as an industry partner and exhibit at this year's Symposium.

To learn more about exhibiting and sponsorship opportunities, or to reserve your space today visit:

www.emc2025.org/exhibitors-sponsors

EXHIBIT HALL IS LOCATED IN RALEIGH CONVENTION CENTER 100 LEVEL A & B



MEET THE EMC+SIPI 2025 EXHIBITORS

The following information is preliminary and subject to change.

DISCOVER OUR EXHIBITORS!

Absolute EMC LLC.	701
Advanced Programs, Inc.	716
Advanced Test Equipment Rentals	303
AE Techron	301
Altair	411
Amber Precision Instruments	516
American Association for Laboratory Accreditation (A2LA)	312
AMETEK CTS USA, Inc.	311
Amphenol Canada	528
AP Americas Inc.	812
*Applus+Reliable Analysis	811
Bureau Veritas Consumer Products Services, Inc.	814
*Cergen GmbH	713
Changzhou Pioneer Electric Co., Ltd	810
*Classic Coil Company, Inc.	526
Com-Power Corporation	400
Comtest	615
Copper Mountain Technologies	327
CPI TMD Technologies Ltd.	422
D.L.S. Electronic Systems Inc.	310
Dassault Systems SIMULIA	728
DesignCon	0
Electro Magnetic Applications, Inc.	323
Elite Electronic Engineering, Inc.	523
EMCoS LLC	715
ESDEMC Technology	203
ETS-Lindgren Inc.	401
Exodus Advanced Communications, Corp.	302
Fair Rite Products Corp.	623
Faraday Defense Corporation	722
Fischer Custom Communications, Inc.	511
GAUSS INSTRUMENTS International GmbH	410
Global Validity	525
Grand Valley State University	714
HV Technologies, Inc.	510
HYMAG'IN	424
IEEE EMC Society	727
IEEE EMC Society History Committee	727B
IEEE EMC Society Sister Society Booth	721
IEEE EMC Society Standards	727A
IEEE EMC Society Young Professionals	727D
IEEE Microwave Theory and Technology Society (MTT-S)	721B
IEEE Product Safety Engineering Society (PSES)	721C
IEEE Women in Engineering	727C
In Compliance	515
Intertek	423
Keysight Technologies	300
Little Mountain Test Facility - The Boeing Company	414
LUMILOOP GmbH	415
M Precision Laboratories, INC.	622
Maury Microwave	201
MESAGO Messe Frankfurt GmbH	724
MVG (Microwave Vision Group)	611
Narda Safety Test Solutions S.r.l. - Italy	624
Nemko Canada	325
NEXIO INC	416
Nexperia Semiconductor	200
OPHIR RF	402
Pearson Electronics Inc.	522
R&K Company Limited	711
Raymond EMC	710
RF Exposure Lab	413
Robust Physics	524
Rohde & Schwarz USA, Inc.	600
Safety & EMC Magazine	726
Schlegel Electronic Materials	317
SGS North America	200
SGS North America	200
*Signal Edge Solutions	628
Spira Manufacturing Corporation	304
TDK Lambda Americas	210
TDK RF Solutions, Inc.	212
Teledyne LeCroy	205
*Testups, LLC	427
The EMC Shop	204
Transient Specialists	315
TUV Rheinland	529
UEMC, INC.	629
Vectawave	417
Washington Laboratories, Ltd	329
Wurth Elektronik	429

*** Please welcome our new first-time exhibitors**

EXHIBIT HALL SCHEDULE

EXHIBIT HOURS:

TUESDAY, AUGUST 19
Exhibits Open: 9:30 AM – 6:30 PM
Welcome Reception: 5:00 PM – 6:30 PM

WEDNESDAY, AUGUST 20
Exhibits Open: 10:00 AM – 5:00 PM

THURSDAY, AUGUST 21
Exhibits Open: 10:00 AM – 12:00 PM

ATTENDEES REGISTRATION INFO

The following information is preliminary and subject to change.

Photo by Richard Georgerian

JOIN US IN RALEIGH FOR THE PREMIER EMC AND SIPI EDUCATIONAL SYMPOSIUM!

Attendees include all authors, speakers, delegates, companions, and Exhibit Hall visitors.

A full, 5-day attendee registration includes:

- Access to all of EMC+SIPI 2025
- Multiple days of EMC+SIPI original papers
- Five days of practical EMC+SIPI Workshops and Tutorials
- Experiments and Demonstrations of fundamental and advanced topics
- Exhibit Hall, showcasing the latest EMC+SIPI products and services
- Welcome Reception
- Gala Event
- Awards Luncheon
- Symposium Proceedings with all Workshop & Tutorial slide presentations and Technical papers

REGISTRATION TYPES

TECHNICAL ATTENDEE:

We offer 5-Day or 1-Day Registrations:

You have access to all EMC and SIPI paper sessions, Workshops & Tutorials, Experiments & Demonstrations, and the Exhibit Hall. There are also special events available, as well as Technical Committee Meetings, Standards Meetings, and networking opportunities.

- The 5-Day registration includes 5 days of technical sessions, 3 day pass to the exhibit hall, Symposium Record, and social events.
- The 1-Day registration includes 1 day of technical sessions, same day pass to the exhibit hall (if open), and the Symposium Record.

EXHIBIT HALL ONLY:

This is an EMC+SIPI exhibition with many technical activities. For adult (age 18+) customers and clients of our exhibitors. **$25/day**.

- Companions/guests may obtain a pass (Basic Badge) through their technical attendee's registration. Anyone under age 18 may be registered as a companion and must be accompanied by a registered adult. A minor release form will need to be completed and submitted before obtaining a badge for anyone under the age of 18.

COMPANIONS/GUESTS:

Our Companions are family and friends of all ages who are accompanying a registered, technical attendee.

We offer two types of badges:

- **Companion Club:** This package will again include a gift, access to the Companion Suite (4 mornings with breakfast), Exhibit Hall pass, and Welcome Reception ticket. Individual registrations are required. **Cost: $240 Advanced/ $270 Regular**
- **Basic Badge:** For Exhibit Hall entrance and/or Youth Technical Program registration. Sign up your companion within your own 5-Day or 1-Day technical registration. No bar code, no tracking, no charge. Basic Badges are limited to 1 adult companion and their children. **Cost: Free**
  You may sign up your companion within your own registration or they may be registered separately for the **Companion Club**.

EXHIBITOR:

All adult (age 18+) exhibitor staff, reps, and booth workers must register using the link and discount code sent to the Exhibitor/ Sponsor contact to receive an EXHIBITOR ribbon and early access to the Exhibit Hall. Anyone under age 18 must be accompanied by a registered adult and a minor release form submitted prior to obtaining a badge.

There are two badge types:

- **Technical Exhibitor:** receives a full, 5-Day Technical Registration plus EXHIBITOR ribbon.
- **Booth Staff:** receive 3-Day pass to the Exhibit Hall, with early access plus an EXHIBITOR ribbon and access to the welcome reception is included.

www.emc2025.org/registration

REGISTRATION INFORMATION

RALEIGH, NC
EMC+SIPI 2025

IMPORTANT REGISTRATION INFORMATION

AUTHORS: Symposium registration (IEEE Member or Non-Member) is required by at least one author, or the speaker, before the final paper submission deadline, May 23, 2025. Failing to meet this requirement will result in the paper not being published or presented – no exceptions. Your registration confirmation number will be needed for the final paper submittal.

More details can be found on the AUTHOR/SPEAKER page

ADVANCE REGISTRATION: You must be paid in full by midnight PDT, July 18, 2025 to receive the Advanced rates.

EMC SOCIETY MEMBERS: Special rate for full, 5-Day Technical Registrations only. Your membership must be in good standing and paid in full for 2025. If you are not a member and would like to become a EMC-S member, please CLICK HERE or call 1-800-678-IEEE. Please note that you must be a member at the time of registration to receive the member rate.

IEEE MEMBERS: Your membership must be in good standing and paid in full for 2025. Have your member number and current member grade ready when registering. If you are not a member and would like to become an IEEE member, please CLICK HERE or call 1-800-678-IEEE. Please note that you must be a member at the time of registration to receive the member rate.

SISTER SOCIETY MEMBERS: Members of IEEE EMC-S Sister Societies are eligible for the discounted EMC-S Member rate at the annual symposium. Contact the Registration Service to obtain this discount. View a list of the 2025 active Sister Society relationships.

IEEE LIFE MEMBER: There is a further rate reduction for IEEE Life members. IEEE Life Membership is automatically bestowed upon an active IEEE member based on age and years of membership.

EMC-S HONORED MEMBER: You must be an EMC Society Honored Award recipient who was presented with this award in a prior year. No discount code is necessary to register; this is a special rate category.

EMC-S RETIRED OR UNEMPLOYED: EMC-S Retired or Unemployed. Special ADVANCE rate discount for retired / unemployed EMC Society members only. Have your last place of employment and the date of retirement or unemployment ready when registering.

COMPANY GROUP RATE: Sign up to request a company-wide discount code now! We will give each employee a special discounted rate which is roughly 35% off the non-member rate, and over 10% off the EMC-S Member rate! Send an email to: **EMC@iplanitmeetings.com** to receive your Company Discount Code.

Cost: Advance rate is $715/person

FULL-TIME STUDENTS: Special rates for both IEEE members and non-members. You must be enrolled in a full time course of study at a college or university to register in the student categories. Have your college ID number and advisor's name & email ready when registering.

NOTE: Student 5-Day registration packages will include the Symposium Record and tickets to the Welcome Reception & Awards Luncheon. The Gala ticket, however, is NOT included, but may be purchased separately or awarded through volunteering at the symposium.

More details at the EMC+SIPI 2025 Website AUTHOR/PRESENTER page

OTHER INFORMATION:

CERTIFICATE OF PARTICIPATION

A Certificate of Participation may be used to officially document attendance at the Symposium. A personalized certificate will be available at no charge to all registered Symposium attendees and participants. Please visit the Registration Desk to verify your name and affiliation and to pick up your certificate. If you have any questions, please email: **emc@iplanitmeetings.com**.

PAYMENT

Payment is due upon submittal of your registration. Payment can be made by:

- Check (in USD) made out to IEEE EMC+SIPI 2025, and mailed within 2 weeks.
- Credit Card: Visa, MasterCard, American Express, Discover Card.
- Wire Transfer: (Note: Banks usually charge a fee for wire transfers. These are the responsibility of the registrant.)
- Invoice (Government Purchase Order)

Payments by credit card will be charged immediately upon submission of registration. Checks and Wire Transfers must be received within two weeks of the registration date.

You may pay for Companion Club Registration along with your own registration, or via a separate credit card. If you need to pay for tours and social events separately, select "Check" as your payment method and then contact Registration Services at the number on your email confirmation.

CANCELLATION POLICY

For Registration and total order:

- Notice of cancellation must be received in writing via email, sent to **emc@iplanitmeetings.com**. A $50.00 (USD) processing fee will be charged for registrations cancelled by July 18, 2025. For cancellations between July 19 and August 4, 2025, a 50% refund will be given. There will be no refunds after midnight PDT on August 4, 2025.If you applied for a Visa and it is denied, a full refund will be issued less a $20 service charge.
- If you applied for a Visa and it is denied, a full refund will be issued less a $20 service charge.
- In the event of a full cancellation of the conference, IEEE and EMC Society are not responsible for, and will not reimburse, flight costs and other expenses incurred by the attendee.

FOR SOCIAL EVENTS, TOURS AND EXTRAS ONLY

- Notice of cancellation of an individual "extra" item must be received in writing via email, sent to **emc@iplanitmeetings.com**, A $50.00 (USD) processing fee will be charged for registrations cancelled by July 18, 2025. There will be no refunds after midnight PDT on July 18, 2025.
- The EMC 2025 Symposium Committee reserves the right to cancel any tour that does not meet the minimum requirement. If a tour is cancelled, you will receive a full refund and will be contacted prior to the symposium.

RALEIGH, NC
EMC+SIPI 2025

THANK YOU TO THE COMMITTEE

The following information is preliminary and subject to change.

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