



IEEE Seattle EMC Chapter Meeting Announcement

**“Radiated and Conducted Emissions:
Tips and Tools to Increase Your EMC Design
and Test Productivity”**

*A half day educational seminar, with TWO PRESENTATIONS by TWO EMC EXPERTS,
at the Museum of Flight*

**This is a free seminar, but you must [RSVP](#) to assure your space
email: pat@andreconsulting.com**

Date: Wednesday, October 26, 2011

Time: 12:00 pm: Lunch and registration
1:00 pm - 5:00 pm: Presentations

Speakers: Mark Steffka, IEEE EMC Society Distinguished Lecturer,
Adjunct Professor, University of Michigan-Dearborn, General Motors
John Norgard, Member - IEEE EMC Society Board of Directors
Chief Engineer for Electromagnetic Environmental Effects (E3), NASA-Houston

Location: Museum of Flight, Boeing Field, Seattle Washington
See www.museumofflight.org for more details

Directions: [9404 E Marginal Way S Seattle, WA 98108](#) (click for Google Maps)
(206) 764-5720
Take exit 158 from I-5.
Go west.
Turn right at the first light (E. Marginal Way S.)
The Museum is on the right, 1/2 mile.

Several vendors will be available to discuss your needs – see below for more information

TECHNICAL PROGRAM

Radiated and Conducted Emissions: Tips and Tools to Increase Your EMC Design and Test Productivity

Presentation 1: Conductors and “Conductive Paths” – What is Really Happening (although why should anyone care?) by *Mark Steffka, IEEE EMC Society Distinguished Lecturer*

Most people involved in EMC work know exactly what conductors and conductive paths are (or do they really know?). This presentation will look at the basic physics involved in current flow along conductors and how those physical conditions can create or solve EMC issues. These concepts are critical to know and understand, since the fundamentals apply at any level, from the smallest interconnections in micro-electronic devices to transmission lines in “large” systems. The presentation will discuss physical construction of conductors, different types of intended (and non-intended) conductive paths, and effects of conductor geometry. Examples of the correct (and sometimes incorrect) application of these fundamentals will be discussed. NOTE: This presentation was first given at the 2011 IEEE International Symposium on EMC in Long Beach, California to rave reviews. It was standing room only for this presentation in Long Beach; in Seattle, you will enjoy the comfort of the Weyerhaeuser Theater for this presentation.

Presentation 2: “Radiated Emissions/Immunity” – The ABC’s of Basic Antenna Theory/Testing by *John Norgard, IEEE EMC Society Board of Directors*

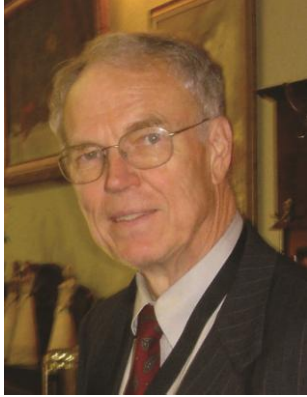
Radiated Emissions (RE) from an electronic system can cause Electromagnetic Susceptibility (RS) in other nearby electronic devices. All components of the electronic system radiate, and all parts of the electronic device receive, forming a transmitter/receiver pair. Electromagnetic Interference (EMI) between the system and device can cause device degradation, damage, destruction, etc. of the components of the device. EMI MIL-STD emissions/immunity testing of the radiated emissions from and radiated susceptibility of an electronic circuit are reviewed. All the components in the system/device are modeled and simulated as radiating/receiving antennas. The physics (concepts) and math (models) of basic antennas are reviewed. The concept of radiation is discussed. The two radiation integrals (one describing the electric effects of the antenna, and the other describing the magnetic effects of the antenna) are derived “Heuristically” from the auxiliary potential equations (Poisson/Laplace), as THE unique particular solutions to the (coupled) Maxell and (uncoupled) Helmholtz field/wave equations (and the Conservation of Charge/Current) for all basic antennas types radiating in simple media (with linear/homogeneous/isotropic/non-dispersive constitutive relations). Near-Field and Far-Field solutions are presented. The interrelationship between antenna Analysis and Synthesis (Design) concepts are discussed. The near, immediate, and far fields radiated from a simple Hertzian dipole are found as an example. The physical characteristics of an antenna, e.g., radiation pattern, directivity/gain, input impedance/reflection coefficient, lobes/nulls, matching/VSWR, etc., are defined and discussed.

Speaker Biographies



Mark Steffka received the B.S. degree in electrical engineering from the University of Michigan in 1981, and a M.S. from Indiana Wesleyan University in 1987. He has almost 30 years of experience in the design and development of military, aerospace, and automotive electronics systems. He is currently with General Motors' Powertrain Electromagnetic Compatibility (EMC) Group. In 2000, he was appointed as a Lecturer at the *University of Michigan-Dearborn* and in 2006, was also appointed as an Adjunct Professor at the *University of Detroit – Mercy*. He regularly teaches at both universities with courses on EMC, antennas, and electronic communication systems.

He is the author and/or co-author of many publications on EMC, Radio Frequency Interference (RFI), and his paper to the *Society of Automotive Engineers (SAE) Congress* on "Engine Component Effects of Spark-Ignition Caused Radio Frequency Engineering (RFI)" was "Judged (by SAE) to be among the most outstanding SAE technical papers of 2007". He is an IEEE member and his professional activities include serving as a technical session chair for SAE and IEEE conferences. He was the Technical Program Co-Chair for the 2008 IEEE International Symposium on EMC and has been an instructor the symposium's "Global EMC University". He has also been an invited speaker at *IEEE* and *SAE* conferences held in the United States and international locations. He is a member of the ARRL's EMC Committee, and holds the amateur radio call sign WW8MS.



Johannes Nordgaard (John Norgard) (Georgia Tech-B.S.E.E./1966/Co-Op; Caltech-MS/1967/Applied Physics; Caltech-PhD/1969/Applied Physics) of NASA/JSC is the Chief Engineer for Electromagnetic Environmental Effects (E3). Prior to joining NASA, Dr. Norgard was a Professor at the University of Colorado at Colorado Springs, the President and CEO of ElectroMagnetic Techniques (EMT), Inc., the Chief Scientist of ZeeWaves, Inc., and the Senior Research Scientist for the Radar Techniques Branch of the Sensors Directorate at the Rome Research Site of the Air Force Research Lab [AFRL/RRS (SNRT)]. He has also been a Distinguished Visiting Professor (DVP) at the US Air Force Academy in the Electrical & Computer Engineering Department. He has taught graduate and undergraduate courses in Electromagnetic Field Theory for over 30 years and was the Director of the Electromagnetics Laboratory at the University of Colorado. Before coming to the University of Colorado, he was a Professor in the Electrical Engineering Department at Georgia Tech and was a Post-Doctoral Fellow at the Norwegian Defense Research Establishment (NDRE) in Kjeller, Norway. He worked at the Jet Propulsion Laboratory (JPL) while studying at Caltech and was a Co-Op student at Georgia Tech while working at the Charleston Naval Shipyard (CNS). He has worked on numerous computational electromagnetic problems, including conformal antennas/apertures, strip lines/microstrips, waveguides/cavities and transmission lines, propagation of waves through various plasma media (polar ionosphere, rocket soundings), interaction and coupling of waves to wires (cross-talk, NEMP, and lightning), EMI, EMC, EMS/V, backscatter from clutter targets, ESD, HPM radiation, GPR, RF Tomography, and IR Metrology. He has developed a 2D thermal mapping technique using infrared thermography and microwave holography to measure electromagnetic fields and to verify and validate numerical CEM codes. He has been a Visiting Professor at the Tel-Aviv University and was a member of the technical staff of the Bell Telephone Laboratories. He is an Adjunct Professor at Syracuse University and at the University of Houston. He is a Fellow of IEEE for IR measurements of EM fields, a past member of the Board of Directors for the IEEE/EMC Society serving as the Vice President for Standards, on the Board of Physics and Astronomy for the National Academy of Sciences, Past Chairman for Commission A/Metrology of URSI, and an Associate Editor for the IEEE/EMC Transactions in the area of antenna metrology. He has authored several hundred technical papers, reports, and journal articles and has contributed chapters to four EM books.

See below for exhibitor information.....

Seattle EMC Chapter: Exhibition on October 26
Museum of Flight – Seattle, WA

Calling All EMC Exhibitors!

There will be a small tabletop exhibition during the October 26 half-day meeting at the Museum of Flight in Seattle. **Due to limited space, only eleven tables are available on a first come, first served basis.**

Details:

- Eight tables are each 30"W x 72"L and are available for **\$175 per table**.
- Three tables are each 30"W x 96"L and are available for **\$300 per table**.
- Promotional opportunities may be secured by issuing a check payable in full to "Seattle EMC Chapter" and sending to: Janet O'Neil, 22316 NE 19th Street, Sammamish, WA 98074. **Space will be confirmed in order of checks received until space is sold out.**
- Exhibitors are limited to what can be placed on the table only. No exceptions!
- Only one table is allowed per company.
- All exhibitors may set up starting at 11:00 am and must be torn down by 6:00 pm on October 26.
- Exhibit hours are 12:00 pm to 5:00 pm.
- All exhibitors will receive an attendee list prior to the seminar and a final version following the seminar.
- BONUS: The museum will be open for IEEE EMC Chapter members and guests only from 5:00 – 6:00 pm. See the great planes on display, tour the famous Boeing "Red Barn" and more during this private viewing time.

Contact Janet O'Neil at 425-868-2558 or at j.n.oneil@ieee.org to reserve your space.

**Due to the popularity of the speakers and the broad appeal of the topic,
we expect good attendance and the tables to fill quickly.
Do not delay if you wish to secure a table!**