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Distinguished Lectures on Electromagnetic Compatibility, Friday 24 May 2013, 4.10-6.10 PM

1. Fundamentals of Signal Integrity and Power Integrity,

**Prof. Dr. sc. techn. Christian Schuster, Institut für Theoretische Elektrotechnik,
Technische Universität Hamburg-Harburg, Germany**

This presentation gives an introduction to the fundamentals of signal and power integrity engineering for high-speed digital systems with a focus on packaging aspects. It is intended for an audience that has little or no formal training in electromagnetic theory and microwave engineering. Topics that will be addressed include lumped discontinuities, transmission line effects, crosstalk, bypassing and decoupling, power plane effects, return current issues, and measurement techniques.

2. Micro and Nano miniaturization of systems

**Prof. Madhavan Swaminathan, John Pippin Chair in Electromagnetics,
Georgia Institute of Technology, Atlanta, USA**

The main driver for the semiconductor industry has been Moore's law where the doubling of transistors has led to phenomenal increase in functionality of the integrated circuit (IC). Today, microprocessors support a billion transistors, run at a frequency that is 250X higher than 2 decades ago and provide performance close to a super computer in a handheld device. However, integrating a System on Chip (SOC) has still not been possible due to technical and business reasons. This has led to highly integrated ICs but bulky systems. Around 2 decades back, Georgia Tech pioneered a new concept called System on Package (SOP) that enabled the miniaturization of systems consistent with Moore's law for IC integration. A suite of technologies were developed that enabled the integration of digital, RF, optical and other functionality in the package and board that provided a significant increase in the component density at the system's level. These components in the micro-meter scale provided ~1000X reduction in size as compared to other technologies while providing significant increase in performance and reliability while at the same time reducing the cost for manufacturing. Today, the need for including sensing and energy harvesting devices for biomedical and other electronic applications is becoming necessary. These require the integration of nano-materials, nano-sensors and nano-generators into the SOP platform.

Time/Date: 4:10 – 6:10 PM, Friday 24 May 2013

Venue: B21 Inkgarni Wardli (Innova21 - Basement)
North Terrace, The University of Adelaide

Site Map: www.adelaide.edu.au/campuses/mapscurrent/north_terrace.pdf

Speaker Biographies:



Christian Schuster (S'98 - M'00 - SM'05) received the Diploma degree in physics from the University of Konstanz, Germany, in 1996, and the Ph. D. degree in electrical engineering from the Swiss Federal Institute of Technology (ETH), Zurich, Switzerland, in 2000. Since 2006 he is full professor and head of the Institute of Electromagnetic Theory at the Hamburg University of Technology (TUHH), Germany. Prior to that he was with the IBM T. J. Watson Research Center, Yorktown Heights, NY, where he was involved in high-speed optoelectronic package and backplane interconnect modeling and signal integrity design for new server generations. His current interests include signal and power integrity of digital systems, multipoint measurement and calibration techniques, and development of electromagnetic simulation methods for communication electronics.

Dr. Schuster received the IEEE Transactions on EMC Best Paper Award in 2001, IEC DesignCon Paper Awards in 2005, 2006, and 2010, three IBM Research Division Awards between 2003 and 2005, IBM Faculty Awards in 2009 and 2010, and an award for the best interactive presentation at DATE-Europe in 2009. He is a member of the German Physical Society (DPG) and several technical program committees of international conferences on signal and power integrity and electromagnetic compatibility. He is currently serving as a Distinguished Lecturer for the IEEE EMC Society in the period 2012-2013.



Madhavan Swaminathan is the John Pippin Chair in Electromagnetics in the School of Electrical and Computer Engineering (ECE) and Director of the Interconnect and Packaging Center, Georgia Tech and the Founder and CTO of E-System Design, a company focusing on the development of CAD tools for achieving signal and power integrity in integrated 3D micro and nano-systems. He is also the co-founder of Jacket Micro Devices, a company that specialized in integrated RF modules and substrates for wireless applications that was acquired by AVX Corporation. He formerly held the position of Joseph M. Pettit Professor in Electronics in ECE and Deputy Director of the NSF Microsystems Packaging Center at Georgia Tech. Prior to joining Georgia Tech, he was with IBM working on packaging for supercomputers. He is the author of more than 350 journal and conference publications, holds 27 patents, is the author of 3 book chapters, primary author and co-editor of 2 books - "Power Integrity Modeling and Design for Semiconductors and Systems", Prentice Hall, Nov 2007 and "Introduction to System on Package", McGraw Hill, Mar. 2008 in the field of packaging and has won several awards including the Technical Excellence Award from Semiconductor Research Corporation. He is an IEEE Fellow and serves as the Distinguished Lecturer for the IEEE EMC society for the 2012 – 2013 term. He received his M.S and PhD degrees in Electrical Engineering from Syracuse University in 1989 and 1991, respectively.

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