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Keynote Address

The Application of Modeling and Simulation in the Medical Device Field

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With an aging baby boomer generation and increasing demand world-wide for life changing medical technology, the medical device industry has seen substantial growth in the past 30 years. With annual sales of over $200 billion in 2009, this market is highly innovative, driving key electrical technologies in the areas such as low power design, miniaturization and packaging, nano-technology, and micro-electro-mechanical systems (MEMS). These products can be very complex systems that are costly and time consuming to design, test and iterate. The need to develop innovative products quickly and with the highest level of quality has driven the desire to employ more computer based analysis methods including modeling and simulation. Behavioral models are used to help define requirements and develop robust products that deliver patient therapies. Modeling and simulation is used to make educated design partitioning and component selection decisions which can optimize for variables such as power, hardware vs firmware, and reliability. Simulation is also used as a method to reduce development time, assure the design is testable, and guarantee high design margin and yield. All of this enables high quality innovative medical electronic products to be delivered to patients in a timely manor.

Robert Mehregan

Robert Mehregan received the MS degree in Electrical Engineering from University of Central Florida in 1995, the BS degree in Electrical Engineering and BS degree in Engineering Business Administration from Michigan Technological University in 1993.

He is currently employed as a Principal IC Design Engineer at Medtronic, Inc. in Minneapolis, MN and has been with that company for 14 years. His previous employment was at Harris Semiconductor in Palm Bay, FL as a Sr CAD Engineer and Cadence Design Systems in Orlando, FL as an Applications Engineer.

His focus includes integrated circuit, hybrid PCB, battery, MEMs, environmental and discrete component modeling and advanced analog and mixed-signal design verification. He has also served as a lead in top-down requirements driven design methodologies, worst-case and reliability modeling, hybrid level simulation and simulation and modeling for hardware verification test development. His background includes the use of languages such as Verilog-A/MS, SPICE, VHDL-AMS, Spectre-HDL, System-C, Matlab/Simulink, and SysML. He currently serves in the Hardware Architecture group in the Cardiac Rhythm Management division of Medtronic.