



## TECHNICAL PRESENTATION

**Keynote Speech** by Dr. James Davis, University of South Carolina, USA

### **Designing Electronics and Computing Systems: the State of Practice and Future Trends**

Abstract:

"In this talk, I will present a survey of the issues and state of practice for the design of electronics computing systems. There are a number of different types of systems design methods--for embedded computing, VLSI system-on-chip, reconfigurable computing, for example.

There are design approaches at different levels of design abstraction--system-level, register-level, gate-level, etc. In addition, there are design applications--algorithms, protocols and architecture patterns--that are common across the problem domains associated with scientific computing, mobile computing, personal and ubiquitous computing, etc. I'll be surveying all of these areas, in hopes to put these different aspects of the design space into perspective. I'll be focusing on the use of "model-based" analysis and design methods, and how they can be easily taught and practiced, so as to "level the playing field" for novice design engineers. Finally, I'll present some of the coming trends as they relate to designing large-scale, reliable systems consisting of Billions of nano-scale switches, and how we'll need to consider the problem of systems design for nano-computing. This will require a balance of design methods and processes, and the ability of designers to practice "conceptual design" in a manner similar to software designers. VLSI hardware design will require both an understanding of systems analysis and architecture design--in addition to an understanding of the core principles underlying the creation of digital systems, either on a CMOS substrate, or on future nano-electronics substrates."

**Workshop** by Dr. James Davis, University of South Carolina, USA

### **How to Become an Expert Digital Systems Designer: Analysis, Architecture Exploration, Modeling Methods and Systems Platforms**

Abstract:

In this workshop, we examine what are the skills you need to become an "expert" designer of digital systems. Our research in the education and practice of digital systems design has shown that a capable student or junior designer, given a working knowledge of digital logic and basic computer architecture, can learn how to create world-class digital designs in domains such as wireless networking or consumer electronics. We will be presenting some of the latest ideas on: systems analysis and partitioning; model-based design techniques; object-oriented and algorithm-based methods for creating a system design; and, using design tools and their data to explore the "design space" of candidate architectures to select the best one for your application. We'll explore this set of design methods and an engineering process that will show you how to accelerate your design skill level by up to 3-5 years. We'll show you how it is done, starting with the basic building blocks, and progressing to algorithms for arithmetic and coding circuits and on to designing for mobile communications protocols.

**About the Speaker:**

Dr. James P. Davis, the seminar presenter, is Associate Professor in the Department of Computer Science and Engineering, University of South Carolina, USA, and is author of the upcoming book titled "Digital Systems Analysis and Design: A Model-Based Approach". Dr. Davis has more than 25 years of experience in systems design for both hardware and software, having worked with leading companies such as NCR, Mitsubishi Electric, Sony, Ricoh, Agilera, Hitachi, 3Com, and the United States Department of Defense.