

## **Multicore Architectures - The Start of the Computing Revolution**

### **Dr. Dan Connors**

#### **Abstract**

Computer system performance is directly tied to advances in a range of fields, including medicine, biology, chemistry, physics, and engineering. With increasing transistor density enabled by the scaling of CMOS technology and the rise of application complexity in recent years, next generation processors are being driven to integrate multiple cores per chip. As technology scales, components of multicore systems are becoming less reliable because of transient, permanent, and intermittent faults caused by a variety of factors. While several research efforts in the multicore system-on-chip (SoC) domain are concentrating on application scalability in the form of new parallel languages, architectures, and tools, the achievable performance potential of future systems will be sidelined by issues in on-chip power dissipation and failures due to transient faults.

This talk will explore the topic of run-time adaptation in multicore architectures. The talk will specifically demonstrate the use of dynamic voltage and frequency scaling (DVFS) techniques for balancing processor energy and performance tradeoffs, and present a novel fault tolerant environment for addressing reliability issues in multicore architectures using probabilistic fault assurance (PFA).

#### **Biography**

Dr. Connors received his Ph.D. degree in Electrical Engineering from the University of Illinois at Urbana-Champaign. Dr. Connors then joined the Department of Electrical and Computer Engineering at the University of Colorado at Boulder in the Fall of 2000. While at University of Colorado at Boulder, Dr. Connors directed research and engineering projects with the National Science Foundation (NSF), National Aeronautics and Space Administration (NASA), Intel Corporation, Hewlett-Packard, AMD, Apple, Xilinx, Sun Microsystems, and Altera. Additionally, in 2003, he was honored to receive the College of Engineering highest teaching award (Pebbles Outstanding Teaching Award), and later in 2007 earned the College of Engineering's Award for Innovations to Teaching with Technology- Carlson-Sullivan Teaching Innovation Award. His areas of interest are in the area of computer architecture, computer system design, power-aware computing, fault-tolerant computing, and advanced compiler optimization. Dr. Connors is a member of IEEE, Eta Kappa Nu, and ACM.