



Electrical and Computer Engineering Colloquium

**Design and Test of Defect-Tolerant Quantum-dot
Cellular Automata**

Fabrizio Lombardi
Northeastern University
Candidate for ECE Department Chair

1:30 - 2:30 p.m., Tuesday, April 4, 2006
Dreese Laboratories 260

Over the last few years, considerable research has been undertaken on Quantum-dot Cellular Automata (QCA) as a new computing paradigm and technology in the nano-scale regimes. This talk shall provide a birds-eye view of the QCA projects and directions pursued as part of the current research efforts in nanotechnology at Northeastern University under my supervision. Initially, a brief review of the basic operational principles of metal/molecular QCA will be outlined. Subsequently, a detailed characterization of different aspects of design and test of QCA devices and circuits will be pursued. Topics will include defect modeling at manufacturing, new devices (such as an AOI gate) for combinational and sequential circuits and modular design through tiling. Future research directions and their impacts on nanotechnology and computing will be addressed at the conclusion of this talk.

This research is pursued as a joint collaboration with the University of Notre Dame.

Fabrizio Lombardi graduated from the University of Essex (UK) with a B.Sc. (Hons.) in Electronic Engineering. In 1977 he joined the Microwave Research Unit at University College London, where he received the Master in Microwaves and Modern Optics (1978), the Diploma in Microwave Engineering (1978) and the Ph.D. from the University of London (1982). He is currently the holder of the International Test Conference (ITC) Endowed Professorship at Northeastern University, Boston. At the same Institution during the period 1998-2004 he served two terms as Chair of the Department of Electrical and Computer Engineering. Prior to Northeastern University, he was a faculty member at the University of Colorado-Boulder and Texas A&M University. Dr. Lombardi is the Associate Editor-In-Chief of the IEEE Transactions on Computers, an Associate Editor of the IEEE Design and Test Magazine and a Distinguished Visitor of the IEEE-CS. His research interests are nano computing, configurable/network computing, defect tolerance and CAD VLSI.