



**Graduate Seminar (EEL 6936)**  
**Department of Electrical Engineering**  
**[http://ee.eng.usf.edu/Grad\\_Seminar](http://ee.eng.usf.edu/Grad_Seminar)**

**Dr. Chuck Hawkins**  
University of Florida, Gainesville, FL, USA  
Electrical & Computer Engineering

Friday, February 7, 2013, 3:30-4:30 p.m.  
Engineering Building B (ENB) Room 118

## **The Electronic Behavior of Integrated Circuit Failure**

### **Abstract**

Five years ago, Intel said that 50% of the manufacturing cost of a large microcomputer chip was in the test process. What is this monster challenge, and how do we attack the problem? For many years, failure was defined as a Boolean upset, or also known as the stuck-at fault model with little regard for the reality that lay beneath. This talk will describe the work and results over a ten-year period that moved the field to the defect-based test (DBT) approach. The DBT model measures the electrical properties of all known failures, and then defines detection strategies to exploit these properties. General defect categories are bridges, opens, and parametric failures that are a function of power supply voltage, temperature, and clock speed. This talk will conclude with a description of the next extension from DBT called statistical test that is needed to address the high-speed very large billion transistor devices.

### **Biography**



Dr. Chuck Hawkins is currently an Adjunct Professor in the ECE Department at the University of Florida following a career at the University of New Mexico. His research and graduate teaching was in IC test engineering, reliability, and failure analysis. He has also worked with the CMOS IC Development Group at Sandia National Lab in New Mexico for 20 years and did on-site research at Intel, AMD, Philips Research Labs, Signetics, and Qualcomm.

Dr. Hawkins has taught short courses in Europe, Canada, South America, Australia, Mexico, and China. He recently finished an undergraduate textbook titled, "CMOS Digital Integrated Circuits: A First Course." He also teaches a senior course at UF Gainesville on this topic. A previous book on today's topics was, "CMOS Electronics; How it Works, How it Fails." He was also the Editor of the magazine *Electron Device Failure Analysis*. Dr. Hawkins received his Ph.D. degree from the University of Michigan, an MSEE from Northeastern University, and BEE from the University of Florida.