



Seminar series of Enabling Advances in Technology (EAT) @ DIET

Seminar Announcement

November 19th, 2015 - DIET Dept. Room 206, 1:15 p.m.

Reliability Estimation Techniques for Nano-scale CMOS and FinFETs Circuits affected by Noise, Process Variations and Aging

Speaker: Dr. Usman Khalid

Abstract: Robust yield and reliability, mounting number of transistors, more and more number of functions in single Integrated Circuit (IC) have always been the demand for IC fabrication market. However, invasive uninterrupted scaling of CMOS and FinFET technologies to nano-scale level leads to various fallouts in reliability of logic circuits such as input noise, variability of process parameters and aging due to Bias Temperature Instability (BTI). Such issues ultimately become responsible for logic errors in digital circuits. Therefore, several novel techniques such as analytical, semi-analytical are introduced in order to quantify the reliability/failure-probability for both combinational and sequential circuits in the presence of input voltage noises in conjunction with process variations and aging. Furthermore, an analysis on impact of noise-induced signal voltage pulses on the static power consumption of nano-CMOS circuits is implemented by using approximation model scheme. The proposed techniques were verified against state of the art SPICE Monte Carlo Simulations and results in more than 10^4 faster run time.

Bio: Usman received his BS in Computer Engineering (2008) from COMSATS Institute of IT, Pakistan and in 2012 Master's degree in Electrical and Electronics Engineering by Research where he published 13 conference papers on "Reliability and Fault tolerant Circuit Design at Logic Level" topic. Currently he is finishing his PhD this year in Electronics Engineering, doing research in Laboratory of Digital System Design under Prof. Mauro Olivieri. His main research activities are confined to the challenged involved in Transistor Level Reliability of Nano-scale CMOS, FDSOI and FinFET circuits and able to publish one journal and seven conference papers on this topic during his PhD. He is also Graduate Student Member of IEEE since 4 years. wideband radar systems and exposed subjects.

