

NEEDS

A Primer on the MVS Nanotransistor Model:

Mark Lundstrom
Purdue University

9:00-10:00AM
November 13, 2014
BRK 1001

Abstract: The MIT virtual source (MVS) nanotransistor model provides a simple, physical description of transistors that operate in the quasi-ballistic regime. With only a few empirical parameters that are easily obtained through device characterization, the MVS model has served well for technology benchmarking and more recently it was extended to a full-fledged compact model and validated via circuit simulation and comparison with experimental data on both silicon and III-V transistors.

In this talk, I will present a gentle introduction to the MVS model. I'll show how the basic equations of the model can be obtained by using a traditional approach to MOSFETs. I'll then indicate how the parameters in this traditional model must be re-interpreted in order to capture the physics of nanoscale transistors. My goal is to set the stage for the seminar by Dr Shaloo Rakheja, which follows. Dr. Rakheja will discuss some of the issues involved in turning the physics-based analytical model for nanotransistors into a compact model suitable to use in SPICE-based circuit simulation.

Bio: MARK LUNDSTROM is the Don and Carol Scifres Distinguished Professor of Electrical and Computer Engineering at Purdue University where his teaching and research center on the physics, technology, and simulation of electronic devices. Lundstrom was the founding director of the NSF-funded Network for Computational Nanotechnology, which created the nanoHUB science gateway that now serves over 300,000 users per year. He currently leads an NSF-SRC initiative, NEEDS, that connects material and device technologists to circuit and system designers. He is a member of the U.S. National Academy of Engineering, a fellow of the IEEE, APS, and AAAS, and the recipient of several awards for his contributions to research and education.