October 19, 2009

9:30  Registration

10:00  Post-Silicon 101

Rand Gray, Intel
Brad Quinton, University of British Columbia
Amir Nahir and Allon Adir, IBM

Post-silicon verification is a necessary step in a design's verification process. Pre-silicon techniques such as simulation and emulation are naturally limited in scope and volume as compared with what can be achieved on the silicon itself. Some parts of the verification, such as full-system functional verification, cannot practically be covered with current simulation technologies. Even core functional verification - traditionally a central part of simulation-based verification - cannot be fully taken care of before tape-out.

In this tutorial, the basic concepts and aspects of post-silicon validation will be presented. Speakers from both industry and academia will present the challenges faced by the bring-up team and how these challenges are addressed.

13:00  Lunch

14:30  Satisfiability Modulo Theories (SMT)

Ofer Strichman, Technion

The "Satisfiability Modulo Theories" (SMT) problem is to decide the satisfiability of formulas with respect to a first-order background theory for which there exists a decision procedure — such as the theory of equalities, the theory of lists, and the theory of linear arithmetic.

SMT solvers are routinely used in formal verification, compiler optimization, and scheduling, among others. Microsoft's Z3 SMT solver, for example, is used in many of their program analysis and verification tools.

The tutorial will begin by placing SMT in a broader context and compare it to other methodologies such as constraint solving and automated theorem proving, and describe the various activities performed in the SMT community. It will then give a brief introduction to first-order theories and focus on the state of the art in SMT solving.

16:00  Coffee Break

16:30  Constraint Satisfaction Problems (CSPs) for Verification

Eyal Bin, IBM

Constraint satisfaction problem (CSP) techniques are widely used in verification as core engines for building test generators. CSPs focus on problems having variables with finite discrete domains and constraints that limit the variables' legal assignments.

In this tutorial, we will present the CSP's engine algorithms and the basic concepts of variables and constraints. A brief introduction will be given for advanced topics such as variables and values ordering, CSP languages, soft and hard constraints, the role of propagators, and local vs. global constraints.