Design-Assisted Development of Design Rules

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Bio

Puneet Gupta (http://nanocad.ee.ucla.edu) is currently a faculty member of the Electrical Engineering Department at UCLA. He received the B. Tech degree in Electrical Engineering from Indian Institute of Technology, Delhi in 2000 and Ph.D. in 2007 from University of California, San Diego. He co-founded Blaze DFM Inc. (acquired by Tela Inc.) in 2004 and served as its product architect till 2007.
He has authored over 120 papers, 16 U.S. patents, a book and a book chapter. He is a recipient of NSF CAREER award, ACM/SIGDA Outstanding New Faculty Award, SRC Inventor Recognition Award and IBM Faculty Award. He currently leads the IMPACT+ center (http://impact.ee.ucla.edu) which focuses on future semiconductor technologies. Dr. Puneet Gupta has given tutorial talks at DAC, ICCAD, Intl. VLSI Design Conference and SPIE Advanced Lithography Symposium, etc and has served on the Technical Program Committee of DAC, ICCAD, ASPDAC, ISQED, ICCD, SLIP, VLSI Design, etc.
Dr. Gupta's research has focused on building high-value bridges across software-hardware-technology interfaces for lowered cost and power, increased yield and improved predictability of integrated circuits and systems.

Abstract

Manufacturing has been incapable of keeping up with Moore's law without significantly increasing process variability and imposing massive geometric restrictions on design. Small changes in layout constraints, a.k.a. design rules, can have a significant impact on design power, performance, and area metrics. We will describe the open-source framework developed in our group: Design Rule Evaluator or DRE which allows for design-technology co-optimization at early stages of technology development. The DRE methodology consists of quick estimation of the layout for a given set of rules followed by approximate modeling of design metrics, manufacturability, and yield. We also show how data driven approaches can be used to aid assessment of pattern-restricted technologies like multiple patterning as well as evaluate holistic impact of design rules not just for small cells but for large sized design blocks accounting for complex interactions between rules, performance, variability, yield and area