Building Modern Integrated Systems: A Cross-cut Approach
(The Electrical, The Mechanical and The Optical)

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Abstract
The slowdown in process scaling due to fundamental limitations of transistors and copper wires, has put tremendous challenges on traditional integrated system design methodology and continued performance improvements. These fundamental component limitations (subthreshold transistor leakage and wire capacitance/resistivity) have brought into the focus the need for energy-efficient cross-cut integrated system design, and the need to accelerate the adoption of promising emerging technologies that overcome these limitations.

This talk illustrates several examples of our cross-cut design methodology, which encompasses cross-layer modeling that connects process, device and circuit optimizations to system-level metrics, as well as design of early characterization platforms to accelerate adoption and provide feedback to modeling and device design. These examples focus on development of integrated information transfer systems (e.g. manycore processor and memory systems, and network communication infrastructure), with scaled electronics, as well as emerging mechanical and photonic devices.

Biography
Vladimir Stojanovic is the Emanuel E. Landsman Associate Professor of Electrical Engineering and Computer Science at MIT. His research interests include design, modeling and optimization of integrated systems, from CMOS-based VLSI blocks and interfaces to system design with emerging devices like NEM relays and silicon-photonics. He is also interested in design and implementation of energy-efficient electrical and optical networks, and digital communication techniques in high-speed interfaces and high-speed mixed-signal IC design. He is a recipient of the 2009 NSF CAREER award.

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