

The SRC-NIST Nanoelectronics Research Initiative: Partnership for Innovation

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Presentation

Abstract: One of the formidable challenges of the 21st century is to sustain the exponential rate of improvement in performance-per-unit-cost that has been offered by Moore's law for integrated circuits. More than three decades of unparalleled progress in information technologies has been achieved principally by scaling the feature sizes of transistors relentlessly. Indeed, minimum feature sizes of leading-edge transistors are now far into the nanometer regime. There are, however, studies suggesting that the physical limits for scaling of electron devices may be reached in one to two decades. Even before then, the increased energy consumed by aggressively-scaled chips may force expensive cooling solutions and slow progress. In view of these foreseeable challenges, the semiconductor industry, the federal government, and several states have launched the Nanoelectronics Research Initiative (NRI). NRI is a university-based discovery research program whose goal is to seek new physical principles to continue the benefits that have been provided by Moore's law for semiconductor integrated circuits. In this talk, the origin, the goals, and the current implementation of the NRI program is described. The economic significance of the NRI quest is that those who discover new information processing technologies will be positioned to enjoy a competitive advantage in an important market sector.