

## **Speech Title: Evolution of MOSFETs During the Last Half Century**

**Abstract:** Silicon MOS transistors have been driving the integrated circuit industry for since the first practical demonstration of a MOSFET in the Bell Lab in 1960. Continual scaling of the transistor feature size, as dictated by the well known Moore's law, has enabled the dominance of the MOSFETs over this period. As the transistor size becomes smaller, simple geometrical scaling is no longer able to result in improved device performance. Innovative technologies, such as, high-K gate dielectrics, metal gates, strained channels and multiple gate structures, have paved the path for continued scaling. However, further scaling becomes more daunting due to approaching the limits imposed by fundamental physics. It is expected that at 16 nm node and beyond, even advanced silicon MOSFETs, such as, multi-gate strained silicon MOSFETs, will become inadequate to meet the performance targets set by the International Technology Roadmap for Semiconductors (ITRS). Channel materials with higher mobility and device architecture with increased immunity to short channel effects will be required to maintain the targeted performance enhancements.

In this talk, we will review the evolution of the MOS transistor from a historical perspective. Possible alternatives, which can propel MOSFETs well into the next decade with sub 10 nm feature size will also be discussed.