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Nanoelectronics challenges for the 21st century

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Keynote 1

Nanoelectronics challenges for the 21st century



Professor Dimitri A. Antoniadis

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Abstract:

Leading edge CMOS technologies today are unique examples of nanoscale engineering at an industrial scale. As we celebrate this remarkable achievement of our industry that forms the ever-expanding technology basis of modern society we cannot help but ponder the question of how we can continue to push the envelope of nanoelectronics. With the end of Si FET scaling appearing increasingly near, searching for more scalable transistor structures in Si and in “beyond-Si” solutions has become imperative; from relatively “easy” transitions to non-planar Si structures, to the incorporation of high mobility semiconductors, like Ge and III-V’s, to even higher mobility new materials such as carbon nanotubes, graphene, or other molecular structures. And even further, there are searches for new information representation and processing concepts beyond charge in FETs, as for example, in spin-state devices. Of course, declaring silicon dead is premature at best, and with this in mind I will discuss the challenges and possible scenarios for the introduction of novel nano-electronic devices.

Speaker Bio:

Prof. Dimitri A. Antoniadis was born in Athens Greece. He received his B.S. in Physics from the National University of Athens in 1970 and his Ph.D. in Electrical Engineering in 1976 from Stanford University. He joined MIT in 1978 where he holds the Ray and Maria Stata chair in Electrical Engineering. He is well known for seminal contributions to field-effect devices and to silicon process modeling. His present research focuses on the physics and technology of nano-scale devices in Si, Si/SiGe, and III-V materials for CMOS applications. Currently, he is Director of the multi-university Focus Research Center for Materials Structures and Devices centered at MIT. He is Fellow of the IEEE, member of the National Academy of Engineering, and recipient of several professional awards.