**GAA(Gate-All-Around) technology to enable continuous CMOS transistor scaling for energy efficient computing solution**

**Namsung Kim**,

Senior Director, IMS, Applied Materials

Gate-all-around (GAA) technology is a promising solution to enable continuous scaling of complementary metal-oxide-semiconductor (CMOS) devices, as the current workhorse FinFET architecture is reaching its physical limits. In GAA CMOS, the gate electrode completely surrounds the channel, providing better electrostatic control and reduced leakage. This technology offers several advantages such as superior gate control, improved short channel effects, and lower off-state leakage, which are crucial for achieving higher performance, lower power consumption, and increased integration density. The GAA CMOS architecture can be implemented using different materials, such as silicon nanowires or nanosheets, and various fabrication techniques, such as top-down and bottom-up approaches. In this presentation, we describe the scaling challenges from FinFET to GAA and recent progress in GAA CMOS technology, including performance boosters driven by new materials and integrated process module innovation.

**About Namsung Kim:**

Namsung Kim is a Senior Director in the Integrated Module Solutions (IMS) Group at Applied Materials. He is currently responsible for managing customer engagement programs, driving business growth, and leading cross-functional teams (various Business Units) to deliver the integrated materials/modules-base product solutions across leading-edge CMOS Logic and Memory technologies. Prior to this role, he has successfully led & accomplished the definition of CMOS Logic technology roadmap, its inflections of future technology nodes and delivered multiple product development paths by validating innovative pathway solutions. He joined Applied Materials, Inc., USA in 2015, bringing over 20 years of semiconductor device/process integration experiences (various engineering/management positions) from both CMOS Logic (GlobalFoundries/IBM alliance in USA and SSMC in Singapore) and Memory (SK-Hynix, previously LG Semi., in Korea) industries. He earned a MS in electrical and computer engineering from the National University of Singapore. He has authored and co-authored more than 50 technical publications and holds over 40 patents in the field of advanced logic (FinFETs and GAA devices) and memory technologies.