

Session 1: Plenary

Monday, December 9, 9:00 AM

Grand Ballroom B

Welcome and Awards

General Chair: Mariko Takayanagi, Toshiba

Plenary Papers

Technical Program Chair: Suman Datta, University of Notre Dame

1.1 Process and Packaging Innovations for Moore's Law Continuation and Beyond (Invited)

Robert Chau, Senior Fellow, Intel Corporation

This presentation describes various revolutionary process and packaging technologies on the horizon that will (i) extend Moore's Law scaling through and beyond the next decade and (ii) enable many new, exciting integrated circuit opportunities and functions for future products. By using these new and exciting technologies holistically, and coupled with technology and design co-optimization, the future of Moore's Law is brighter than ever.

1.2 Continued Scaling in Semiconductor Manufacturing Enabled by Advances in Lithography (Invited)

Martin van den Brink, President and CTO, ASML

Our efforts to uphold Moore's Law include continued enhancements of system performance and the development of high-numerical-aperture (0.55 NA) EUVL systems. They also include constant innovations in well-established deep-UV lithography systems that have been driving down cost of ownership and have supported the manufacturing of new device architectures e.g. 3D memories. Full potential of lithography – its ultimate capability when used in manufacturing – is realized by making exposure systems, metrology tools, and computational algorithms work together synergistically. It is our belief that continued advances in this holistic lithography will enable cost-effective scaling in semiconductor device manufacturing beyond the next decade.

1.3 Future of Non-Volatile Memory - From Storage to Computing - (Invited), K. Ishimaru

Institute of Memory Technology R&D, Kioxia Corporation

More than thirty years passed since the first NAND flash memory was presented at the IEDM. The NAND flash memory expanded its market and application by reducing the cost per bit (\$/GB) and this advancement will continue in coming decades. Many innovations, such as double/quadruple patterning, multi-bit programming, wear leveling, etc. were introduced to keep the cost trend and improve the performance. Now 5G and AI are changing our society and "memory centric" computing system is required for such high level computing. Non-volatile memory is a key component to enable this paradigm shift. The challenges and opportunities of NAND flash and other emerging memories for next decades will be discussed.