

Metrology and Material Characterization for the Era of 3D Logic and Memory

Roy Koret, Nova Ltd.

Abstract: As technology keeps scaling, devices migrate from 2D into 3D integration. Within this new era, we observe how 3D aspects of geometry and material characterization become even more prominent. Thus, IC manufacturers need to evaluate the current metrology capabilities, and examine new metrology and characterization techniques they need to add to their toolbox. The course intension is to provide the audience with the understanding of the existing metrology platforms, that have matured during the 2D integration era, how they were taken to their extreme performance, and which new methods (alternative) need to be combined into the production line, in order to support the 3D revolution. The short course will cover among other topics, the usage of multiple dimensional and material metrology techniques such as Critical Dimension Scanning Electron Microscope (CDSEM), *Transmission Electron Microscopy (TEM)*, X-ray Photoelectron Spectroscopy(*XPS*), X-ray Fluorescence (XRF), Atomic Force Microscopy(AFM), Optical scatterometry (OCD), and different aspects of hybrid approach and Machine-Learning usage in High Volume Manufacturing. While having these known systems deployed today, we will review new metrology platforms, which are potential to gain high attraction as they shift from Lab to Fab.

Roy Koret is the Strategic Technology Partnership Manager at Nova Ltd, managing the joint development programs of Nova with leading research and development centers, such as IBM, and IMEC. These collaborations focus on in-depth ground-breaking and innovative metrology research for the Logic Compute segment advanced processes, such as Nanosheet / Forksheet, Semi-damascene, Selective Deposition and complementary FET. Roy joined Nova Measuring Instruments in 2007 as a Scatterometry application engineer. His professional background in metrology also includes leading the Nova Logic and Foundry application team collaborating with Nova's accounts worldwide, and working as an application specialist, supporting customers on both the Logic and Memory segments. Roy Koret earned an M.Sc. in physics from the Tel-Aviv university, specializing in super conductivity.