**Atomically thin oxide semiconductor transistors for BEOL logic and memory applications**

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In the past decade, the semiconductor industry is slowly changing from the classical scaling era by geometric miniaturization to the effective scaling era by exploring vertical dimension through monolithic three-dimensional integration and heterogeneous integration techniques. As silicon technology advances to 3 nm node and beyond, back-end-of-line (BEOL) compatible monolithic 3D integration is considered as the top choice in order to keep improving chip performance. However, new materials and device development with a maximum processing temperature of 450 °C is required. In this talk, we will review our recent work on atomically thin In2O3 channel for both logic and memory devices by a BEOL compatible ALD process. High performance oxide semiconductor transistors as logic devices and ferroelectric transistors as memory devices with the same material platform offer the great promise for in-memory computing application and monolithic 3D integration.

Dr. Peide Ye is Richard J. and Mary Jo Schwartz Professor at School of Electrical and Computer Engineering at Purdue University. His research focuses on atomic layer deposition and its integration on various novel channel materials including III-V, Ge, 2D materials and complex oxides. He obtained his Ph.D. from Max-Planck Institute for Solid State Research in Germany and postdoc training at NTT Basic Research Laboratory, National High Magnetic Field Laboratory and Princeton University. He worked for Bell Labs of Lucent Technologies and Agere Systems before joining Purdue faculty in 2005. Prof. Ye received the 2011 IBM Faculty Award, Sigma Xi Award and Arden Bement Jr. Award. He is IEEE Fellow and APS Fellow for his contributions to materials and device development for compound semiconductor MOSFETs. Prof. Ye is also recognized as a Highly Cited Researcher among 6000 world wide in all fields.

