

Abstract – Deji Akinwande

Atomristors: Monolayer Non-volatile Memory Devices and RF/5G Switches

This talk will present our latest research adventures on 2D atomic nanomaterials towards greater scientific understanding and computing applications. In particular, the talk will highlight our work on non-volatile memory (atomristors) that can be employed in various applications including information storage, brain-inspired computing, and zero-power RF switches. Non-volatile memory device based on atomically-thin materials is an application of defects, and is a rapidly advancing field with rich physics that can be attributed to metal ion binding to native defects. The promising 2D materials for 5G and telecommunications include MoS₂ and hBN. In particular, hBN memory devices feature very low switching energy, low on-state resistance and orders of magnitude on/off ratio. Recent progress has demonstrated record cutoff frequencies, 5G communication, and wafer-scale integration.