Nano Seminar Series

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Co-sponsored with ECE Solid State and Nanotechnology Group and IEEE Southeastern Michigan Trident Chapter IV

Nanoscale Devices Based on Two-dimensional Materials and Ferroelectric Materials

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Abstract: Further scaling of complementary metal-oxide-semiconductor (CMOS) dimensions will soon lead to a tremendous rise in power consumption while limited gain in the performance of integrated circuits. "Beyond-CMOS" devices, based on new materials, device concepts and architectures, can potentially overcome these limitations and further improve the performance, reduce energy consumption, and add novel functionalities to the CMOS platform. In this talk, I will present nanoscale electronic and photonic devices based on two-dimensional (2D) materials and ferroelectric materials. In particular, I will discuss the logic devices, RF devices, photodetectors, plasmonic devices, and tunneling devices based on graphene and transition metal dichalcogenides. I will also present our recent results on non-volatile memories and ferroelectric tunneling junctions (FTJs) based on ferroelectric hafnium oxide and 2D ferroelectric indium selenides.

Biography: Wenjuan Zhu is an assistant professor in Department of Electrical and Computer Engineering at University of Illinois at Urbana-Champaign. Her current research interests are nanoscale electronic and optoelectronic devices based on two-dimensional materials (including transition metal dichalcogenides, graphene, and black phosphorus), and ferroelectric materials. She is a recipient of IBM faculty Award (2018), National Science Foundation CAREER Award (2017), Outstanding Technical Achievement Award in IBM (2008), Henry Prentiss Becton Graduate Prize for Exceptional Achievement in Research in Engineering and Applied Science at Yale University (2003).

Prof. Zhu received her PhD degree in the Department of Electrical Engineering at Yale University in 2003. After graduation, she joined IBM as an advisory Engineering/Scientist at Semiconductor Research and Development Center (SRDC) (2003-2008) and later as a Research Staff Member at T. J. Watson Research Center (2008-2014). In 2014, she joined the faculty at the University of Illinois and established a research group focusing on two-dimensional (2D) materials and nanoscale devices. Her research in the past has resulted in more than 100 publications in journals/conferences and more than twenty patents.

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