

**University of Rochester**  
**Department of Electrical and Computer Engineering**  
**Colloquia Series**

**Energy-Efficient Nanoelectronics and Memory Devices**

**Dr. Feng Xiong**

**Wednesday, February 24th**

**12:00PM – 1:00PM**

**CSB 209**

**Abstract:** A central issue of nanoelectronics concerns their fundamental scaling limits, that is, the smallest and most energy-efficient devices that can function reliably. In the first part, I will focus on phase change memory (PCM) devices, which unlike conventional charge-based electronics, are more immune to leakage at nanoscale dimensions. We developed novel approaches to build PCM nanowires with individual carbon nanotube (CNT) electrodes. With diameters ranging from 1-5 nm, CNTs are the smallest electrodes available, allowing us to reduce the programming current and power of PCM devices by more than 100× compared to state-of-the-art. In the second part, I will talk about our recent work on the two-dimensional MoS<sub>2</sub>. We developed an in-situ platform to electrochemically intercalate Li ions into the interlayer spacing of ultrathin MoS<sub>2</sub> nanosheets. This gives us a rare opportunity to controllably and reversibly modify their electrical, optical and thermal properties at the nanoscale, which could enable exciting opportunities in optoelectronics, transparent electrodes, energy harvesting and storage.

**Bio:** Dr. Feng Xiong is currently a Postdoctoral Fellow in the Department of Electrical Engineering (EE) at Stanford University. He received his Ph.D. (2014) and M.S. (2010) in EE from the University of Illinois at Urbana-Champaign (UIUC) and his B. Eng. in EE (2008) from the National University of Singapore (NUS). His research interests are in energy-efficient electronics, novel 1D and 2D materials, next-generation memory devices, nanoscale thermal transport and renewable energy harvesting. He received several awards including the Stanford Nano- and Quantum Science and Engineering Postdoctoral Fellowship, MRS Graduate Student Gold award and TSMC Outstanding Student Research Gold Award. He is a member of IEEE and MRS.

Light Refreshments Provided