

Seminar: **Electronic, Thermal, and Unconventional Applications of 2D Materials**

Presenter: **Eric Pop, Associate Professor, Department of Electrical Engineering, Stanford University**

Location: Microelectronics and Engineering Research Center (MER 160), Room 2.114, 10100 Burnet Road, Austin TX 78758

Time: Friday, May 26, 2017, at 12:00 - 1:00 PM CDT.

Pizza will be provided.

Abstract: Two-dimensional (2D) materials have applications in low-power electronics and energy-conversion systems. These are also rich domains for both fundamental discoveries as well as technological advances. This talk will present recent highlights from our research on graphene, BN, and transition metal dichalcogenides (TMDs). We have studied graphene from basic transport measurements and simulations, to the recent wafer-scale demonstration of analog dot product nanofunctions for neural networks. We are also growing and evaluating the electrical, thermal, and thermoelectric properties of TMDs including MoS₂, MoSe₂, HfSe₂, and WTe₂. Recent results include low-resistance contacts, 10-nm scale transistors, and high-field transport studies including velocity saturation. We have also examined the anisotropic thermal conductivity of these materials, for unconventional applications to thermal switches and thermal routing. If time permits, I will also discuss nanoscale thermoelectric effects in transistors and phase-change memory (PCM), which could enable energy-efficient operation. Our studies reveal fundamental limits and new applications that could be achieved through the co-design and heterogeneous integration of 2D nanomaterials.



Eric Pop (epop@stanford.edu) is an Associate Professor of Electrical Engineering (EE) and Materials Science & Engineering (by courtesy) at Stanford University. He was previously on the faculty of the University of Illinois Urbana-Champaign (2007-13) and worked at Intel (2005-07). His research interests are at the intersection of electronics, nanomaterials, and energy. He received his PhD in EE from Stanford (2005) and three degrees from MIT (MEng and BS in EE, BS in Physics). His honors include the 2010 PECASE from the White House, and Young Investigator Awards from the ONR, NSF CAREER, AFOSR, and DARPA. He is an IEEE Senior member; he served as the General Chair of the Device Research Conference (DRC) and on program committees of the VLSI, IRPS, MRS, IEDM, and APS conferences. In a past life, he was a DJ at KZSU 90.1 from 2001-

04. Additional info about the Pop Lab is available online at poplab.stanford.edu.