**Monday April 24, 2017  
E2 192  
3:45 Pizza & Refreshments  
4-5 PM Seminar**

**Dr. Eric Pop**

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Dept. of Electrical Engineering and Materials Science & Engineering  
  
"Electronic, Thermal, And Unconventional Applications Of 2D Materials"**

***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 discuss “bottom up” thermal management starting at dimensions comparable to the electron and phonon mean free paths (~100 nm), where quasi-ballistic heat flow effects dominate. Our studies reveal fundamental limits and new applications that could be achieved through the co-design and heterogeneous integration of 2D nanomaterials.**