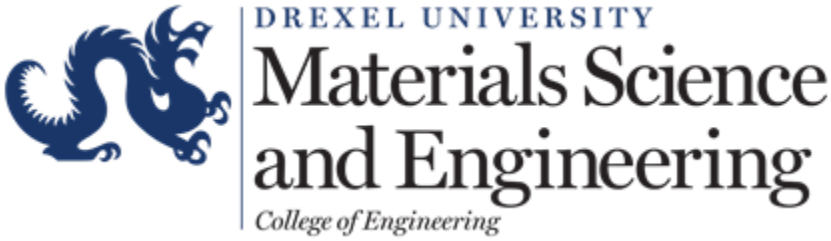


**Department of Materials Science and Engineering**
**PhD Thesis Proposal**

**Monday, June 17th, 2019 at 10 AM**
**Bossone 302**

# On the Electronic Properties of 2D Transition Metal Carbides and Nitrides (MXenes)

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2D transition metal carbides and nitrides (MXenes) are a large family of 2D materials with more than 30 compositions experimentally synthesized and a few dozens more predicted to be stable and studied computationally. They benefit from their high electrical conductivity, wide range of optical properties, hydrophilic surface, and high mechanical strength. Because of those properties, they show promise in a wide a variety of applications from energy storage to photonics. The goal of the proposed research is to understand fundamental electronic properties of MXenes and evaluate the roles of intra- and inter-flake electronic conduction, compositions, and coupling between magnetic and electronic transport properties of MXenes. The roles of the transition metals, the X elements (C and/or N), and surface terminations on the electronic and transport properties of MXenes will be systematically investigated.