



**Western University**  
**Department of Physics and Astronomy**

## **PHYSICS & ASTRONOMY COLLOQUIUM**

**Date:** Thursday, 15<sup>th</sup> December 2016  
**Time:** 1:30 p.m.  
**Location:** Physics & Astronomy Seminar Room 100

### **Dr. Tobin Filleter**

Department of Mechanical & Industrial Engineering  
University of Toronto

### ***“Mechanics of 2D Materials: Tribology, Strength, and Fracture of Graphene and Graphene Oxide”***

#### **ABSTRACT**

Over the last decade two-dimensional (2D) nanostructures have emerged as a new class of advanced material due to their extraordinary materials properties and potential to revolutionize a wide variety of applications. Since the discovery of freestanding graphene just over a decade ago in 2004, it and other 2D materials such as graphene oxide (GO), boron nitride, and molybdenum disulfide have been proposed for use as building blocks in a huge range of applications from high speed electronics, to water filtration, to bulletproof vests. Along with exceptional electrical and thermal characteristics, 2D materials have been shown to exhibit some of nature's greatest mechanical properties. In particular, this has motivated the application of 2D materials as a good candidate for paper-like materials, high tenacity fibers, tough coatings, and reinforcement elements in composites. This talk will explore recent experimental and atomistic simulation studies on the mechanical behavior of 2D materials. A focus will be on coupled experimental-computational studies of graphene and GO based materials across multiple length scales and varying mechanical loading configurations that have provided insight into the size-scale mechanical phenomenon exhibited by these 2D materials. This will include the strength/fracture behaviour of graphene and GO monolayer building blocks and multilayered GO nanosheets, as well as the interfacial shear and friction/wear behaviour of monolayer graphene and GO and multilayers.

***COFFEE + light snacks will be available in the Atrium, 2nd floor, at 1:15 p.m.***