

# MSE SEMINAR

November 3, 2017

113 McBryde Hall

3:30 – 4:30 PM

Refreshments at 3:00 PM

*Keith Hendren*

**Graduate Student**

**Materials Science and Engineering, Virginia Tech**

## **“Polyethylene Catalysis on Cellulose Nanocrystal Supports: Covalent Bonding of Zirconocene Catalyst on a Reinforcing Support”**

### **ABSTRACT**

Cellulose nanocrystals (CNCs) are presently as a nanofiller in polyvinyl alcohol adhesives, and they have the potential to become a reinforcing filler in many common polymers. CNCs have a high aspect ratio, theoretical elastic modulus, and are biorenewable material, and wood CNCs have a low cost source material. In preparation for the projected market cost decrease of CNCs, this project focuses a potential cost effective method of preparing CNC polyethylene composites. Previous works involving polyethylene and cellulose nanocrystals have all involved mixing often with organic solvents. This work takes a step upstream of the production line and instead uses heterogeneous catalysis to add polyethylene to CNCs that have been functionalized with a zirconocene catalyst.

### **BIOSKETCH**

Keith Hendren is a Doctorate student in Dr. Foster's Advanced Materials Group. He graduated from New Mexico State University in 2010 with a bachelor's degree in chemical engineering. As an undergraduate, he interned at Sandia National labs for two summers supporting research related to the Waste Isolation Pilot Plant (WIPP site) and did undergraduate research at the University of Massachusetts at Amherst. Currently he is a Graduate Research Assistant supported by the ICTAS Doctoral Scholars Program. His research interests include polysaccharide modification, nanocomposites, sulfur chemistry, and synthetic polymer processes.