

# MSE SEMINAR

April 7, 2017

113 McBryde Hall

3:30 – 4:30 PM

Refreshments at 3:00 PM

*Chris Rader*

**Graduate Student**

**Materials Science and Engineering, Virginia Tech**

## “Nanostructuring PEEK for Bone Replacement”

### **ABSTRACT**

Hip and knee replacements have become a common solution of patients with cartilage damage or osteoporosis. The procedure often uses materials such as Nickel-Cobalt alloys or High Density Polyethylene to replace the cortical bone. Our research expands on a potential new material for bone replacement, poly(ether ether ketone) or PEEK based composite. The biocompatibility, wear resistance, and mechanical properties make PEEK an ideal material bone replacement. However, traditional processing methods require high heat restricting the structure, shape, and composition. We introduce a unique solvent casting process, which we have been able to change the structure, control shape, and introduce additives to PEEK to optimize its osteointegration. We analyzed our properties through SEM imaging, and compared our findings to PEEK composites processed through injection molding.

### **BIOSKETCH**

Chris Rader is a Masters Student working under Dr. Johan Foster. He received his Bachelors in Materials Science and Engineering in 2016 working on physical aging of polymers for senior design. Chris's research involves biomedical applications of nanostructured poly(ether ether ketone). Chris has had experience performing dynamic mechanical analysis of alginate based hydrogels.