MSE SEMINAR

April 20, 2018
113 McBryde Hall
3:30 – 4:30 PM
Refreshments at 3:00 PM

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"Strain Rate Effects on Ceria-Zirconia Shape Memory Ceramic"

Abstract:

In recent history, shape memory alloys (SMAs) have become an area of interest to the scientific community due to their unique ability to revert to their original shape after undergoing some plastic deformation and subsequent heat treatment. SMAs have shown promising results in applications like actuators for the automotive industry to dental braces for biomedical applications. An up and coming area of study in the field of shape memory materials concerns shape memory ceramics. A shape memory ceramic undergoes a reversible martensitic transformation after an applied stress and then heat treatment, like SMAs. Yet, shape memory ceramics are advantageous compared to SMAs due to their high strength and temperature stability as well as corrosion resistance. This opens opportunities for applications like linear actuators in extreme environments and reusable body armor. Though limitations like brittleness common with ceramics provide challenging aspects to overcome.

This talk will focus on illustrating the effects of varying strain rate on the transformation behavior of Ceria-Zirconia shape memory ceramic through the use of nano-indentation/impact and AFM analysis.

Biosketch:

Daniel Eynisfeld is a Master of Engineering Student in Dr. Hang Yu's research group who graduated from Virginia Tech with a Bachelor of Science in Materials Science and Engineering in 2017. During his undergraduate career, he was an active member the Galileo Living and Learning Community, an officer of the Tau Beta Pi National Engineering Honors Society and conducted biomaterial research under Dr. Abby Whittington's senior design team. He is now working on improving the understanding of shape memory ceramics and is graduating in May 2018.