

# DEPARTMENT OF MECHANICAL ENGINEERING

## WILLIAM MAXWELL REED SEMINAR SERIES

### **“KRUPS: A Hypersonic Re-entry Capsule.”**

**Alexandre Martin, Ph.D.**  
**Professor, University of Kentucky**

#### **Abstract:**

On December 15th, 2021, two KRUPS capsules successfully performed an hypersonic re-entry, returning from the International Space Station, delivering thermal performance data. KRUPS -- short for Kentucky Re-entry Universal Payload System -- has been developed at the University of Kentucky over the past 6 years. It is a small re-entry capsule designed as a technology testbed. For its first incarnation, KRUPS has been designed to test Thermal Protection System (TPS) material and instrumentation. TPS are used to protect spacecraft, and its payload, from the extreme conditions of planetary entry. This talk will present the origin of the KRUPS project, go through validation, and present the results.

#### **Speaker Bio:**

Dr. Alexandre Martin has worked in the field of fluid-solid interactions for the last 15 years. He has contributed to various scientific fields ranging from hypersonic aerothermodynamics, plasma physics, and numerical algorithmic. He is especially interested in ablation, the removal of solid material from a surface by energy exchanges. Over the years of his scientific career, he has developed and supervised computational fluid dynamics and heat transfer codes that were able to model various types of ablation. More specifically, he focuses his work on ablation of the heat-shields of atmosphere re-entry vehicles, mostly as part of a NASA funded projects.

**Date: Friday, February 11, 2022**  
**Place: Whitehall Classroom Building 110**

**Time: 3:00 PM EST**  
**Contact: Dr. Alexandre Martin 257-4462**

Attendance open to all interested persons