



WPI

MATERIALS SCIENCE & ENGINEERING

Materials Science & Engineering Seminar

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Washburn 229



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Atomistic methods applied to aerospace engines

Abstract

Atomic structure and atomistic mechanisms significantly influence the behavior of materials and the engineered system in which materials are employed. However, the theoretical and computational techniques available to our community are often unable to directly predict macroscopic performance owing to the vast disparity between the computationally available and practically relevant time and length scales. In this talk I will describe two practical applications of atomistic methods towards the design of aerospace engines. First, variation in static friction between components is explored as a function of thermal history, demonstrating the value of atomistic methods for correlative design. Second, the interaction of oxygen interstitials with deformation twins in Ti alloys is explored, highlighting the use of atomistics to identify plausible mechanisms and guide efficient experimentation. Together, these examples suggest opportunities for connecting materials and mechanical design across scales.

Bio:

Will Joost is a Principal Materials Engineer at Pratt & Whitney in East Hartford, CT, where he focuses on applying computational materials science and integrated computational materials engineering (ICME) towards advances in jet engines. His primary area of research is multi-scale modeling of mechanical behavior and tribology in crystalline materials. Prior to joining Pratt, Will spent 7 years as the Program Manager for Lightweight Metals in the Vehicle Technologies Office at the U.S. Department of Energy where he oversaw a portfolio of light metals R&D projects. Will also spent time as a postdoctoral research in the Theoretical Division at Los Alamos National Laboratory writing high performance computing code for dislocation dynamics simulations. Will holds a B.S. from RPI, an M.S. from Arizona State University, and a Ph.D. from the University of Maryland, all in Materials Science and Engineering.