The AAE Fall 2018 Colloquium Series Presents

“Modeling Materials Degradation in Nanostructures: An Example of the Intersection of Computational Material Science, Experimental Characterization and Data Analysis”

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Abstract
Nanoscience is highly interdisciplinary; greater insight into (nanostructured) materials-properties relationships requires the development of multi-scale, multi-physics models and comparably advanced experimental design, instruments, and analysis. Such expanding scope of research motivates synergies between the data analytics, experimental and computational communities.

This talk attempts to illustrate the interdisciplinary and collaborative nature of this emerging field of science through several modeling examples on materials degradation in nanostructure. In particular, these include (i) characterizing irradiation induced aging of nanocrystalline materials through the development of “reduced order mesoscale models”; (ii) bridging nanoscale phenomena at interfaces and grain boundaries to meso- and continuum scales for interface-informed design of nanostructured materials; and (iii) directly incorporating experimental characterization methods (Selected Area Electron Diffraction) within atomistic simulations to bridge the gap between the simulation predictions of atomic trajectories and experimentally observable information for quantifying and characterizing radiation damage.

Bio
Dr. Rémi Dingreville is a CINT Scientist and Principal Member of the Technical Staff at Sandia National Laboratories in Albuquerque, NM. He received his Ph.D. in 2007 in Mechanical Engineering from the Georgia Institute of Technology, Atlanta, GA. Remi’s research focuses on microstructure-properties aging relationships on a variety of materials across multiple length scales by employing and combining various methods of theoretical and computational materials science.