UCI Samueli School of Engineering

Department of Materials Science and Engineering UCI

UNIVERSITY OF CALIFORNIA, IRVINE

DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING

IS PROUD TO HOST A SEMINAR BY

"RADIATION RESISTANCE AND MECHANICAL RESPONSE OF CERAMICS IN EXTREME ENVIRONMENTS"

IZABELA SZLUFARSKA

HARVEY D. SPANGLER PROFESSOR & CHAIR
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Thursday, February 12, 2026

2:00 PM - 3:20 PM

McDonnell Douglas Engineering Auditorium

Abstract: Development of energy-efficient and safe technologies for energy production, transportation, and defense poses ever-increasing demands on materials stability in harsh environments. Ceramics are attractive in this regard because of their high-temperature stability, good corrosion and radiation resistance, and excellent mechanical strength. This talk will be focused on fundamental issues related to stability of ceramics and intermetallics in extreme environments. First, I will discuss the role that chemical short-range order and interfaces play in radiation resistance of complex structural ceramics, and I will introduce our new approach for predicting phase stability of compositionally complex materials. Secondly, I will discuss the response of materials to mechanical stresses and high-velocity impact and our recent discovery of new mechanisms of ductility in nominally brittle materials, with a potential for self-healing. These mechanisms open a path for design of materials that are both strong and ductile. The discoveries presented in this seminar have been made using a combination of atomistic simulations, machine learning potentials, and nanoscale experimental characterization.

Bio: Izabela Szlufarska is a Harvey D. Spangler Professor of Engineering at the University of Wisconsin-Madison and the chair of the Materials Science & Engineering Department. Her other leadership roles include chairing the University of Materials Council, service on the MRS Board of Directors, and her appointment as the Editor in Chief for the journal of "Current Opinion in Solid State and Materials Science". In her research Szlufarska develops and employs theoretical and computational tools combined with experimental characterization to design new materials for extreme environments, including corrosion, high temperature, mechanical properties, and radiation. She has published over 170 peer-reviewed papers and her most recent awards include TMS Brimacombe Medalist and H. I. Romnes Faculty Fellowship.