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

"ACCELERATED DISCOVERY OF THE PROCESSING GENOME"

ANDREA M. HODGE

FLUOR PROFESSOR

MORK FAMILY DEPARTMENT OF CHEMICAL ENGINEERING AND MATERIALS SCIENCE
UNIVERSITY OF SOUTHERN CALIFORNIA

Thursday, January 29, 2026

2:00 PM - 3:20 PM

McDonnell Douglas Engineering Auditorium

Abstract: The creation and implementation of novel materials relies on the interconnected processing-microstructure-property-performance lifecycle. Specifically, we focus on building a data-driven testbed for processing-microstructure relationships capable of unraveling the complex synthesis of multi-phase, heterogeneous nanostructured materials (HNMs). To achieve this, we have launched a novel processing platform, Data-driven Recursive AI-powered Generator of Optimized Nanostructured Superalloys (DRAGONS), that will utilize predictive models to infer microstructure features based on provided processing parameters (DRAGONS-Predict) and prescribe processing parameters required to achieve a desired microstructure through inverse design (DRAGONS-Prescribe). Experimentally, nanotwinned (NT) Inconel alloys were synthesized via magnetron sputtering and subjected to an aging treatment that ultimately induced a transformation from a highly NT structure to a heterogeneous nanostructured material with a unique and complex gradient grain topology. In this presentation, the microstructure of distinct domains with variable grain size, precipitate formation, and morphologies will be discussed and connected to accelerated materials discovery using combinatorial and high throughput characterization techniques.

Bio: Andrea Hodge holds the Fluor Professorship of Chemical Engineering and Materials Science and of Aerospace and Mechanical Engineering at the University of Southern California (USC). She received her Ph.D. degree in Materials Science from Northwestern University. Prof. Hodge served as the Vice Provost for undergraduate programs at USC from July 2016 to June 2020. She is currently Co-Director for the USC Materials Consortium and Chair of the Chemical Engineering and Materials Science Department. Her research focus is the synthesis and microstructural design of nanoscale metals and ceramics for extreme environments. Dr. Hodge is the recipient of several prestigious research, mentoring, and teaching awards such as NSF CAREER Award, ONR Young Investigator Program (YIP) Award, and DARPA Young Faculty Award (YFA) as well as the Minerals Metals and Materials Society (TMS) Julia and Johannes Weertman Educator Award (2020). She is a Fellow of the Materials Research Society (MRS), ASM International and the American Association for the Advancement of Science (AAAS).

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