



At the Crossroads of Additive Manufacturing, Analytics and Advanced Materials

OCT **Tresa Pollock**

University of California, Santa Barbara | ALCOA Distinguished Professor of Materials, Associate Dean of Engineering | Hosted by School of Materials Engineering

LECTURE

Thursday, October 24

MRGN 121

2:30-3:30 p.m.

Watch: kaltura.com/tiny/jmtqh

PANEL

Thursday, October 24

MRGN 121

3:45-4:45 p.m.

Watch: kaltura.com/tiny/v92sb

ABSTRACT: Additive manufacturing promises new pathways for integration of advanced alloys with complex structural component design. Achieving desired properties mandates control of structure and an improved understanding of the processes that occur at the individual melt pool scale and their superposition as melting occurs on a layer-by-layer basis. A new technique developed at UCSB, TriBeam tomography, has been employed to acquire chemical, structural and misorientation information on structural alloys printed by electron beam and laser powder based processes. The data challenges with additive manufacturing and the corresponding 3D quantification of structure will be addressed. In large 3D datasets, the persistence of grains layer to layer due to remelting / nucleation has been studied as a function of scan strategy. The benefits of multimodal data for characterization of submicron features will be discussed. Finally, 3D EBSD data indicates that the accumulation of large crystallographic misorientations during printing is directly related to the alloy solidification path. Implications for alloy design and new alloys for printed structures will be discussed.

PANEL: How Do New Materials Change the Things Around You

How do new materials change the Earth, things we make, and businesses we work at. The panel will address societal implications of new materials introduction, and sustainability for material additive change aspect.

MODERATOR: Michael Titus, Assistant Professor of Materials Engineering, Purdue University

PANELISTS:

- **Tresa Pollock**, ALCOA Distinguished Professor of Materials and Associate Dean of Engineering, University of California, Santa Barbara
- **Rob Carter**, The Barnes Group Advisors
- **Mark Gruninger**, Managing Director for Industrial Consortia, School of Materials Engineering, Purdue University
- **John Sutherland**, Professor and Fehsenfeld Family Head of Environmental and Ecological Engineering, Purdue University