

SEMINAR SERIES

High Entropy Materials: New Opportunities and Challenges

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11:00-12:00pm, Brauer Hall, Rm 12

The high entropy concept was launched on two intertwined, foundational ideas – that the stability of solid solutions can be manipulated by adjusting configurational entropy (via the number and concentrations of alloying elements) and that a vast number of new, unexplored materials awaited discovery. These two ideas have inspired a major movement in materials science. Once primarily focused on metallic alloys with single-phase solid solution microstructures, the field now also includes intermetallic compounds, ceramic materials, and microstructures with multiple phases. Alloys are conceived and studied for basic scientific interest as well as for both structural and functional applications. New scientific discoveries have been made on topics that include solid solution strengthening, deformation mechanisms, corrosion behaviour, and structure/properties relationships. Major new technical challenges have emerged as a result of the vast number of new material systems introduced by the high entropy concept. These challenges are motivating new research in high throughput evaluations to rapidly evaluate the huge number of candidate materials and in the use of emerging tools such as machine learning and additive manufacturing. This talk will give a broad perspective of high entropy materials that describes the evolution of thought and brief descriptions of selected, major efforts in this dynamic and growing field.



Dr. Daniel Miracle is the Acting Chief Scientist in the Air Force Office of Scientific Research (AFSOR) of the Air Force Research Laboratory (AFRL). In this role, he is the principal science and technology adviser to the director in matters of formulation, planning, managing and integration of the Air Force's \$500 million basic research investment. Each year, AFOSR selects, sponsors and manages revolutionary basic research around the world and transitions resulting discoveries to other components of the AFRL, to defense industries and to other federal agencies. Dr. Miracle is also a current member of the AFRL Research Advisory Council where he advises on the strategies, policies and workforce development for a staff of over 3,400 scientists and engineers. He builds technical partnerships through interactions with universities, industry and the international scientific community.

Faculty, students, and the general public are invited.

Hosted by: Katharine Flores