



## Spring Seminar Series

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### Rapid Exploration of Multi-Principal Element Alloys via Additive Manufacturing

Tuesday – April 11, 2023 | 10:30am | Grissom 302

#### **ABSTRACT**

Multi-principal element alloys (MPEAs), typically consisting of four or more elements in high concentration, are a class of materials that often possess remarkable structure-properties relationships. However, it is challenging to efficiently explore the multidimensional phase and composition space of these materials with conventional manufacturing routes. This talk presents recent efforts in implementing a high throughput alloy processing methodology to rapidly assess MPEA structure-properties relationships via metal Additive Manufacturing (AM). The methodology is outlined and select case studies are presented to illustrate the efficacy of the approach. High throughput simulations that provide rapid insight into material structure-properties relationships are also presented. Results demonstrate the value proposition of utilizing high throughput experimental processing and computational tools to accelerate materials development for AM. *SNL is managed and operated by NTESS under DOE NNSA contract DE-NA0003525.*

#### **BIO**

Andrew Kustas is a Principal Member of the Technical Staff in the Advanced Metal Processing Department at Sandia National Laboratories and is currently a virtual worker living in Colorado. He also holds an affiliate faculty position in the Metallurgical and Materials Engineering Department and adjunct faculty position in the Mechanical Engineering Department at Colorado School of Mines. Kustas received a B.S. in Mechanical Engineering from Colorado State University in 2012 as a member of the Pi Tau Sigma Honor Society and a Ph.D. in Materials Engineering from Purdue University in 2016 as a Bilslund Dissertation Fellowship Awardee. After graduation, he joined Sandia as a postdoctoral appointee and was promoted to staff in 2018. His research interests are in processing metallurgy and alloy development, with recent emphasis on metal additive manufacturing and deformation processing of high-entropy alloys and soft-magnetic alloys. He is a member of TMS and ASM professional societies, with active participation in various technical symposia and committees. He also served as the Albuquerque ASM Chapter Chair from 2020-2022. Kustas has published over 35 peer-reviewed journal papers and delivered over 10 invited technical talks at conferences and universities.