

# MSE 2024

24 - 26 Sep 2024 (Darmstadt)

dgm.de

Topic S: Structural Materials

## S02: High Entropy Alloys: From basic research to industrial applications

This Symposium will provide a venue for presentations of fundamental, applied and industrial research progress on the experimental discoveries and theoretical modeling of high-entropy alloys (HEAs) and related compositional complex alloys (CCAs).

The HEAs/CCAs concept shows new approaches to alloy design by allowing to engineer the material you actually need and will enable high performance materials through extraordinary material properties and unique property combinations. Depending on alloy systems, such properties include strength, ductility, corrosion and oxidation resistance, fatigue and wear resistance, and functionalities like superconductivity, thermoelectricity and catalysis. These properties will undoubtedly make these new materials of interest for use in various structural and functional applications. Given the novel and exciting nature of HEAs/CCAs, the research area is still seeing a rapid growth.

Topics to be covered in this Symposium include but are not limited to:

- Material fabrication and processing, such as casting, powder metallurgy, additive manufacturing, severe plastic deformation, and thermomechanical treatments
- Advanced characterization, such as synchrotron and neutron scattering, three-dimensional (3D) atom probe tomography and high-resolution TEM
- Mechanical behavior, such as fracture, fatigue, creep, and micro/nano-mechanics
- Functionality, such as magnetic, electric, thermal, catalytic and biomedical behavior
- Corrosion and oxidation behavior
- Wear and tribological behavior
- Hydrogen storage and hydrogen embrittlement
- Coatings and surface treatment
- Combinatorial alloy design and high throughput screening
- Theoretical modeling and simulation using density functional theory, molecular dynamics, Monte Carlo simulations, phase-field and finite-elements method, and CALPHAD modeling
- Machine learning and artificial intelligence applied to the discovery of novel HEAs/CCAs
- Industrial applications

### Symposium Organizer



Prof. Dr. Sheng Guo  
Chalmers University of Technology



Dr. Jörg Kaspar  
Fraunhofer Institute for Material and Beam ...

