

## MM 39: Invited Talk: Yolita Eggeler

Time: Wednesday 15:00–15:30

Location: C 130

**Invited Talk** MM 39.1 Wed 15:00 C 130  
**Exploring Creep-Induced Planar Faults: Segregation Dynamics and Defect Phase Transformations in High Performance Alloys** — •YOLITA EGgeler — KIT - Laboratory for electron microscopy

This study investigates the extent of segregation to creep-induced planar faults in superalloy ERBO1 under 1% and 2% creep strains. Findings show that increasing creep strain leads to a rise in dislocation density, resulting in more planar faults. Notably, segregation levels in 1% and 2% strains are comparable, indicating saturation of the fault with relevant elements and the consistent establishment of a local defect phase equilibrium, irrespective of strain magnitude. Acknowledg-

ing this constancy, the study recognizes a critical time beyond which the hypothesis may no longer hold true, influenced by factors such as diffusion, solute element cloud, and temperature. Utilizing MEMS-based heating chips and efficient energy-dispersive X-ray spectroscopy detectors within the transmission electron microscope (TEM), enable to explore the kinetics of defect phase transformations through local segregation during isothermal exposure on the nanometer scale. With a nano-diffusion-couple (NDC) approach demonstrated at the interfaces of a two-phase model system, the NDC approach is extended to study segregation phenomena at planar defects. Chemical segregation near planar defects indicates an apparent defect phase transformation within the parent phase, influencing the high-temperature properties of the alloy.