

MS10: Multi-scale analysis

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This minisymposium is dedicated to discuss recent advances on fracture and failure of materials using methodologies that specifically consider mechanisms interacting across the scales.

Scale transitions in space and time, involving at least 2 scales, are of interest as well as all issues related with the transfer between scales and computational efficiency.

The prime focus on this topic is computational, but multi-scale approaches incorporating experimental input are also welcome.

Topical points of interest for this minisymposium are:

- Two-scale modeling of microscopically based failure processes in materials
- Multi-scale methods for capturing emergent phenomena related to fracture
- Two-scale simulations of strain localization, crack initiation and propagation
- Computational homogenization based techniques enabling failure process simulations
- Numerical and experimental validation of multi-scale techniques for failure
- Numerical or analytical methods for bridging the gap between scales
- Coarse graining methods focusing on material damage and failure
- ROM, FFT, VME and other numerical procedures aiming at reducing the computational cost associated with multi-scale techniques in material failure.
- Multi-physics and coupled fields at different interacting scales