

RECENT ADVANCES IN COMPUTATIONAL MODELLING OF FRACTURE AND DAMAGE
MECHANICS

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Keywords: Material failure, Fracture, Damage Mechanics.

ABSTRACT

This mini-symposium will focus on recent advances in damage and fracture mechanics both from a theoretical and computational point of view, bringing together emerging and early-career researchers with backgrounds in engineering, physics and mathematics. Addressing the complex challenge of accurately modeling extreme mechanical behaviors — such as damage, damage to fracture transition, crack propagation, and fatigue — in both traditional and innovative materials, the mini-symposium will feature contributions that span a diverse range of methodologies and approaches, including but not limited to:

- Material failure and damage;
- Robust numerical methods for complex structural analyses up to failure;
- Regularized gradient damage models;
- Enhanced damage models;
- Peridynamics and nonlocal approaches for fracture;
- Sharp-interface cohesive models;
- Variational and phase-field formulations for brittle and ductile fracture;
- Enriched finite element methods and virtual element methods for crack simulations;
- Coupling between plasticity and fracture;
- Failure modeling accounting for anisotropic, cyclic loading or dynamical behaviors;
- Contact-induced fracture and surface damage;
- Damage and failure in composite, heterogeneous, and random materials;
- Multi-scale and/or multi-physics damage problems (fracking, hydrogen embrittlement).

By promoting the exchange of novel results, the symposium aims to foster dialogue and collaborations in damage and fracture mechanics research.