

# Atomistic and Mesoscale Aspects of Fracture and Fatigue

**Mini symposium at the 14<sup>th</sup> International Conference on Fracture  
Rhodes, June 18-23 2017**

**Chair:** Prof. Peter Gumbsch, Karlsruhe Institute of Technology & Fraunhofer IWM, Germany  
**Co-chair:** Dr Gianpietro Moras, Fraunhofer IWM, Germany

This symposium is intended as an international forum for the presentation and discussion of the latest scientific developments related to fundamental mechanisms and physics of fracture and fatigue at the atomic and meso-scale. The fracture of materials under static or dynamic (e.g., cyclic) load, often assisted by environmental conditions, has huge technological and economic impacts on our society. In most cases, the macroscopic fracture development is determined by atomic-scale processes such as a sequence of bond breaking events in brittle materials, the nucleation and motion of dislocations in ductile materials, or the interaction of environmental molecules with defects in the case of stress-corrosion cracking. Continuous improvements in the efficiency of atomistic simulation techniques, together with the ever-increasing availability of computational and data-storage resources, have made an accurate description of such atomic-scale processes under mechanical load possible. Similarly, new developments in mesoscale simulation methods enable to study more complex situations, including the formation of plastic zones around cracks. Simultaneously, the range of length- and time-scales accessible to experiments has drastically increased and experimental observations can now be directly compared to or interpreted by the results of atomistic simulations or of mesoscale models informed by these results.

The goal of this symposium is to gather a group of world-leading, theoretical and experimental experts to discuss ways to bring together the disparate multidisciplinary aspects of fracture, which are necessary for the development of an atomistically informed understanding and prediction of fracture and fatigue processes.

The topics treated in the symposium will include (but will not be limited to) atomistic and mesoscale aspects of:

- Fracture initiation
- Brittle fracture and crack - microstructure interactions
- Interfacial fracture
- Interplay between fracture and plasticity
- Environmentally assisted fracture
- Nucleation and propagation of fatigue cracks
- Fracture under tribological load
- Atomistically informed mesoscale and continuum fracture models

**If you would like to participate please submit your abstract through the ICF14 website <http://www.icf.org> by October 31st 2016, assigned to this specific mini-symposium.**

**For informal enquires please contact [gianpietro.moras@iwm.fraunhofer.de](mailto:gianpietro.moras@iwm.fraunhofer.de).**