

COMPUTATIONAL MODELING OF SURFACE AND INTERFACE MECHANISMS

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ABSTRACT

Classical approaches in computational mechanics mostly focus on material modeling, often treating interfaces and surfaces as a-priori known boundary conditions. Many advanced materials, however, are characterized by microstructured interfaces and surfaces that interact with each other via complex mechanisms. Due to the increase of the ratio between surface and volume, interface and surface mechanisms become increasingly important at decreasing length scales. On the other hand, key macroscopical properties such as strength, stiffness, ductility and durability of structures featuring adhesively bonded connections, as well as important macroscopic effects such as friction and wear in mechanical parts undergoing contact, are all heavily affected by the behavior of structural interfaces. Characterization and tailoring of such behavior requires a deep understanding and a sound predictive ability of the interface and surface mechanics. Apart from classical continuum mechanical simulation approaches such as finite element methods, particle-based, multi-scale and multi-physics approaches are necessary to fully understand interface and surface phenomena at several length scales.

All contributions related to computational surface and interface modeling are welcome. Possible topics to be discussed in this minisymposium include:

- adhesion
- biomechanical surfaces and interfaces
- cohesive zone modeling
- contact mechanics
- debonding and delamination
- friction and wear
- high order surface descriptions
- interface constitutive laws

- interface fracture mechanics
- multiphysical modeling of surfaces and interfaces
- multiscale methods for surfaces and interfaces
- surface adsorption and desorption
- surface characterization and manufacturing
- surface energy driven systems
- surface fouling
- surface wetting
- tailored interface and surface properties