

Seminar im Rahmen des GRK 2078

Referee: **M.Sc. Marie-Christine Reuvers**
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Date: Tuesday, February 4, 2020
Time: 14:00 h
Location: Bldg. 10.23, 3rd Floor, Room 308.1 (KM-Seminar Room)

Title: **A thermomechanical interface formulation describing separation in ceramic matrix composites**

Abstract

Ceramic matrix composites (CMCs) as an enhancement of classical technical ceramics overcome limitations such as low fracture toughness and brittle failure under mechanical or thermomechanical loading. Their low weight and high temperature stability makes them attractive for use in various fields, especially aerospace industry, where they improve engine efficiency as substitutions for metal components. Despite their positive attributes current CMCs lack well established material property design databases for a reliable use in critical aerospace structures. Demonstrating the durability and lifespan of this relatively new class of materials is the present task. Therefore, their failure mechanisms emerging from e.g. interface separation or oxidation need to be investigated further, taking into account the extensive range of temperatures the components are subjected to. This talk discusses the successive development of a woven representative volume element (RVE) for arbitrary CMCs combining different damage phenomena. Focussing on the material specific weak interface between fiber and reinforcement a new interface formulation based on [1] is established to describe separation and friction motivated by the idea of classical cohesive zone elements. A continuum mechanical approach[2] accounts for brittle matrix damage.

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References:

- [1] S. Rezaei, D. Jaworek, J. R. Mianroodi, S. Wulfinghoff, S. Reese, *Journal of the Mechanics and Physics of Solids*, 124, 325-349, 2019.
[2] T. Brepols, S. Wulfinghoff, S. Reese, *International Journal of Plasticity*, 97, 64-106, 2017.

Alle Interessenten sind herzlich eingeladen.

Prof. Dr.-Ing. Thomas Böhlke
(Sprecher des GRK 2078)