

SPEAKER



NAME

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BIOGRAPHY

Dr. Jaan-Willem Simon completed his diploma degrees in Civil Engineering and in Physical Engineering Sciences at the TU Berlin in 2005 and 2006, respectively. Thereafter, he moved to RWTH Aachen University where he worked as scientific co-worker and finished his PhD in 2011. Since then, he has been working as lecturer and group leader of the research group Composite Materials and Structures at the Institute of Applied Mechanics at RWTH. There, he finished his habilitation in 2018.

LECTURE

Multiscale Modeling of Paper – How to get from Network to Sheet Level

In many cases, it is very challenging to evaluate experimentally the mechanical behavior of materials with microstructures made of fibrous networks due to the small dimensions of the specimens. Hence, to predict properly mechanical properties, network-scale models are required to obtain homogenized material properties by considering fiber-scale mechanisms.

The current study demonstrates how three-dimensional representative volume elements for fiber networks can be used within the finite element method in order to investigate the influence of micro-scale properties on the macro-scale material response. Both, current trends and open challenges, will be addressed with particular focus on nonlinear material models.