



Topic: **Failure Analysis of Composite Laminates Across the Scales with the Extended Finite Element Method**

Speaker: **Dr. Frans van der Meer**
Delft University of Technology (TU Delft)
The Netherlands

Date: **10 December 2013, Tuesday**

Time: **3.00pm to 4.00pm**

Venue: **EA-06-03** (*map of NUS can be found at <http://map.nus.edu.sg/>*)

Host: **Prof. Tay Tong Earn**

Abstract

In this presentation, several computational models for different aspects of laminate failure are presented. The presented models operate on different scales of observation; what they share is their usage of the extended finite element method (XFEM). The first model employs XFEM for transverse matrix cracks in laminates. This approach allows for many discrete cracks in the solution without having to mesh the cracks. Interaction with models for delamination and fiber failure is natural. The second model has been introduced for efficient large scale analysis of delamination. This model uses level sets to describe the location of the crack front and XFEM to create a weak discontinuity in the deformation across the front. Thirdly, results are presented from micromechanical simulation of delamination. A model that combines XFEM with level sets is employed to simulate cusp formation in mode II delamination.

About the Speaker

Dr. Frans van der Meer is a researcher in the computational mechanics group at Delft University of Technology, The Netherlands. His main research interests lie in the development of robust and efficient methods for analysis of failure of materials and structures, with special attention to fracture of composite laminates. He aims to bring the latest innovations from computational mechanics to the field of virtual testing of composites. Dr. Van der Meer received his PhD in Delft in 2010 for a thesis on computational modeling of failure in composite laminates. This thesis was awarded as the best thesis of the year on solid mechanics by the European Community on Computational Methods in Applied Sciences (ECCOMAS). After spending one year in France with Prof. Nicolas Moës, he went back to the computational mechanics group of Prof. Bert Sluys in Delft. In 2012, he received a personal grant from the Netherlands Organisation for Scientific Research (NWO) for research on the micromechanical modeling of delamination in composites.

Admission is free. All are welcome to attend.