

SEMINAR

APPLIED MATHEMATICS AND MECHANICS

FS1033

2 June 2026

A DCAMM seminar No. 807 will be presented by

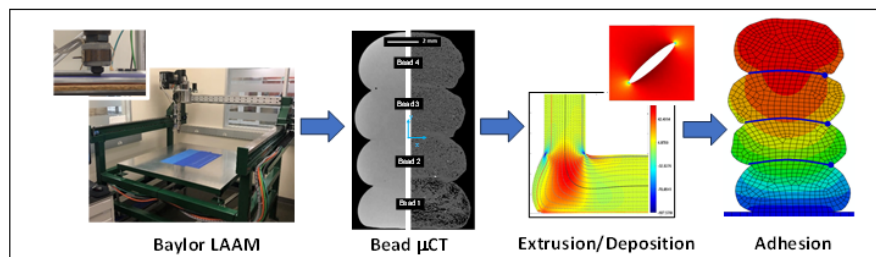
Douglas E. Smith, PhD, PE
ADME Fellow
Professor of Mechanical Engineering
Baylor University, USA

The title of the lecture is

Relating Microstructure and Processing to Adhesion Performance for Large Area Additive Manufacturing Polymer Composite Extrusion/Deposition

Abstract:

Polymer extrusion/deposition is perhaps the most popular additive manufacturing technology as it offers significant design flexibility with extensive material options at a low cost. While the introduction of chopped carbon fibers into the polymer matrix improves thermo-mechanical properties, fiber inclusions appear to be instigators for micro void nucleation in the bead microstructure, leading to inferior part performance. This presentation considers the presence of carbon fiber and its influence on micro void formation (process) during polymer composite extrusion/deposition Large Area Additive Manufacturing (LAAM). Micro CT is used to characterize the microstructure within printed carbon fiber ABS (CF-ABS) beads where correlation between fiber alignment and void formation (property) is explored for the pellet feed stock, freely extruded strand, deposited bead, and roller compacted bead. Next, fiber tip pressure within the extrusion/deposition polymer composite melt flow is evaluated with a custom multiscale finite element modeling procedure which identifies a fundamental mechanism for potential void nucleation during processing. Finally, a finite element study and fracture toughness testing are presented which highlight the dependence of interlayer bead adhesion (performance) on fiber orientation and void content.



DATE: **Tuesday 16 June 2026**
TIME: **14:00 – 14:45**
PLACE: **Building 413, Room 041B**
DTU, Technical University of Denmark

Danish pastry, coffee and tea will be served 15 minutes before the seminar starts.

All interested persons are invited.

Jon Spangenberg/Jan Becker Høgsberg

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