SEMINAR

APPLIED MATHEMATICS AND MECHANICS

A DCAMM seminar No. 775 will be presented by

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The title of the lecture is

Improving the Human Acceptance Rate of Topology-Optimized Designs

Abstract:

Topology optimization has gained traction as a design method for high-performing engineering components and structures. It is a computational approach that generates efficient material layouts, tailored to a user's specific design requirements. To take full advantage of its exploratory power, topology optimization leaves the human user as a passive observer who initiates the design process and assesses the quality of the design upon completion. The resulting engineering designs are typically high-performing and have high levels of geometric complexity. However, ensuring the physical performance is adequately predicted by a fully automated design approach requires the inclusion of all relevant operating conditions, mechanical behaviors, and fabrication constraints. Stipulating that this requirement limits the widespread use of topology optimization as it often requires a significant number of restarts before the user accepts the design solution, this talk will focus on recent contributions that address this barrier by introducing human-guided geometry processing as designs are generated and using ideas from machine learning. The human experience is actively leveraged to interactively alter local geometric feature size requirements or to encourage similarity to drawn sketches. Integrating human-guided geometry processing is shown to improve known and complex performance considerations related to both mechanical behavior and manufacturability of the designs. Additionally, as in machine learning research, the hyper-parameters of topology optimization are optimized using a surrogate modeling approach.

DATE:	**Monday, 17 June 2024**
TIME:	**15:00 – 15:45**
PLACE:	**Building 414, Room 061B**
	DTU, Technical University of Denmark

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

All interested persons are invited.

Jan Becker Høgsberg

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