IOWA STATE UNIVERSITY
Department of Mechanical Engineering

Aligning Interests in Complex System Design: from Aerospace to Emerging Markets

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Abstract
Design often requires balancing competing objectives from a variety of stakeholders. From aerospace systems to product design in emerging markets, a variety of technical and socio-technical factors can affect how design teams manage these trade-offs. This seminar presents research investigating differences between how formal strategies can be used to balance trade-offs and how practitioners currently perform this task. Through the use of interviews, case studies, and field and laboratory experiments, this work seeks to examine how real-world designers approach these problems. The work investigates practitioner strategies and analyzes them to gain a better understanding of how human design teams operate. These insights are then used to inform proposed guidelines for performing design tasks in these contexts. First, observations of practitioners in space system design lead to a new way of modeling interactions between sub-systems. Then, interviews with designers working on products for emerging markets are used to formulate a new methodology, Design for Micro-Enterprise. Results from the analysis suggest that focusing on a micro-entrepreneur's business strategy may be a successful approach to balancing both the end-user and supply chain requirements in these markets.

Biography
Jesse Austin-Breneman is a Post-doctoral Research Associate in the MIT Ideation Lab and the MIT Global Engineering and Research Lab. His research focuses on system-level approaches to difficult engineering design problems, such as large-scale complex system designs and product design for emerging markets. His work uses empirical studies, practitioner interviews and simulations to gain insight into issues facing multi-disciplinary design teams working in these fields. He is particularly interested in how teams manage competing objectives throughout the design process and formal strategies for helping them do so.

This seminar counts towards the ME 600 seminar requirement for Mechanical Engineering graduate students.

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