Collaborative Design Informatics: Helping Communities Create Better Designs through Data

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**ABSTRACT:** The nature of product design is evolving, both inside corporations and in self-organized online communities (e.g., OpenIDEO, VehicleForge). This is thanks to unprecedented amounts of digital design information made possible by globally distributed groups of thousands of people who collaborate together on design projects over the Internet. However, this plethora of information comes with a price: individuals cannot process all of it in a reasonable time frame, limiting their potential.

In this talk I will describe how to apply machine learning techniques to help designers navigate and use this vast quantity of information. Specifically, I will present a story about a particular design community, OpenIDEO, and some of the challenges they face: How do you maintain a sustainable and creative design community without centralized command? How do designers locate the most relevant or creative inspirations out of thousands of ideas? How do novice designers use the community to learn what design methods are appropriate for a given problem? Framing these real-world problems through the lens of Network Analysis, the Maximum Coverage Problem, Link Prediction, and Recommender Systems, I will summarize the empirical performance modern algorithms achieve in practice, describe the major stumbling blocks that need to be overcome, and present algorithms that ameliorate some of those issues. In addition, I will discuss the implications my results have on what role data-driven techniques should play in the creative design of new products.

**BIO:** Mark Fuge is a Ph.D. candidate and in Mechanical Engineering at the University of California at Berkeley, where he is a member of the Berkeley Expert System Technologies Lab and the Berkeley Institute of Design. His research lies at the intersection of Mechanical Engineering, Machine Learning, and Design; an area he refers to as Design Informatics. He holds a B.S. and M.S. in Mechanical Engineering from Carnegie Mellon University. He has conducted research in applied machine learning, optimization, network analysis, 3D sketching interfaces, augmented reality, design metaphors, and creativity support tools. He is supported by an NDSEG Fellowship.