Materials Science & Engineering Seminar Series

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Black Box AI for Science and Engineering

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ABSTRACT:

Artificial intelligence (AI) has accomplished some amazing feats, from self-driving vehicles to winning at Jeopardy. However, many scientists and engineers are skeptical of these methods, and for good reason. Many of the most powerful AI algorithms are “black boxes” – we are not able to determine how they arrive at their results. In this presentation, we will discuss how black box models work and some of the methods for probing their decision-making processes. In addition, for the many cases where a black box is unavoidable, we will outline rules and best practices for using them with knowledge, judgment, and responsibility. My goal is to convince you that black box AI can be a valuable tool for scientific discovery and engineering application – or have you convince me otherwise!

BIOGRAPHY:

Elizabeth A. Holm is a Professor of Materials Science and Engineering at Carnegie Mellon University. Prior to joining CMU in 2012, she spent 20 years as a computational materials scientist at Sandia National Laboratories. Her research areas include the theory and modeling of microstructural evolution, the physical and mechanical response of microstructures, atomic-scale properties of internal interfaces, and the intersection between computer science and materials science. Dr. Holm obtained her B.S.E in Materials Science and Engineering from the University of Michigan, S.M in Ceramics from MIT, and dual Ph.D. in Materials Science and Engineering and Scientific Computing from the University of Michigan. Active in professional societies, Dr. Holm has received several honors and awards, is a Fellow of ASM International and the Minerals, Metals, and Materials Society (TMS), 2013 President of TMS, an organizer of numerous international conferences, and has been a member of the National Materials Advisory Board. Dr. Holm has authored or co-authored over 150 publications.

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