Materials Science & Engineering Seminar Series

Carnegie Mellon University
Materials Science & Engineering

presents

Information and the Materials Paradigm

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ABSTRACT:
In general, Materials Science and Engineering is centered around change: how does matter evolve from one structural configuration to another? We need to know how many topological and geometrical aspects of the structure (and their corresponding energy contents) are needed to explain the spectrum of potential behaviours (the properties). At the same time, we need to know how to build new structures that offer performance advantages in order to better address the materials-related problems surrounding us.

If we follow Donald MacKay's definition that "information is a distinction that makes a difference", then the Materials Science concept of 'structure' illustrates the physical nature of information. In defining structure, we are numerically defining the information state of the system, or at least the state of information needed to provide a mechanistic model. In this sense, the Process-Structure-Property-Performance paradigm (P_{pspp}) provides the framework in which information of different types is stitched, one to another, in order to generate meaning.

This talk will discuss some of the broader questions surrounding the Materials Science and Engineering paradigm. In particular it will focus on how P_{pspp} acts like a type of universal node for materials-related information and I will use my own sub-field of architectured materials to illustrate how we can make sense of information across organizational scales.

BIOGRAPHY:
Glenn Hibbard has been a professor at the University of Toronto since 2004. His research focuses on the development of architectured materials. Before being a professor he worked for two years at a nanotechnology start-up, Integran Technologies Inc. in Toronto, Canada.

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