

Carnegie Mellon

Materials Science and Engineering Seminar Series

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“Blind and Deaf: Having Fun with Periodic Polymers”

Friday, April 20, 2007

11:00 A.M. Seminar in Doherty Hall 1212

Nanotechnology requires control of materials from the atomic to the 100 nanometer to the macroscopic level. Exploiting the size and shape dependence of material properties and accessing multi-functionality holds great promise for the development of materials that will contribute to novel future technologies. Polymers are a class of materials that have a very broad range of properties and moreover, can act as hosts for metallic and dielectric nanoparticles as well as organic molecules, resulting in nanocomposites with combinations of properties not available by other means. *Periodic* structural assemblies are of particular interest, due to their interesting interactions with waves: especially light and mechanical waves. Progress in this exciting area requires excellent control of structure formation. A top-down, bottom-up approach, involving interference lithography and self assembly is demonstrating good success in fabricating the requisite structures and desired properties for photonics and phononics.

Edwin Thomas' research interests include polymer physics and engineering of the mechanical and optical properties of block copolymers, liquid crystalline polymers, and hybrid organic-inorganic nanocomposites. Currently he serves as the Department Head of Materials Science and Engineering and as Founding Director, for the Institute for Soldier Nanotechnologies at MIT. He and others from MIT co-founded OmniGuide Inc., in Cambridge. Before coming to MIT, he founded and served as codirector of the Institute for Interface Science and was head of the Department of Polymer Science and Engineering at the University of Massachusetts. Thomas is the recipient of the 1991 High Polymer Physics Prize of the American Physical Society and the 1985 American Chemical Society Creative Polymer Chemist Award. He was elected a Fellow of the American Physical Society in 1986 and a Fellow of the American Association for the Advancement of Science in 2003. He has written the undergraduate textbook *The Structure of Materials*, has coauthored over 350 papers and holds eleven patents.