

**North Carolina Section of the American Chemical Society
ACS Polymer Discussion Group**



**Thursday April 20, 2006
(THIRD THURSDAY)**

University Club: North Carolina State University

*Social Hour: 5:30 PM

**Dinner: 6:00 PM

Program: 7:00 PM

Direct 3D Visualization and Analysis of Complex Soft Nanostructures

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ABSTRACT

Soft complex nanostructures exist throughout nature, and we are now positioned to design and implement such nanostructures in materials design. Nanostructured polymers in particular are becoming increasingly ubiquitous in diverse (nano)technologies due to their unique potential for tunable multifunctionality. Since the spatial distribution of microphases or nanoscale additives is often of tremendous importance in the design and use of such materials, detailed investigation of their morphological characteristics in 3-D can provide valuable information regarding parameters such as interfacial area, characteristic length scales and connectivity. While some of these parameters may be inferred from other analytical methods, direct visualization provides a wealth of information unavailable from indirect (reciprocal-space) techniques such as scattering. In this work, I shall describe the use of transmission electron microtomography (TEMT), or 3-D TEM imaging, as an emerging analytical tool in the study of nanostructured polymers, such as those containing microphase-separated block copolymers. Quantitation of local and global topology will be shown to provide useful metrics by which to classify and compare complex morphologies, whereas visualization of discrete particles on a surface/interface and nanofibrils/tubes in nanocomposites can serve to augment the current understanding of nanostructured systems. This nonparametric analytical approach is completely general and can be readily applied to nanostructured materials derived from both equilibrium and nonequilibrium (dynamic) systems.

* Social hour will consist of a cash bar.

** Contact Russell Gorga at (919) 515-6553 or regorga@ncsu.edu (email preferred) for dinner reservations by noon on Wednesday, April 19, 2006, to guarantee a reservation for dinner. If you are unable to make a reservation by that time, check with Russell regarding the availability of places. Dinner is \$15 for Members and \$8 for students. Reservations are *not* required to attend the seminar without dinner.