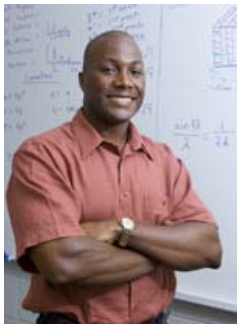
HAJIM SCHOOL OF ENGINEERING & APPLIED SCIENCES
UNIVERSITY of ROCHESTER

Department of Chemical Engineering

Professor Thomas H. Epps, III



Department of Chemical & Biomolecular Engineering
University of Delaware

Generating Functional Materials from Nanostructured Polymers

Wednesday, December 11, 2013
2:15 p.m.
101 Goergen Hall

The nanoscale self-assembly of block copolymers (BCP)s can facilitate materials design for many emerging nanotechnologies. In the Epps group, we utilize an assortment of techniques to understand and control the self-assembly of BCPs, including synthetic or non-synthetic manipulations to inter-block interactions and modifications to the copolymer's external environment (solvents and interfaces). Two areas of recent research in the group involve: *(1)* manipulating inter-block interactions independent of block chemistry and molecular weight, while retaining complex nanoscale structures, and *(2)* controlling thin film morphologies and orientations through substrate surface and solvent vapor (free surface) annealing methods. In the first area, we employ synthetic modifications to the tradition BCP architecture to control the ordering transitions and phase behavior in tapered diblock and triblock copolymers. Thus, we can generate and tune nanoscale networks for applications ranging from analytical separation membranes to ion-conducting materials. In the second area, we use solvent vapor annealing (SVA) and small-molecule chemistry on silicon substrates to manipulate BCP interactions with free and substrate surfaces. As one example of recent efforts, we developed a raster solvent vapor annealing (RSVA) method that provides "stylus-like" SVA writing capability, which enables positional control over nanoscale BCP orientations in thin film geometries.