Sensing the Surface/Tracking the Interface:

Polymer models for adsorption and dynamic melt interfaces

Whether looking for variations in polymerization behavior near a surface in grafting from reactions or using the long, end-tethered polymer chain as a model for a free chain near a surface, we are using polymer brushes to learn more about the fundamental descriptors that can capture interactions between surfaces, macromolecules and solution. I'll describe two examples: the measurement of reactivity ratios for the same monomer pair at the same temperature using conventional and controlled free radical polymerization, and using neutron and x-ray reflectivity data of brushes in solvents and vapors to elucidate chain dynamics in the transition regime between "brush" and "mushroom" behavior. I'll also describe some new work in our group looking at interfaces in melts and semi-crystalline materials. In particular, the kind of behavior near a bulk/melt interface such as those created during the process of fused filament additive manufacturing.