Long Range Order of Block Copolymer/C$_{60}$ Thin Films KATIE CAMPBELL, DAVID BUCKNALL, YONATHAN THIO, Georgia Institute of Technology — The use of block copolymers as a template to localize C$_{60}$ particles was investigated. The addition of C$_{60}$ fullerenes to poly(styrene-b-dimethylsiloxane) thin films leads to disorder in a system that is otherwise ordered in the range of tens of microns. Because C$_{60}$ segregates into the PS phase, the degree of disorder is dependent on the concentration of C$_{60}$ as a weight percent of the PS block, as indicated by AFM studies. Disorder effects are exacerbated by fullerene aggregation in the solution prior to spin coating on a substrate. Several strategies are proposed for achieving and maintaining long-range order in block copolymer/C$_{60}$ thin films. First, the aggregation of C$_{60}$ in solution is controlled by preparing thin films from solutions with C$_{60}$ and block copolymer co-dissolved at a time when aggregation is at a minimum to achieve good dispersion of the C$_{60}$. Secondly, several methods for achieving long-range order have been investigated including the use of solvent annealing in combination with shear and topographic substrates. Results have shown that solvent annealing alone orders poly(styrene-b-butadiene-b-styrene) copolymers without C$_{60}$; however, addition of C$_{60}$ to the system alters the order seen with solvent annealing.