"A Tailored Surface Approach to Anti-fouling, Fouling Resistant Coatings"

Polymer brushes are a common feature in many biological surfaces. The ability to rapidly transform a substrate from a hard, structural material to a soft, hydrogel structure over the course of a few tens of nanometers makes polymer brushes elegant materials for tailoring the biology-materials interface. Polymer brushes, because of their surface confinement, are typically stretched from the surface when compared to identical unattached polymer segments and confinement provides them with useful barrier properties. This presentation will discuss recent studies of surface grown polymer brushes, effects of charge on surface properties and brush viability, the use of charged brushes for interaction with biological systems both in terms of directing cell growth and their use for support of cell membrane mimics.

While "grown from" polymer brushes cannot address large surface area applications, the use of block copolymers in place of "grown from" brushes provides most of the benefits of polymer brushes with the ability to coat large area surfaces. Surfaces used for anti-fouling coatings are an example of brush like, large area application. Numerous studies have shown that amphiphilic brush surfaces (with both polar and non-polar groups) provide a broad range of anti-fouling properties. Here we describe new approaches to surface active block copolymers including the use of sequence controlled functional groups to tune surface properties and surface placement.