

**Picking Materials That Make a Difference:**  
**Soft Solids, Colloidal Gels and Nanofibrous Structures**

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In this presentation, we will present vignettes of various research projects in our group, the focus of which have primarily been on multicomponent soft materials. Examples will be drawn from, various classes of polymeric, colloidal, nanoparticulate and biological systems, to elucidate the relationship between material microstructure/morphology, chemistry, formulation and macroscopic behavior. We hope to illustrate this notion by using examples of (a) surface-modified silica dispersions/gels in which the interaction of surface groups with the dispersing media is controlled to develop gels with predicted moduli, (b) photo-activated polymer hydrogels wherein we examine the gelation of alginate undergoing a two-step ionic crosslinking upon ultraviolet (UV) irradiation using *in situ* dynamic rheology, (c) hydrophobically-modified associative polymers in which the role of hydrophobic interactions will be modulated using surfactants, cyclodextrin and enzymes; and (d) functional electrospun nanofibers templated with nanoparticles or encapsulated with enzymes for use in sensors, batteries and regenerative medicine.