

**Research Seminar Series**

**University of Nebraska-Lincoln**

**Department of Chemical and Biomolecular Engineering**

Elastomeric Surfaces for the Rational Synthesis, Assembly, and Fabrication of Functional Materials

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**Friday, February 3rd**

3:30 p.m. – 4:30 p.m.

Othmer Hall, Room 106

*\*Refreshments provided*

**Abstract**

We are investigating new synthetic strategies for the fabrication of functional (electronic, optical, magnetic, etc.), hybrid structures comprised of soft materials (e.g., polymers) and hard materials (e.g., inorganic crystals). Central to these efforts are materials with heterogeneous chemical, structural, and physical properties that can be reversibly “reconfigured” using simple, macro-scale processes such as mechanical deformation. Specifically, we focus on systems fabricated from elastomeric polymers, such as silicone, which provide a diversity of chemical and mechanical properties. Our efforts are divided between two areas: (i) Mechanically tunable surface-chemical patterns, and (ii) Soft, stretchable microfluidic systems. In this talk I will highlight our recent findings in the area of mechanically tunable surfaces, which include the synthesis/assembly of solids (e.g., optically active semiconductor films and catalytically active microparticles) and the manipulation of liquids (e.g., picoliter-volume droplets of aqueous solutions and prepolymer droplets). The unique properties (chemical, physical, and structural) of these surfaces and the unique capabilities they provide will enable new methods of nano/micromaterial synthesis, manipulation, and organization, and provide new techniques for the fabrication of hierarchical hybrid structures applicable to, for example, soft sensors, optics, and electronics, energy conversion devices, and chemical assays. Furthermore, the ability of the strategies described to operate simultaneously on large numbers of micro-/nanoscale functional components using macroscale processing (e.g., tensile deformations) presents advantages in the scalable manufacturing of functional materials.