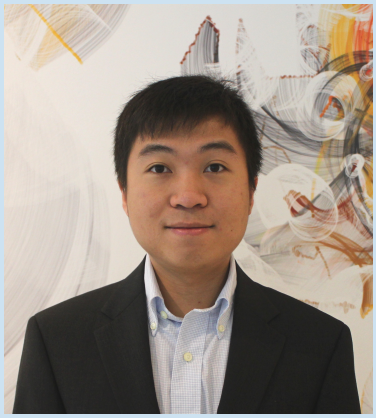
PennState College of Engineering | CHEMICAL ENGINEERING

Faculty Candidate Seminar

Shengchang Tang

Graduate Student
Department of Chemical Engineering

Massachusetts Institute of Technology



Tuesday,
February 23, 2016

11:30 - 12:30 p.m.
102 Chemistry

Dynamics and Mechanics of Associating Polymer Networks

Abstract

Associating polymers offer important technological solutions to self-healing materials, conductive electrolytes for energy storage, as well as devices for cell and protein deliveries. The interplay between polymer topologies and association chemistries leads to new physics in associating networks, yet poses significant challenges for studying these systems over a wide range of time and length scales. In this talk, I will present new discoveries related to diffusion mechanisms of several types of associating polymers using a combination of experiment and theory. The fundamental insights gained from these studies illustrate how dynamics translates from associating functional groups to molecules up to the entire network. I will also present a new strategy of modulating the network mechanics specifically on long time scales. By tuning the diffusion dynamics of macromolecules, I will demonstrate the ability to produce redox responsive hydrogels that are soft but tough and highly extensible.

Biography

Shengchang Tang is currently a graduate student in the Chemical Engineering Department at MIT. He received his master's degree in Chemical Engineering Practice from MIT and his bachelor's degree in Polymer Materials and Engineering from Tsinghua University. His Ph.D. thesis work with Professor Bradley Olsen has been focused on dynamics and mechanics of associating polymer networks. In addition, he has developed efficient methods of synthesizing mucin-mimetic brush polymers for selective multivalent antiviral agents. Shengchang's research has been recognized with several awards, including Excellence in Graduate Polymer Research from the American Chemical Society and from the American Institute of Chemical Engineers. He was recently selected as a Padden award finalist from the American Physical Society.