Daniel Liu, Ph.D. - Biography:

Dr. Daniel Liu is currently a Postdoctoral Research Fellow in the NSF-PREM Center on Interfaces in Materials at Texas State University. Prior to joining Texas State, Dr. Liu was a Senior Scientiest in the Polymer Science & Materials Chemistry Practice at Exponent, Inc., a scientifc and engineering consulting firm. His expertise includes polymer nanocomposites, polymer toughening and strengthening, fracture mechanism and failure analysis, and structure-property relationship. Dr. Liu earned his Ph.D. in Materials Science and Engineering from Texas A&M University. He is currently a senior member of Socierty of Plastics Engineers (SPE) and serves as a Board Member at SPE Engineering Properties and Structure Division. He has authored 2 book chapters and more than 40 peer-reviewed journal papers or conference technical papers.

Title 1: Technical Consulting – Another Career Choice for Materials PhDs

Abstract:
Dr. Daniel Liu will discuss what a technical consulting job is like based on his four-year experience as a senior scientiest at Exponent, Inc., a leading scientific and engineering consulting firm. Exponent specializes in failure analysis, accident investigation and technical consulting for most challenging problems in a broad array of disciplines, including Materials Science and Mechanical Engineering, Thermal Sciences, Vehicle Engineering, Defense Technology Development, and Biomechanics. Consultants are expected to quickly understand a client's technical issues, determine root causes and provide technical guidance. This talk will present actual case studies and describe the role of a consulting scientiest or engineer.

Title 2: Toughening of Epoxy Based on Self-Assembly of Nano-Sized Amphiphilic Block Copolymer Micelles

Abstract:
An amphiphilic block copolymer (BCP) toughener was incorporated in epoxy and self-assembled into well-dispersed 15 nm spherical micelles. The nano-sized BCP at 5 wt% loading can significantly improve the fracture toughness of epoxy without reduction in modulus or glass transition temperature (T_g). The toughening mechanisms were investigated and it was found that the nano-particles could effectively cavitate to induce matrix shear banding, which mainly accounted for the observed remarkable toughening effect. A discussion of the possible reasons responsible for the attractive mechanical property improvements due to the BCP modification is given. Implications of the present finding for designing high performance toughened polymers are also discussed.