

### **Technical Abstract:**

#### **Bridging Science and Product Through Understanding of (Nano)composite Structure-Property Relationships**

Polymer composites, especially as those derived from fillers, continue to be a subject of intense research and development in both academia and industry. A common goal in this field is to achieve very efficient property enhancements through chemical and/or mechanical manipulation of the dispersed filler phase. Unfortunately, many approaches, including those involving nanofillers, still lead to undesirable sacrifices properties such as strength, toughness, adhesion, and/or viscosity. Recent developments at LORD Corporation have shown that property tradeoffs can be greatly minimized by developing a thorough understanding of the relationships between chemical structure, physical structure, and composite properties. This presentation will highlight some examples of how such structure-property knowledge was used to create novel materials needed for commercial applications such as elastomeric bearings, thermal interface materials, and lightning strike protection coatings for composites.

### **Commercialization Forum Abstract:**

#### **The Definition of Success from an Industrial Perspective**

Merriam-Webster defines success as “the attainment of wealth, favor, or eminence.” Although this definition is accurate from a universal standpoint, its microscopic application across different careers within the same field of study can be misleading. For example, achieving eminence as a MSE Professor may be deemed “successful” from an academic standpoint; however, the same achievement by an industrial Materials Engineer may be viewed quite the opposite, especially if his or her eminence produces little wealth for the company. As part of the Commercialization Forum, this talk will discuss some of the essential elements needed to fulfill the definition of success for an industrial Materials Researcher. The talk will also integrate some of the formal and informal steps often taken at LORD Corporation to better ensure that good ideas in the lab translate in substantial, monetary growth for the company.

### **Tim Fornes' Bio:**

Dr. Tim Fornes is a Staff Research Engineer within the Chemical Research Department of LORD Corporation. Dr. Fornes's research involves the design, creation, characterization and modeling of novel polymer-based composites that have commercial relevance in the electronics, aerospace, and automotive industries. His specific areas of interest include thermosetting adhesives, additives, thermally and electrically conductive polymers, block copolymers, high resolution microscopy, and mechanical modeling. Dr. Fornes is the author or co-author on 18 peer-reviewed technical publications and is a co-inventor on 6 patents (2 published, 4 pending). His publications in the area of polymer-clay nanocomposites have been heavily cited. Notably, he was the 3<sup>rd</sup> most cited author in the journal *Polymer* during 2000-2008. During his tenure at LORD, Dr. Fornes was one of a select group of engineers selected by the National Academy of Sciences to participate in the 2010 Indo-American Frontiers of Engineering Symposium. More recently, Dr. Fornes's principal work on self-assembling, conductive polymers was instrumental in helping his company receive Aviation Week's 2012 Innovation Challenge Award in the area of Advanced Materials. Prior to his arrival at LORD, Tim held a post-doctoral position at MIT's Institute for Soldier Nanotechnologies. He has a BS degree in Chemical Engineering from NC State University and MS and Ph.D. degrees in Chemical Engineering from the University of Texas at Austin.