



# Preface

## Special Issue on Time Dependent Behavior in Polymeric Composites and Their Matrices

Time dependent behaviors of polymers and polymer matrix composites are important considerations in designing a growing variety of products, for applications under working conditions which may be either harsh or routine. Significant research has been conducted in the past in this field. This special issue of the Journal of Engineering Materials and Technology reflects a selection of innovative current efforts, containing papers delivered at the Symposium on Time-Dependent Behaviors of Polymers and PMCs (Polymer Matrix Composites), held in Orlando, Florida as part of the 2005 ASME International Mechanical Engineering Congress and Exposition.

A total of 28 talks were delivered in five sessions, which spanned many aspects of the time-dependent behaviors of these materials. In addition to behaviors related to traditional structural applications, the mechanical behaviors of soft biomaterials and fluid-structure-chemical-ionic transport interactive effects, as well as self-healing, are represented. Strictly speaking, the term "time-dependent" is meant to indicate behaviors in which time is explicitly required as a variable; that is, behaviors that are inelastic and rate-dependent and/or involve transport processes with fields varying significantly over the time domain of the problem of interest. That said, other materials behaviors displaying some, but not all, of these characteristics are also of interest due to their

close relationships to the described behaviors. Examples are time-independent plasticity and damage, and nonlinear elasticity, where the time variable can be replaced by a deformation or loading variable without consequence. A limited number of the included papers meet these latter criteria.

It has been the privilege of the guest editors to organize this special issue, and we thank all the participants and reviewers for their contributions and the Journal of Engineering Materials and Technology for the opportunity to publish it.

**Richard B. Hall**

Special Issue Guest Editor  
Air Force Research Laboratory,  
Materials and Manufacturing Directorate,  
Wright Patterson Air Force Base

**H. Jerry Qi**

Special Issue Guest Editor  
Department of Mechanical Engineering,  
University of Colorado