



# Foreword

## Special Issue on Durability and Damage Tolerance of Heterogeneous Materials and Structures

This special issue of the ASME Journal of Engineering Materials and Technology contains a selective set of papers that were presented at the symposium on Durability and Damage Tolerance of Heterogeneous Materials and Structures held at the International Mechanical Engineering Congress and Exposition in New Orleans, LA on November 17–22, 2002. This symposium was jointly sponsored by the Materials, the Applied Mechanics, and the Transportation Divisions of the American Society of Mechanical Engineers (ASME). The guest editors would kindly like to acknowledge the authors and the reviewers for their generous contribution of time and research material. Furthermore, the support and dedication of the Technical Editor, Professor Huseyin Sehitoglu, are also greatly appreciated.

Heterogeneous materials have constituted a revolution in material applications in recent years. In order to design, predict life, and conduct repair, it is essential to understand the damage characteristics and failure mechanisms in these advanced systems and structures. The studies presented herein, address the current engineering and scientific advances made in the aforementioned issues in regards to heterogeneous material systems. The selected topics include experimental characterization, modeling of fracture toughness and of damage tolerance, and development of experimental and of processes techniques. The research topics of this issue address heterogeneous material systems at the macro and nano-scales, as well as, analytical, numerical and experimental problems. More specifically, the areas studied here are the laser surface modification of powder metallurgy materials, effect of laser pre-treatment on machining performance of Aluminum/SiC MMC, frictional impact of a spatial beam, optimization of continuous indentation technique parameters, effect of graded strength on damage propagation, control damage in composite laminates by ply-stacking designs, strain rate characterization of graphite/epoxy composites at room and elevated temperatures, evaluation method for fatigue strength of FRP/metal adhesive joints, spatially averaged local strains in textile composites via the binary model formulation, assessment of the fracture behavior of asymmetrically loaded cantilever composite structure, and nanoindentation measurements on low- $k$  porous silica thin films on silicon substrate.

The goal for this issue is to present the latest advances in the analytical, numerical, and experimental approaches for the aforementioned materials, thereby promoting collaboration and technology transfer among academic and industrial researchers. The editorial team is committed towards this end. Finally, we immensely enjoyed interacting with our authors, reviewers, and editor while preparing this issue. We hope that you will enjoy it as much!

Welcome,

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