

This special issue of the journal is the result of the efforts of the participants of the 1998 IMECE-ASME Symposium on Durability and Damage Tolerance of Heterogeneous Materials. We first wish to thank the authors and the reviewers for their hard work and commitment. We also sincerely thank the editor, Professor David L. McDowell, for his help and dedication in producing this special issue.

The papers contained herein describe a number of advances in numerical, analytical and experimental methods in assessing damage and durability. Each paper addresses failure mechanisms for a particular set of material microstructure, properties and function. The heterogeneous systems studied include laminated plates, particulate reinforced and porous materials, including honeycombs and battery materials, and functionally graded materials. As such, the papers represent a cross-section of the growing work in damage and durability modeling. It is our hope that this special issue will serve as a survey of the continuing advances in modeling and experimentation in damage and durability, and also provoke discussion among workers and continuing examination and comparison of approaches in disparate materials systems.

Research advancements will be required in the coming decades in intensively cross-disciplinary applications. As process advancements allow materials design at ever-smaller scales, consideration of the role of heterogeneities in materials will become ever more imperative. We hope that these contributions will pave the way for greater consideration of microscale and mesoscale mechanics and for the careful experimentation required to validate failure hypotheses.

We hope you enjoy the issue.

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