Preface

Challenges in Mechanics of Time-Dependent Materials, Fracture, Fatigue, Failure and Damage Evolution, represents one of six volumes of technical papers presented at the 2019 SEM Annual Conference and Exposition on Experimental and Applied Mechanics organized by the Society for Experimental Mechanics and held in Reno, NV, June 3–6, 2019. The complete proceedings also include volumes on *Dynamic Behavior of Materials; Advancement of Optical Methods & Digital Image Correlation in Experimental Mechanics; Mechanics of Biological Systems and Materials & Micro- and Nanomechanics; Mechanics of Composite, Hybrid and Multifunctional Materials; and Residual Stress, Thermomechanics & Infrared Imaging and Inverse Problems.*

Each collection presents early findings from experimental and computational investigations on an important area within Experimental Mechanics, the Mechanics of Time-Dependent Materials, Fracture, Fatigue, Failure and Damage Evolution being some of these areas.

The Time-Dependent Materials track was organized to address time (or rate)-dependent constitutive and fracture/failure behavior of a broad range of materials systems, including prominent research in progress in both experimental and applied mechanics. Papers concentrating on both modeling and experimental aspects of Time-Dependent Materials are included.

Fatigue and fracture tracks are two of the most critical considerations in engineering design. Understanding and characterizing fatigue and fracture has remained as one of the primary focus areas of experimental mechanics for several decades. Advances in experimental techniques, such as digital image correlation, acoustic emissions, and electron microscopy, have allowed for deeper study of phenomena related to fatigue and fracture. This volume contains the results of investigations of several aspects of fatigue and fracture such as microstructural effects, the behavior of interfaces, the behavior of different and/or complex materials such as composites, and environmental and loading effects. The collection of experimental mechanics research included here represents another step toward solving the long-term challenges associated with fatigue and fracture.

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