Contents

Contributors	vii
Preface	ix
Robust Reliability of Structures	
Yakov Ben-Haim	
I. Introduction II. Convexity and Uncertainty III. Truss with Uncertain Static Load IV. Geometric Imperfections: Axially Loaded Shell V. Dynamic System: Lifting Devices VI. Modal Reliability VII. Fatigue Failure and Reliability with Uncertain Loading VIII. Reliability of Mathematical Models IX. Summary References	1 4 6 10 15 21 25 34 39
Compresssive Failure of Fiber Composites N. A. Fleck	
 I. Introduction II. Competing Failure Mechanisms in Composites III. Compressive Strength of Unidirectional Composites Due to Microbuckling IV. Propagation of a Microbuckle in a Unidirectional Composite V. The Notched Strength of Multi-axial Composites VI. Directions for Future Research Acknowledgments References 	43 44 62 94 103 109 113
Delamination of Compressed Thin Films Gustavo Gioia and Michael Ortiz	
I. IntroductionII. Experimental BackgroundIII. Folding Patterns as Energy MinimizersIV. Film Morphologies	120 122 132 163

vi	Contents

V. Conclusion	
Acknowledgments References	
Motions of Microscopic Surfaces in Materials	
Z. Suo	
I. Introduction	
II. Interface Migration: Formulation	
III. Interface Migration Driven by Surface Tension and Phase Difference	
IV. Interface Migration in the Presence of Stress and Electric Fields	
V. Diffusion on: Interface Formulation	
VI. Shape Change Due to Surface Diffusion under Surface Tension	
VII. Diffusion on an Interface between Two Materials	
VIII. Surface Diffusion Driven by Surface- and Elastic-Energy Variation IX. Electromigration on Surfaces	
Acknowledgments	
References	
Strain Gradient Plasticity N. A. Fleck and J. W. Hutchinson	
N. A. Fieck and J. W. Huichinson	
I. Introduction	
II. Survey of Strain Gradient Plasticity: Formulations and Phenomena	
III. The Framework for Strain Gradient Theory	
IV. Flow Theory	
V. Single-Crystal Plasticity Theory	
Appendix: J_2 Deformation Theory and Associated Minimum Principles Acknowledgments	
References	
References	
AUTHOR INDEX	
SUBJECT INDEX	
Subject Index	