Preface

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Dynamic fracture and fragmentation problems are important in a number of applications that include fracturing of oil beds, pulverizing rocks, fragmentation of warheads, earthquake dynamics, debris produced by impact, failure of brittle materials due to impact or blast, ultrasonic breakup of kidney stones, the shear rupture of interfaces and geological faults and, on a lighter side, the breaking of dry spaghetti, etc. There has been a spurt of research activity in these areas in the past few decades, stimulated by advances in experimental and computational tools. The current state-of-the-art in these areas was captured at *IUTAM Symposium on Dynamic Fracture and Fragmentation*, held at the Campus of the University of Texas, Austin, TX, during March 8–12, 2009. This symposium brought together leading researchers interested in the fundamental aspects of fracture and fragmentation to a common forum for exchange of ideas. Progress in various aspects of physical investigations, theoretical modeling and numerical simulations was highlighted. In the area

of dynamic fracture, experiments, models and simulations were discussed that spanned the range from atomistic, to the technological scale to the tectonic scale, dealing with earthquakes. Many of the discussions in this area focused on the effect of the nonlinear processes in the vicinity of the crack, the need for better elucidation and modeling of the material properties at the appropriate scale in this region, and on the need for developments of robust simulation methodologies. Fragmentation problems were also addressed at multiple length scales, from microscale particle breakup upon impact to scaling related to breakdown of comets; discussions of various aspects of spall fracture in high-strain rate impact were presented. Another major topic covered was the application of the methods of fracture analysis to problems involving earthquakes. The collection of papers included in this volume represents current progress in experimentation, modeling and simulation in dynamic fracture and fragmentation.

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