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Preface

Instability plays a crucial role in the design of solids and structures as it often limits their performance from their manufacturing stage to their installation and operation. During the last decade, this classical subject has received a new impetus from investigations at the material level. As is the case in the more classical problems, such instabilities are governed by nonlinear interaction of geometry and material properties which can be related to the microstructure of the material. The International Union of Theoretical and Applied Mechanics (IUTAM), recognizing the vitality of this field of solid mechanics, sponsored a special one week symposium held at the University of Texas at Austin from May 7 to 11, 2001 which dealt with the general subject of *Material Instabilities and the Effect of Microstructure*. The symposium brought together an international group of experts selected by the scientific committee for their contributions to the subject of instability as it affects a wide variety of material systems including metals, polymers, soils/granular materials, concrete, composites, active materials, cellular materials, etc. Theoretical, experimental and numerical aspects of how microstructure affects material instabilities were addressed. The varied background of the participants generated a fertile atmosphere for technical exchange on the latest advances in the field.

This volume includes 32 articles which have arisen from the presentations made at the symposium. The articles were peer reviewed in accordance with the editorial policies of the International Journal of Solids and Structures. The articles are presented in no particular grouping of topics in order to illustrate the interrelation between the diverse subjects covered as was done with the oral presentations of the symposium.

Acknowledgements

The success of the symposium as well as of this volume obviously depended strongly on the participants to whom we express our gratitude. The assistance of the scientific committee in selecting the participants is acknowledged with thanks. We also thank Linda Hallidy and Jan Shrode for their assistance in the organization of the symposium and in the production of this volume. In addition, we wish to acknowledge and thank the following organizations for sponsoring and financially supporting the symposium:

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- General Motors Corporation, Enterprise Systems Laboratories.
- International Union of Theoretical and Applied Mechanics, Prof. Keith Moffatt, President.
- National Science Foundation, Mechanics and Materials, Dr. K.P. Chong, Program Director.
- Office of Naval Research, Ship Structures and Systems Division, Dr. Y.D.S. Rajapakse, Program Officer.

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- The Research Center for Mechanics of Solids, Structures and Materials, The University of Texas at Austin.
- The Texas Materials Institute, The University of Texas at Austin.

Dedication

The symposium and its proceedings volume are dedicated to the memory of Dr. Owen Richmond, a member of the scientific committee, who passed away on April 17, 2001, just short of the symposium.

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