

# Multiscale Modeling Scheme

## PREFACE

This special issue of the International Journal of Computational Multiscale Computational Engineering contains papers focused on “Multiscale Modeling Scheme” from the International Conference on Heterogeneous Materials Mechanics (ICHMM) held at ChongQing University, P.R. China, June 21-26, 2004. This is the first international conference to concentrate exclusively on core issues of heterogeneous material mechanics. The objective of the ICHMM is to bring forth the science in interdisciplinary fields of materials science and solid mechanics in an integrated fashion and to emphasize a more in-depth understanding of the fundamentals at the interface of these disciplines.

The collection of 7 papers in this special issue is chosen from 220 paper abstracts submitted to the ICHMM. These selected papers concentrate on research in a broad range of multiscale modeling schemes including theoretical formulation of quantitative transition from atomistic calculations to fundamental variables of continuum under thermomechanical loading, multiscale modeling of polymer composite properties by taking into considerations of atomic-molecular formations, computational characterization of micro- to macroscopic deformation behavior of amorphous, crystalline and semicrystalline high density polyethylene blocks under uniform tension and compression, size effects on constitutive laws of layer-structured materials via damage and multiscale analysis, a multiscale analysis and numerical modeling of the Portvin-Le Chatelier effect, an atomistic Solid-On-Solid kinetic Monte Carlo model for surface diffusion, and modeling of mechanical behavior of geomaterials on the mesoscale.

The interest in multiscale materials modeling expressed at ICHMM shows the existing needs for developing new generation of multiscale modeling schemes. Research in this field necessarily drives new conceptual development and new discoveries in mechanics, physics, mechanical engineering, materials science, and computer sciences. This special issue was compiled with the hope that deep and interdisciplinary research activities can be shown to explore cutting-edge developments in this exciting research field.

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