Multiscale Simulations and Mechanics of Biological Materials
Shaofan Li (Editor), Dong Qian (Editor)

DESCRIPTION

Multiscale Simulations and Mechanics of Biological Materials

A compilation of recent developments in multiscale simulation and computational biomaterials written by leading specialists in the field

Presenting the latest developments in multiscale mechanics and multiscale simulations, and offering a unique viewpoint on multiscale modelling of biological materials, this book outlines the latest developments in computational biological materials from atomistic and molecular scale simulation on DNA, proteins, and nano-particles, to mesoscale soft matter modelling of cells, and to macroscale soft tissue and blood vessel, and bone simulations. Traditionally, computational biomaterials researchers come from biological chemistry and biomedical engineering, so this is probably the first edited book to present work from these talented computational mechanics researchers.

The book has been written to honor Professor Wing Liu of Northwestern University, USA, who has made pioneering contributions in multiscale simulation and computational biomaterial in specific simulation of drag delivery at atomistic and molecular scale and computational cardiovascular fluid mechanics via immersed finite element method.

Key features:
Offers a unique interdisciplinary approach to multiscale biomaterial modelling aimed at both accessible introductory and advanced levels

• Presents a breadth of computational approaches for modelling biological materials across multiple length scales (molecular to whole-tissue scale), including solid and fluid based approaches

• A companion website for supplementary materials plus links to contributors’ websites (www.wiley.com/go/li/multiscale)

ABOUT THE AUTHOR

Shaofan Li is Professor of Applied and Computational Mechanics in the Department of Civil and Environmental Engineering at University of California, Berkeley, USA. He gained his PhD in Mechanical Engineering from Northwestern University, Illinois, in 1997, having previously earned his MSc in Aerospace Engineering. His current research interests include Meshfree Simulations of Adiabatic Shear Band and Spall Fracture, Simulations of Stem Cell Differentiations, and Multiscale Non-equilibrium Equilibrium Molecular Dynamics. Dr Li is the author of numerous articles and conference proceedings.

Dong Qian is Associate Professor of Mechanical Engineering and Director of Graduate Study for the Mechanical Engineering Program at the University of Cincinnati, USA. He obtained his BS degree in Bridge Engineering in 1994 from Tongji University in China. He came to US in 1996 and obtained M.S. degree in civil engineering at the University of Missouri-Columbia in 1998. Dr. Qian is a member of the US association for computational mechanics and ASME. He has published over 40 journal papers and book chapters. His research interests include nano-scale modeling, simulation and applications, meshfree methods, and development of multi-scale methods in solid mechanics.

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