

# Special Issue on Meshfree and Particle Methods

## Preface

Thanks for the characteristics of discretization flexibility and customized approximation, meshfree and particle methods have undergone extensive developments and led to widespread applications in interdisciplinary sciences and engineering over the past two decades. While significant research efforts have been spent on various aspects of meshfree and particle methods, tasks such as development of robust and efficient formulations, applications in multiscale and multiphysics problems, numerical treatments in various constrained and coupled systems, large-scale computation and finding new application areas are considered to be critical for the continuous success of this class of methods. The objective of this special issue is to present the state-of-the-art and prospective directions in the research and application fields on meshfree and particle methods.

This special issue of *Interaction and Multiscale Mechanics* contains 10 peer-reviewed papers. Wu and Hu introduce a multi-scale finite element formulation with global residual-free meshfree enrichments for the analysis acoustic waves. Wang et al. present an efficient stabilized conforming nodal integration meshfree formulation for consolidation analysis of saturated porous media. A molecular dynamics simulation is performed by Shen to study al solute-dislocation interactions in Mg alloys. Guo *et al.* propose a meshfree adaptive procedure for shell analysis with application to sheet metal forming analysis. Zhou *et al.* discuss the movement and evolution of macromolecules in a grooved micro-channel using the dissipative particle dynamics. Wu *et al.* study the concrete fragmentation using coupled finite element-meshfree formulations. A coupled finite element/meshfree moving boundary method is also proposed by Cai *et al.* for the self-piercing riveting simulation. Tian investigates the meshfree and generalized finite element methods from the hardware-efficiency prospective. Moballa *et al.* present an incompressible smoothed particle hydrodynamics modelling of thermal convection. The metal forming analysis based on the meshfree-enriched finite element method and mortar contact algorithm is studied by Hu and Wu.

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