Comp. Part. Mech. (2014) 1:1
DOI 10.1007/s40571-014-0011-x

Preface

Tarek I. Zohdi · Eugenio Oñate · Peter Wriggers

Published online: 15 April 2014

Particle-based mechanics and numerical methods have become wide-spread in the natural sciences, industrial applications, engineering, biology, applied mathematics and many other areas. The term "particle mechanics/methods" has now come to imply several different aspects to researchers in the twenty-first century, for example, including:

(1) Particles as a physical unit in granular media, particulate flows, plasmas, swarms, etc.,
(2) Particles representing material phases in continua at the meso-, micro-and nano-scale,
(3) Particles as a discretization unit in continua and discontinua in numerical methods,

The application areas of particle-based methods are quite wide-ranging:

(1) Particulate and granular flow problems motivated by high-tech industrial processes such as those stemming from spray, deposition and printing processes
(2) Fluid-structure interaction problems accounting for free surface flow effects on civil and marine engineering (water jets, wave loads, ship hydrodynamics and sea keeping situations, debris flows, etc.),
(3) Coupled multiphysical phenomena involving solid, fluid, thermal, electromagnetic and optical systems,
(4) Material design/functionalization using particles to modify base materials,
(5) Manufacturing processes involving forming, cutting, compaction, material processing,
(6) Biomedical engineering, involving cell mechanics, molecular dynamics and scale-bridging,
(7) Multifracture and fragmentation of materials and structures under impact and blast loads.
(8) Excavation and drilling problems in the oil/gas industry and tunneling processes.

Computational particle mechanics is a quarterly journal with the goal of publishing full-length original articles addressing the modeling and simulation of systems involving physical particles and particle-based methods.

The goal is to enhance communication among researchers in the applied sciences who use "particles" in one form or another in their research. It is our hope that this forum will have a positive influence in fostering and spreading particle-based research in the computational mechanics community. Finally, we wish to express our deepest appreciation to all the editorial board members who have helped with the start of this journal. Furthermore, we warmly thank Springer Verlag for the invaluable collaboration over that last few years that has made this journal possible.

T. I. Zohdi (✉) · E. Oñate · P. Wriggers
Department of Mechanical Engineering, UC Berkeley,
University of California, 6117 Etcheverry Hall, Berkeley,
CA 94720-1740, USA
e-mail: zohdi@berkeley.edu

T. I. Zohdi · E. Oñate · P. Wriggers
The United States Association for Computational Mechanics,
UC Berkeley Computational Science and Engineering Program,
Berkeley, CA, USA