Foreword

Tarek I. Zohdi¹

Published online: 4 February 2016
© OWZ 2016

As we enter our third year of the journal, it is our pleasure to update the readership.

The creation of the journal Computational Particle Mechanics (CPM) in 2013 was motivated by the fact that particle-based mechanics and numerical methods have become widespread in the natural sciences, industrial applications, engineering, biology, applied mathematics, and many other areas. The goal is to enhance communication among researchers in the applied sciences who use “particles” in one form or another in their research. Broadly speaking, our motivation for the starting the journal has as its core the fact that “particle mechanics/methods” has now come to imply several different aspects to researchers in the 21st 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; and (3) particles as a discretization unit in continua and discontinua in numerical methods. It is our hope that this forum will have a positive influence in fostering and spreading particle-based research in the computational mechanics community. This field has even become even more active since the founding of the journal, with applications in (1) Particulate and granular flow problems, (2) Fluid-structure interaction problems, (3) Coupled multiphysical phenomena, (4) Material design/functionalization, (5) Manufacturing processes, (6) Biomedical engineering, (7) Multifracture and fragmentation, and (8) Excavation and drilling problems. In particular, the combination of rigorous material modeling theories, cou-

pled with the dramatic increase of computational power, can potentially play a significant role in the analysis, control, and design of many emerging additive manufacturing and 3D printing processes. A key ingredient of these processes is specialized particle-functionalized materials. A large portion of this activity has been motivated by advanced manufacturing in the form of additive processes and 3D printing, since several industrialized countries have recently stressed the importance of advanced manufacturing to their economies, with the objective being to develop superior products, produced at lower overall operational costs. For these goals to be realized, a deep understanding of the essential ingredients comprising the particle-based materials involved in additive manufacturing is needed in the future. Finally, we would like to add that the journal supports scientific international conferences and workshops in the field of particle methods and their applications, such as the series of international conferences on Particle-Based Methods. The fifth edition of this conference will take place in the city of Hamburg (Germany) on 26–28 September 2107 (<http://congress.cimne.com/particles2017/frontal/default.asp>).

Best regards, The CPM Editors, Tarek I. Zohdi, Eugenio Oñate and Peter Wriggers

Note: The cover figure comes from the CPM article, “Adaptive model reduction for nonsmooth discrete element simulation,” by Martin Servin and Da Wang. It is an illustration of an excavation scenario. The particles are color coded by velocity from blue (stationary) to red.

✉ Tarek I. Zohdi
zohdi@berkeley.edu

¹ Berkeley, USA