

## ADVANCES AND APPLICATIONS OF MESHFREE AND PARTICLE METHODS

TRACK NUMBER (200 - ADVANCED DISCRETIZATION TECHNIQUES)

DONGDONG WANG<sup>1</sup>, C.T. WU<sup>2</sup>, J.S. CHEN<sup>3</sup>, ZHEN CHEN<sup>4</sup>, SHENG-WEI CHI<sup>5</sup>,  
MIKE HILLMAN<sup>6</sup>, LIHUA WANG<sup>7</sup>, XIONG ZHANG<sup>8</sup>

<sup>1</sup>Xiamen University, China  
[ddwang@xmu.edu.cn](mailto:ddwang@xmu.edu.cn)

<sup>2</sup>Livermore Software Technology Corporation, USA  
[ctwu@lstc.com](mailto:ctwu@lstc.com)

<sup>3</sup>University of California, San Diego, USA  
[js-chen@ucsd.edu](mailto:js-chen@ucsd.edu)

<sup>4</sup>University of Missouri, Columbia, USA  
[chenzh@missouri.edu](mailto:chenzh@missouri.edu)

<sup>5</sup>University of Illinois at Chicago, USA  
[swchi@uic.edu](mailto:swchi@uic.edu)

<sup>6</sup>Pennsylvania State University, USA  
[mhillman@engr.psu.edu](mailto:mhillman@engr.psu.edu)

<sup>7</sup>Tongji University, China  
[lhwang@tongji.edu.cn](mailto:lhwang@tongji.edu.cn)

<sup>8</sup>Tsinghua University, China  
[xzhang@tsinghua.edu.cn](mailto:xzhang@tsinghua.edu.cn)

**Key words:** Meshfree Methods, Particle Methods, Applications.

### ABSTRACT

Meshfree and particle methods have emerged as a new class of numerical method and play an increasingly significant role in the study of challenging engineering problems. New and exciting developments of meshfree and particle methods often go beyond the classical theories, incorporate more profound physical mechanisms, and are becoming the exclusive numerical tools in addressing the computational challenges which were difficult or impossible to solve by conventional methods. The goal of this minisymposium is to bring together experts working on these methods, share research results and identify the emergent needs towards more rapid progress in advancing the important fields of meshfree and particle methods. Topics of interest for this minisymposium include, but are not limited to the following:

- Recent advances in meshfree and particle methods, coupling of meshfree methods with other methods, smoothed particle hydrodynamics, material point methods and peridynamics
- Methods coupling multiple physics and/or multiple scales
- New domain integration methods for Galerkin meshfree methods
- Strong form collocation methods
- Characterization and stabilization of numerical instabilities
- Recent advances in modeling strong and weak discontinuities
- Methods of fictitious or immersed domain and non-intrusive coupling

- Recent advances in modeling extreme loading events
- Recent advances in modeling manufacturing problems
- Recent advances in modeling bio- and nano- mechanics problems
- Nonlocal mechanics and computation
- Parallel computation, solver and large-scale simulations
- New applications