



Application of Computational Fluid Dynamics and Particle-Based Methods

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Message from the Guest Editor

Simulations play an ever-increasing role in several technological areas. Computational fluid dynamics (CFD) has been at the forefront of this development. Today, the main types of CFD based on discretization methods are joined by the more recent particle-based methods involving dynamical properties and symmetry characteristics, such as smooth particle hydrodynamics (SPH); dissipative particle dynamics (DPD); and kinetic-based methods including lattice Boltzmann methods (LBM), gas kinetic schemes (GKS), and quadrature-based moment methods (QMOM).

Moreover, rapidly developing methods in data science offer complimentary abilities to CFD tools. In this way, artificial intelligence (AI) techniques can be employed to extract underlying fluid mechanics from data, optimize the numerical methods, and increase stability and accuracy in complex symmetry-breaking flows...





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Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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