

## RECENT ADVANCES AND APPLICATIONS IN THE LATTICE BOLTZMANN METHOD

SEIYA WATANABE<sup>\*</sup>, PIERRE BOIVIN<sup>\*\*</sup>, MASAYUKI KANEDA<sup>†</sup>  
AND CHRISTOPHE COREIXAS<sup>††</sup>

<sup>\*</sup> Research Institute for Applied Mechanics, Kyushu University  
6-1 Kasuga-koen, Kasuga, Fukuoka, 816-8580, Japan  
swatanabe@riam.kyushu-u.ac.jp

<sup>\*\*</sup> Aix Marseille Univ, CNRS, Centrale Méditerranée, M2P2  
Marseille, France  
pierre.boivin@univ-amu.fr

<sup>†</sup> Department of Mechanical Engineering, Osaka Metropolitan University  
1-1 Gakuencho, Naka-ku, Sakai, 5998531, Japan  
f21084v@omu.ac.jp

<sup>††</sup> Institute for Advanced Study, Beijing Normal - Hong Kong Baptist University  
Zhuhai, 519088, China  
christophcoreixas@bnbu.edu.cn

**Key words:** Lattice Boltzmann Method, Kinetic Approaches, Turbulent Flow, Compressible Flow, Multiphase Flow, High Performance Computing.

### ABSTRACT

The Lattice Boltzmann Method (LBM) provides an efficient CFD alternative to Navier-Stokes solvers, particularly for complex geometries and large-scale simulations. Beyond its established success in both academic research and industrial applications, continuous innovation is essential for topics such as high-Reynolds turbulence, compressible flows, fluid-structure interactions, and multiphase flows.

This symposium gathers global experts to discuss the latest LBM breakthroughs. We welcome theoretical contributions on a broad range of topics, including but not limited to, advanced collision operators, high-order boundary treatments, interface capturing, grid refinement, and high-performance computing.

Applications across various fields are also highly encouraged, such as aerodynamics, hydrodynamics, compressible flows, multiphase flows, reacting flows, transport in porous media, and computer graphics. Furthermore, we invite studies exploring the synergy between LBM and emerging technologies, such as machine learning and data-driven modeling, which align with the interdisciplinary theme of the conference.

Depending on submissions, thematic blocks will be organized to cover both theoretical advancements and diverse LBM applications.