## CMHL SJTU COMPUTATIONAL MARINE HYDRODYNAMICS LAB 上海交大船舶与海洋工程计算水动力学研究中心

## Dr. Weiwen Zhao

Dr. Weiwen Zhao is currently a research associate in Computational Marine Hydrodynamics Laboratory (CMHL). He received a BSc and MSc in Naval Architecture and Ocean Engineering from Huazhong University of Science and Technology, and a PhD from Shanghai Jiao Tong University. He is currently a member of the 30th specialist committee on Ocean Renewable Energy in the International Towing Tank Conference (ITTC). He is also an editorial board member of the



Journal of Hydrodynamics. His research interest mainly focus on the development and application of high fidelity numerical methods for marine dynamics, such as the Ghost Fluid Methods of incompressible two-phase flow, hybrid RANS/LES methods, dynamic overset grid methods, wavecurrent interaction, vortex identification and visualization.

## **Keynote Presentation 4: Numerical improvements of turbulent two-phase flow past surface-piecing vertical cylinder**

The interactions between two-phase free surface flow and vertical cylinder structures are common occurrence in marine and civil engineering. For high Reynolds and high Froude number flow, the bluff body introduce violent free surface flow containing some interesting hydrodynamic phenomena which are difficult to analyze in experimental measurements. In this study, we introduced and combined several improvements of the numerical modeling for violent turbulent two-phase flow, including the Ghost Fluid Method (GFM) to resolve the pressure jump condition across the free surface, the Piecewise Linear Interface Calculator (PLIC) for sharp interface capturing, an improved turbulent model for two-phase flow to avoid excessive turbulence damping near free surface. These numerical improvements are applied to two-phase flow past fixed and mounted surface-piercing circular cylinder for validation.