海岸和近海工程国家重点实验室
STATE KEY LABORATORY OF COASTAL AND OFFSHORE ENGINEERING

海岸和近海工程国家重点实验室
学术讲堂

题　目： **Advances in Multi-scale Multi-model Simulation for Wave-Structure Interactions**

报告人： **Prof. Shiqiang YAN**

时　间： **2021年12月31日 15:30-16:30**

地　点： **腾讯会议房间号：681 7974 9019**

内容简介：

Shiqiang Yan is a Reader in Hydrodynamics and Director of the Research Centre for Sustainable and Resilient Civil Engineering at City, University of London. He received his PhD degree in Hydraulic Engineering from City in 2007. His main research area is the development and applications of numerical tools for wave-structure interaction. He has been the core developer of fully nonlinear potential (FNPT) code, QALEFEM, and the hybrid model, qaleFOAM, coupling the QALEFEM with OpenFOAM. He is also involved in the development and applications of other codes such as ESBI, MLPG-R and ISPH. He has published more than 100 peerreviewed papers. A recent paper on the qaleFOAM and WECs (doi: 10.1680/jencm.19.00035) has been awarded the Baker Medal in 2021 by the Institute of Civil Engineering. He is currently a Principal Investigator of an EPSRC grant on hydrodynamics associated with the floating offshore wind system, Co-Investigator of two EPSRC marine wave energy projects. He was a PI/Co-I of several other EPSRC, British Council grants and was a Leverhulme Trust Early Career Research Fellow, undertaking research with a total grant value of £8M. He is the vice Chair of International Hydrodynamic Committee (IHC) of the International Society of Offshore and Polar Engineering (ISOPE).

Abstract: Numerical modelling for wave-structure interaction often needs to consider multiple physics with considerable different spatial-temporal scales. Resolving micro-scale physics near the structure, e.g., turbulence and aeration at ~cm to ~m, in a large wave field in ~km in the numerical practices is challenging. Hybrid modelling coupling different numerical methods, including the potential theory and computational fluid dynamics based on the Navier-Stokes models, has shown its superiority over single-model simulation in terms of the robustness and accuracy. The presentation will introduce the multi-scale multi-model framework being developed at City, University of London, which consists of various hybrid models coupling potential theory and CFD by using either the space/time domain splitting or the function splitting approaches. It then concentrates on the recent development of the qaleFOAM, which coupling the fully nonlinear potential theory with OpenFOAM using the space splitting approach, and its applications to ship hydrodynamics, floating wind turbines and wave energy converters.

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