

OpenFOAM & Combustion Simulation



Large Eddy Simulation of Supersonic Combustion via OpenFOAM

Prof. Wei Yao

Chinese Academy of Sciences

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Host: Prof. Zhiwei Huang (Shanghai Jiao Tong University)

Register: https://nus-sg.zoom.us/webinar/register/WN_r86klkRlSku0ErIjBw4F2A



Abstract

Supersonic combustion involves the complex interaction between turbulence, chemistry, and properties. To achieve high-fidelity yet high-efficiency modeling, six individual models are proposed based on the concept of dynamic adaptive zone division, i.e., (1) Dynamic Zone Flamelet model (DZFM), (2) Zonal Dynamic Adaptive Chemistry (Z-DAC), (3) Zonal In Situ Adaptive Chemistry (Z-ISAT), (4) Zonal Nonequilibrium Model (ZNM), (5) Zonal Extended Corresponding State (Z-ECS), and (6) Zonal hybrid KT/central scheme. The presentation shows how to model turbulence-chemistry-property interaction accurately and efficiently from different perspectives. Finally, it shows how to program a compressible reacting solver in the framework of OpenFOAM.

About the Speaker

Prof. Wei Yao joined Institute of Mechanics, Chinese Academy of Sciences (CAS) since 2013. He obtained Bachelor's and Master's engineering degrees from University of Science & Technology of China (USTC) in 2005 and 2007, respectively. He received his PHD degree from University of Ulster (UU) in 2010. Prof. Yao's research interests include large eddy simulation of supersonic combustion, development and calibration of combustion models under scramjet conditions, reduced combustion kinetics relevant to engine fuels (e.g., Jet-A, RP-3, and hydrogen), numerical optimization of scramjets. Prof. Yao was awarded AIAA Best Hypersonic Systems and Technology Paper Award in 2018 and CAS Youth Innovation Promotion Association Award in 2019.

