



Technische
Universität
Braunschweig



Leichtweiß-Institut

Recent advances in numerical modelling of coastal engineering problems: Breaking waves and sediment transport

Lecture of
**Assistant Professor, Dr.-Ing.
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August 27, 2024, 11:00

Seminar room 013, Institute for
Steel Construction
Beethovenstr. 51, Braunschweig
Ground floor

Also online: [Webex link](#)

This talk will focus on challenges and recent research breakthroughs on computational fluid dynamics (CFD) modelling of related coastal engineering problems in terms of (1) breaking waves in the coastal surf zone and (2) sediment transport with considering the seepage effect in the porous seabed. In the past two decades, CFD studies of surf zone breaking waves with using standard two-equations models have shown a marked tendency to severely over-estimate turbulence levels, both pre- and post-breaking. Even after stabilization, their behaviors in the surf zone is still not optimal. Our recent works with Reynolds stress turbulence models (RSM), which was proven to be neutrally stable in the potential flow region beneath surface waves, yielded unprecedented accuracy in the prediction of coastal breaking waves on a sloped beach, as well as breaking wave-structure interaction. For sediment transport problems, our recent study has coupled the hydrodynamic and morphological processes with the dynamic seepage effect in the seabed, which is useful for the prediction of tsunami-induced sediment transport and scour.

At the end of this talk, Dr. Li will share the research overview of Coastal Protection and Flood Resilience Institute (CFI) of Singapore. As a small and low-lying city-state, Singapore is extremely vulnerable to the consequences of climate change, such as rising sea levels, intense rainfall and other extreme events. To strengthen our capabilities and expertise in relevant research and solutioning, CFI was launched at NUS on 7 Sep 2023 with a funding of S\$125 million (~85million Euro). Dr. Li will talk about the missions and research focus of CFI Singapore, as well as highlight some research collaboration opportunities.

Organised by
Leichtweiß-Institute for Hydraulic Engineering and Water Resources
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