



Technische  
Universität  
Braunschweig



Leichtweiß-Institut

# DualSPHysics: a Lagrangian CFD model for complex engineering problems

Lecture of  
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13:30**

Seminar room Leichtweiß-Institute  
Beethovenstr. 51A, Braunschweig  
3<sup>rd</sup> floor

Also online: [Webex link](#)

Numerical modeling represents a viable alternative for the description of natural phenomena to expensive, long running physical model tests, particularly on the initial design of coastal and offshore structures. Smoothed Particle Hydrodynamics (SPH) is an exceptionally suitable numerical method for engineering problems involving significant fluid deformations, especially for collisions with solid structures. As a meshless and Lagrangian method, SPH has become increasingly popular in recent years as a novel technique to model violent hydrodynamics in wave breaking, wave-structure interaction, and floating objects. SPH finds room to deal with more and more industrial applications and engineering design. Recently, SPH has been successfully applied in the context of marine renewable energy and coastal defense, currently representing hot topics of great interest in light of the ongoing energy market trends and global warming.

The DualSPHysics code has been developed to use SPH for real engineering problems. DualSPHysics is open source and can be freely downloaded from the website [www.dual.sphysics.org](http://www.dual.sphysics.org). The presentation will provide a concise overview of the SPH method and the DualSPHysics code implementation, starting with its basic principles and going into various case studies related to coastal protection, debris flows and floating devices. Finally, key computational aspects will be highlighted, underscoring why DualSPHysics is a leading model for both academic research and small to medium enterprise (SME) use.

Organised by  
Leichtweiß-Institute for Hydraulic Engineering and Water Resources  
Division Hydromechanics, Coastal and Ocean Engineering  
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