

Manchester Metropolitan University

People

Mr. C. G. Mingham

is Reader in Hydroinformatics. He uses Cartesian cut cell shallow water and Navier Stokes models to simulate coastal and estuarine flows and wave energy devices.

Professor D. M. Causon

is Professor of Computational Fluid Dynamics. He simulates free surface flows using surface capturing methods for applications which include wave attack on coastal structures.

Dr S. Ilic

is lecturer at Lancaster University. She uses field and laboratory measurements to understand the impacts of structures on the adjacent sea bed and shoreline.

Dr W. Bai

is a post doctoral research fellow in numerical simulation

Relevant Expertise

The MMU group has developed a suite of computational fluid dynamics (CFD) codes for compressible flow, incompressible flow and shallow water hydrodynamics based on the use of high resolution Riemann-based solvers, artificial compressibility techniques and interface capturing on Cartesian cut cell meshes. Work in the hydrodynamics area has led to versions with mesh adaptation and extensions to 3D. The group's solvers have been used in conjunction with physical scale models in several EPSRC-funded projects to study wave-structure interactions. Developments resulting from these projects include AMAZON-SC a novel solver able to simulate air/water/solid interactions and, in particular, multi-valued free surfaces such as those occurring in breaking waves.

Technical role within the Supergen

Aim:

to use a combination of numerical simulation and laboratory experiments to predict scour around offshore wind turbine mounts and to investigate scour minimisation by using different mount profiles.

Specific objectives are:

- i) to establish if equilibrium scour hole dimensions can be reached in alternating tidal flows;
- ii) to quantify the difference between scour hole shapes for varying steady unidirectional flows;
- iii) to establish if existing empirical relationships for scour-hole dimensions in shallow water are applicable for shelf sea depths;
- iv) to find vertical mount profiles that minimise scour.

The Centre for Mathematical Modelling and Flow Analysis at Manchester Metropolitan University specialises in developing CFD methods and is the leading UK group in the area of Riemann-based solvers on Cartesian cut cell meshes.

