

**SPH FOR FLOATING BODIES
APPLICATION TO EXTREME WAVE LOADING ON OFFSHORE WAVE ENERGY DEVICES**

University of Manchester

**Supervisors: Peter Stansby, Dominique Laurence
SPH team: Ben Rogers, Damien Voileau (EdF), Eun-Sug Lee**

This PhD studentship is for three years, starting in October 2006.

Closing date for applications is 30th June 2006.

Applications should be sent to p.k.stansby@manchester.ac.uk

The SPH team at Manchester is described above with a postdoctoral associate on an EPSRC grant (Ben Rogers) and an EPSRC PhD student (Eun-Sug Lee) working on fundamental aspects associated with turbulence modelling and coastal engineering applications. Damien Voileau is actively involved from EdF who have made available their SPH code SPARTACUS for development and some additional funding.

In addition to this grant on floating bodies an EU Marie Curie Fellowships for Knowledge Transfer – Industry/Academia Partnership Scheme has been applied for with leading European Companies (VaTech Hydro and EdF-LNHE) and Institutes (the Universities of Manchester and Lyon and the CSCS- Swiss National Supercomputing Centre) in SPH.

This studentship is part of a larger EPSRC consortium with studentships also available at the University of Bath and the Manchester Metropolitan University and their contacts are given below:

University of Bath – using CFX and STAR-CD/COMET – contact d.m.greaves@bath.ac.uk

Manchester Metropolitan University – using their in-house code AMAZON-SC3D – contact d.m.causon@mmu.ac.uk

THE FULL CONSORTIUM ADVERT IS SHOWN BELOW



3 PhD Studentships

CFD FOR FLOATING BODIES WITH APPLICATION TO EXTREME LOADS ON WAVE ENERGY DEVICES

Project Description: Three PhD studentships are available, one at Bath University, one at Manchester Metropolitan University and one at Manchester University, to candidates with a first class or upper second class or equivalent degree and/or relevant MSc in science, mathematics or engineering. The aim of the project is to predict loading and response of two floating wave energy devices in extreme waves using CFD (computational fluid dynamics), in which fluid viscosity, wave breaking and the full non-linearity of the Navier-Stokes and continuity equations are included. The CFD simulations will be undertaken using three different approaches: by code development using the **commercial codes**, CFX and STAR-CD V4 at Bath University; by the **AMAZON-SC** finite volume cut cell surface-capturing codes at Manchester Metropolitan University (MMU); and by the novel **SPH** (smoothed particle hydrodynamics) gridless method at Manchester University. Initially, steep waves of permanent form will be used followed by focused wave groups modelled using New Wave, developed by project partners at Oxford University, in order to represent extreme wave conditions in a random sea. Two classes of device will be considered: Pelamis (of Ocean Power Delivery Ltd.), the prototype having already successfully generated electricity into the grid, and a floating buoy device responding in heave, known as the Manchester Bobber (Manchester University), which is being tested at 1/10th scale. The project industrial partners are Ocean Power Delivery Ltd, Atkins Process, CD-Adapco and Ansys. The project is funded by the Engineering and Physical Sciences Research Council (EPSRC).

Knowledge/experience in one of the major programming languages like FORTRAN90 and/or C++ is desirable. The research outcomes are likely to offer benefits in the analysis of extreme wave interaction with wave energy devices, ships, other marine vehicles and structures in general. The programme offers the successful applicants a unique opportunity to gain an outstanding training in CFD modelling by joining a team of leading researchers and industrial collaborators in this important area of research.

This studentship is open to Home/EU residents (see www.epsrc.ac.uk for eligibility criteria) and the start date is 1 October 2006. Applicants should send a cv and covering letter to:

Dr Deborah Greaves,
Department of Architecture and Civil Engineering,
University of Bath,
Claverton Down,
Bath BA2 7AY.
d.m.greaves@bath.ac.uk
<http://www.bath.ac.uk/csae/new/activities/cfd.html>

Professor Derek Causon,
Department of Computing and Mathematics,
John Dalton Building,
Manchester Metropolitan University,
Chester Street,
Manchester M1 5GD.
D.M.Causon@mmu.ac.uk
<http://www.docm.mmu.ac.uk/cmmfa/>

Professor Peter Stansby,
School of Mechanical, Aerospace and Civil Engineering,
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PO Box 88,
Manchester M60 1QD.
p.k.stansby@manchester.ac.uk
<http://www.mace.manchester.ac.uk/>
<http://cfd.me.umist.ac.uk/sph/>

Closing date for applications is **30 June 2006**. Applicants may apply for more than one of the studentships.