Final Year Projects – Semester 1, 2013
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1. Developing models for assessing risk associated with hydraulic fracturing

This project will build on ongoing projects in reconstructing and modeling heterogeneous media, to develop models to assess the risk of environmental contamination associated with fracking. The focus of this project will be to develop a method of modeling fracturing in a spatially heterogeneous domain, and capturing the statistical nature of the rock properties and the resultant variability of the fracture process.

2. Modelling ocean spray generation

Spray generation under varying ocean conditions can dramatically influence visibility for operations near the ocean surface. This project will explore existing knowledge on the mechanisms and nature of spray generated under a range of ocean conditions, with the ultimate objective of developing a model for the droplet/spray distribution in the first 1-2 metres above the ocean under varying ocean conditions
(Note – this may become a CEED project)

3. Experimental simulation of ocean spray interaction with surfaces

Spray generated by wind and waves will interact with optical devices operating near the ocean's surface. This project will develop an experimental rig capable of generating droplets of varying size and then introducing them into an air stream simulating the air flow around particular surfaces. If time permits, the project will proceed to undertake an experimental program.
(Note – this may become a CEED project)

4. Sand transport in flexible pipes

Past projects have created an experimental rig for studying sand transport in stratified gas/water flows. This project will extend the work by modifying the rig to accommodating a flexible pipe, and will then proceed to experiments to determine the critical velocities for eliminating sand deposition in flexible pipes.
(Note – this may become a CEED project).

5. Finite Element Modelling of whisker reinforced composites

A code is available that can generate and mesh an array of randomly oriented cylinders. The objective of this project is to develop a technique to mesh the matrix volume in the composite, permitting the execution of models of whisker reinforced composites and whisker reinforced composite interfaces. This project will proceed in parallel with an existing project, and will extend the results of that project.
6. Fracture properties of 3d printed metal components

This project will review techniques for modelling fracture in 3d printed metal components using commercial finite element software (such as ABAQUS). The project will review the current state of the art in 3d laser printing of metal components, with a view to developing models for the integrity of components synthesized via this method.

Notes

- I may be open to taking on students who bring their own projects in Computational Fluid Dynamics or Finite Element Modelling – it will depend on the proposed projects and the resources available to support the projects.
- Additional CEED projects under my supervision may become available in the coming weeks – monitor www.ceed.uwa.edu.au for details and application information.