FACE
The Norwegian Flow Assurance and Innovation Centre
MSc thesis suggestions

Simulation of Complex Fluid System Using Meshfree Particle Method

Computational fluid dynamics (CFD) has increasingly become a very important approach for solving problems in engineering and science. Grid or mesh based methods such as finite volume method and finite element methods have been widely applied to various areas and they are currently the dominant methods in CFD. The use of grid/mesh can lead to difficulties in dealing with problem s with free surface, deformation boundary and moving interface. A recent strong interest is focused on the next generation computational method, meshfree methods. Currently, we have a code to solve 2-D problem, which is developed by FORTRAN. The basic technique in this code is to solve the particle-particle potential function. The aim of this MSc project is to generalize the particle-particle potential function to 3-D space, as well as the other parts of the original code. The candidates are expected to keep in close contact and attend meetings with the FACE project partners. The knowledge of FORTRAN and Linux is desired but not necessary.

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Interested candidates are invited to discuss this opportunity with Jun Huang (+47-45069475, jun.huang@ntnu.no).

The FACE SFI

FACE was initiated in August 2007 with the vision of *combining surface and colloid chemistry with fluid mechanics to solve flow assurance challenges.* Its objective is to *deliver world class applied and fundamental research and education focused on production, transportation and separation of complex well fluids.*

To achieve the FACE objective, a main goal was set: to develop **generic methods** to describe **complex fluid systems** in models that can be incorporated into scalable and robust multiphase flow assurance tools needed by the petroleum industry to develop new production solutions for oil and gas with complex fluids. The two terms **generic methods** and **complex fluid systems** basically define and focus the work carried out within FACE.