

Prof. Jos Derksen

University of Aberdeen, Aberdeen, UK

will present a seminar for our group Engineering Fluid Dynamics with title:

Dispersed Multiphase Flow at the Particle Level

Date: Thursday January 21, 2016

Time: 16:00

Location: Horst NH.124

Abstract

Many (chemical) engineering processes rely on mass transfer between a dispersed phase and a continuous phase: bubble columns (gas-liquid), slurry reactors (solid-liquid), fluidized beds (solid-gas or solid-liquid), extraction columns (liquid-liquid) are a few examples. Gravity driven flow, fluidization, and mechanical agitation (stirring) are common ways of enhancing transfer rates. We perform detailed simulations of fluid flow and scalar transport in dense two-phase systems in order to better describe and understand these transfer processes. The emphasis in this presentation is on solid-liquid suspensions. A key challenge for mass transfer simulations involving liquids are their usually high Schmidt numbers (of the order of 1,000) which imply very thin mass transfer boundary layers at solid surfaces. We try to resolve these by coupling fine mass transfer grids to the coarser flow dynamics grids. Excursions will be made towards dense suspensions of non-spherical particles and ways to deal with collisions between such particles, as well as dispersions of immiscible liquids. The latter with a focus on (problems with) computationally resolving drop break-up and coalescence events.

Biography

Jos Derksen obtained an MSc degree in Mechanical Engineering from the University of Twente in 1985, and a PhD degree from Eindhoven University of Technology in 1991. He has been on the faculties of Delft University (1992-2007 & 2014/2015), the University of Alberta, Canada (2007-2013), and the University of Aberdeen, UK (2013/2014 & 2015-present). Over the years, his research has drifted in the direction of transport processes in chemical engineering and revolves around meso-scale simulations of multiphase flow, in many cases using the lattice-Boltzmann method. He teaches courses on fluid mechanics and numerical methods. For more information:

<http://homepages.abdn.ac.uk/jderksen/pages/index.html>