



2009 Mechanical Engineering Distinguished Seminar Series



The Department of Mechanical Engineering and the Burgers Program for Fluid Dynamics is pleased to host

Prof. Eckart Meiburg
Dept. of Mechanical Engineering
University of California, Santa Barbara

Computational Investigation of Gravity and Turbidity Currents

Abstract: We will present an overview of high-resolution, Navier-Stokes based simulations of gravity and turbidity currents, with the focus on the standard lock-exchange configuration. The turbidity currents we consider are driven by particles that have negligible inertia and are much smaller than the smallest length scales of the buoyancy-induced fluid motion. For the mathematical description of the particulate phase an Eulerian approach is employed, with a transport equation for the particle-number density. The governing equations are integrated numerically with high-order, mixed compact finite difference and spectral/spectral-element techniques. We will discuss differences between two- and three-dimensional turbidity current dynamics, and we will introduce some effects due to complex topography. Results will be shown regarding the unsteady interaction of a gravity current with a submarine structure, such as a pipeline. Furthermore, we will discuss the linear stability problem of channel and sediment wave formation by turbidity currents.

Biography: Prof. Meiburg received his Ph.D from the U. of Karlsruhe, Germany in 1986. After completing a postdoc at Stanford University, he joined Brown University as an Assistant Professor. After a stint as an Associate and Full professor at the U. of Southern California, he became a Professor at UC Santa Barbara where he served as the Department Chair from 2003-2007. Professor Meiburg's research interests lie in the general area of fluid dynamics and transport phenomena. His group primarily employs the tools of computational fluid dynamics (CFD), in particular highly resolved direct numerical simulations, in order to obtain insight into the physical mechanisms that govern the spatio-temporal evolution of a wide variety of flow fields. Occasionally, his group extends their analyses to address issues of linear stability as well. Frequently, they collaborate closely with corresponding experimental investigations. Some current interests are focused on particle and droplet laden flows, free shear flows with and without swirl, gravity currents, fluid transport in porous media, and miscible fluid flows with steep concentration gradients.

Date: November 6, 2009 at 2:00 pm

Place: DeWalt Seminar Room, 2164 Glenn Martin Hall

Host: Dr. Meiburg will be hosted by Associate Professor Ken Kiger of Mechanical Engineering (kkiger@umd.edu)