Special Seminar-CIVE 6111 Graduate Seminar Series

(11:15 am-12:30 pm, March 9 (Monday) at Rm. 102-D)

PHYSICS OF ENVIRONMENTAL FLOWS USING NUMERICAL SIMULATIONS

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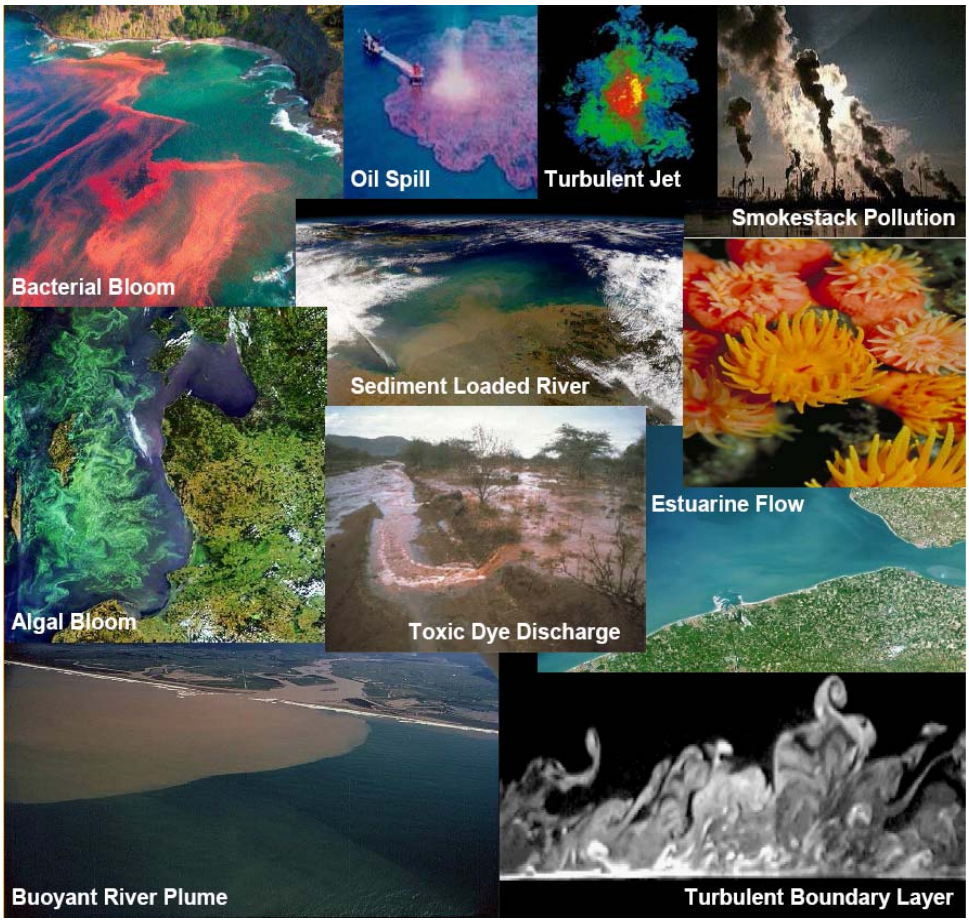
Environmental fluid mechanics can be defined succinctly as the study of naturally occurring fluid flows in the earth's atmosphere and hydrosphere. The key questions in this broad and important area in fluid mechanics focus on how fluids move constituents through our natural environment. A defining characteristic of many environmental flows is density stratification which arises due to temperature and/or salinity variations. Understanding how turbulence and stratification interact with each other is a fundamental issue and provides the key to enhancing our ability to predict how mixing and transport occurs in the natural environment. In this talk, following a brief introduction of my background, an overview on the application of computational fluid dynamics (CFD) in environmental flows will be presented. A couple of research problems will be discussed to highlight the use of direct numerical simulations (DNS) and large-eddy simulations (LES) in studying research problems ranging from the laborarory scale to the field scale. The examples will focus briefly on the following broad topics:

1. Stably stratified turbulent flows and internal waves in the coastal ocean
2. Plume dispersion in coastal and estuarine flows.

I will conclude the talk with some thoughts and ideas on future directions for my research.



Dr. Venayagamoorthy is an associate professor of Civil and Environmental Engineering and Borland Professor at Colorado State University (CSU). He received his BScEng (summa cum laude) and MScEng (cum laude) degrees in Civil Engineering from the University of Natal in Durban, South Africa and his PhD in Civil and Environmental Engineering from Stanford University. He is a recipient of several awards including the Frenkiel Award for Fluid Dynamics, NSF CAREER Award, the Office of Naval Research Young Investigator Award and the CSU Best Teacher Award. His research interests focus on environmental fluid mechanics, hydraulics and hydrology using computational flow modeling in combination with theoretical and experimental methods.