Boulder Fluid Dynamics Seminar Series

Tuesday, June 2, 2015
3:30pm-4:30pm (refreshments at 3:15pm)
Bechtel Collaboratory in the Discovery Learning Center (DLC)
University of Colorado at Boulder

VAPOR: A desktop environment for interactive exploration of large scale CFD simulation data

John Clyne, *National Center for Atmospheric Research*

This talk will provide a broad overview of the unique capabilities of NCAR's visual, scientific data analysis package, VAPOR (www.vapor.ucar.edu). VAPOR provides a desktop solution for qualitatively and quantitatively interrogating high-resolution numerical simulation outputs. The development of VAPOR is guided by an international steering committee comprised of researchers working in the atmospheric and related sciences. VAPOR's feature set is thus strongly tailored towards the needs of this community. Also discussed will be VAPOR's wavelet-based progressive access data model: an intelligent approach to handling large data sets, whose generality may have applicability far beyond the VAPOR desktop application.

Discontinuous Galerkin methods in coastal engineering, geophysical flow modeling, and plasma dynamics

Craig Michoski, *University of Colorado, Boulder*

High order accurate discontinuous Galerkin (DG) methods can offer tangible advantages in engineering and science applications. The talk will begin with a brief overview of DG methods, and how to apply them to a simple linear advection model. We then jump to some large-scale application problems. First, coastal engineering applications using the shallow water equations will be presented for large-scale validation problems in hurricane storm surge and coastal flooding. Next we will discuss how to extend the shallow water equation model to support geophysical flows and erosion, as accomplished by coupling to the Exner equations. Finally we discuss some applications in high energy plasma dynamics, where turbulent saturation in nonlinear plasma can be used to model and predict the behavior of scrape-off layer dynamics in the presence of resonant magnetic pulses near plasma material interfaces in tokamaks.