

May 11, 2007



Oceanography Seminar

SPEAKER

Frank Giraldo, PhD

AFFILIATION:

Naval Postgraduate School, Department of Applied Mathematics

TITLE:

Towards Next-Generation High-Order Conservative Geophysical Fluid Dynamics Models

DATE:

Wednesday, May 16, 2007

TIME:

12:00 PM

PLACE:

Spanagel Hall, Rm 316

ABSTRACT:

In this talk I will give an overview of the research that I am conducting in the construction of new geophysical fluid dynamics (GFD) models. I will begin by discussing the motivation for even considering building new models. In brief, the reason has to do with improving the conservation properties of the models as well as constructing new models which scale on modern computer architectures such as commodity-based multi-processor machines (a.k.a parallel computers). The numerical algorithms that I have developed all belong to the general class of Galerkin methods; however, my area of interest is in element-based Galerkin methods which are local Galerkin methods (an example of a local Galerkin method is the finite element method). I will give a brief introduction to these methods and then move on to discussing three types of GFD models that I have developed based on these methods: 1) a global baroclinic atmospheric model, 2) a 2D mesoscale non-hydrostatic atmospheric model, and 3) a 2D oceanic shallow water model which will eventually become a coastal ocean model. I will discuss the performance of these models as well as show results for various idealized test cases. The goal of my talk will be to introduce the oceanography department to the research that I do with the hope that some of you may find a need for some of the tools/models that I am developing. For more information on my research please visit the URL www.nps.navy.mil/faculty/giraldo.