1014-65-184   **Jiangguo Liu*** (`liu@math.colostate.edu`), Department of Mathematics, Colorado State University, Fort Collins, CO 80523-1874, **Hongsen Chen** (`hchen@isc.tamu.edu`), Institute for Scientific Computation, TAMU 3404, Texas A&M University, College Station, TX 77843, and **Richard E Ewing** and **Guan Qin**. *Efficient Implementation of Characteristic Finite Element Methods.*

In this talk, we will examine some important issues and present our strategies in implementing characteristic-based finite element methods for fluid flow problems. On the spatial aspect, our finite element implementation is dimension-independent and includes all commonly used elements. Moreover, this implementation unifies finite difference, finite element, finite volume, and even the discontinuous Galerkin methods. For characteristic tracking, we propose setting up an auxiliary rectangular mesh to help locate the foot or head of a characterisitc. In particular, we will look into details in the implementing the Eulerian-Lagrangian localized adjoint methods (ELLAM) for convection-dominated transport equations. (Received August 10, 2005)