

## Mixed and Discontinuous Galerkin Finite Element Methods for Advection-Diffusion Equations

### *Abstract*

In this talk, we will discuss the use of discontinuous Galerkin and mixed finite element methods for advection-dominated advection-diffusion equations. Some recent convergence analysis of these methods will be discussed, both with and without degenerate diffusion. In the general case, some loss of accuracy is observed in the error estimates. However, in some special cases the full accuracy can be recovered, and superconvergence can also be obtained. Numerical results will also be presented to compare to the theory. The work presented is joint work with Robert Kirby (former student at Texas Tech), Vadym Aizinger, Bernardo Cockburn and Paul Castillo.