1077-65-1492 **Xu Zhang*** (xuz@vt.edu), 460 McBryde Hall, Virginia Tech, Blacksburg, VA 24061, and **Tao Lin**. *Immerse Finite Element Methods for Solving Parabolic Type Moving Interface Problems.*

In science and engineering, many simulations are carried out over domains consisting of multiple materials separated by curves/surfaces. This often leads to the so-called interface problems of partial differential equations whose coefficients are piecewise constants. Using conventional finite element methods, convergence cannot be guaranteed unless meshes are constructed according to the material interfaces. Geometrically, this means each element needs to be essentially on one side of a material interface. Due to this reason the mesh in a conventional finite element method for solving an interface problem has to be unstructured to handle non-trivial interface configurations. This restriction usually causes many negative impacts on the simulations if material interfaces evolve. In this presentation, we will discuss how the recently developed immersed finite elements (IFE) can alleviate this limitation of conventional finite element methods. We will present both semi-discrete and fully discrete IFE methods for solving parabolic equations whose diffusion coefficient is discontinuous across a time dependent interface. These methods can use a fixed structured mesh even the interface moves. Numerical examples will be provided to demonstrate features of these IFE methods. (Received September 20, 2011)