1155-65-243 **Ruchi Guo*** (guo.1778@osu.edu) and **Tao Lin**. *An Immersed Finite Element Method For Elliptic Interface Problems In Three Dimensions.*

We present an immersed finite element (IFE) method for solving the typical three-dimensional second order elliptic interface problem with an interface-independent Cartesian mesh. The local IFE space on each interface element consists of piecewise trilinear polynomials. In this space, the IFE shape functions with the Lagrange degrees of freedom can always be constructed regardless of interface location and discontinuous coefficients. Detailed geometric analysis is given for surface approximation and its effect on the construction of IFE functions. The proposed IFE space is proven to have the optimal approximation capabilities to the functions satisfying the jump conditions. (Received January 14, 2020)