1132-65-256 **Jingyang Guo** and **Jae-Hun Jung*** (jaehun@buffalo.edu), Department of Mathematics, SUNY Buffalo, Buffalo, NY 14068. *Radial basis function weighted essentially non-oscillatory methods for hyperbolic problems with optimal shape parameters.*

The weighted essentially non-oscillatory (WENO) method provides an efficient way of dealing with discontinuous solutions to nonlinear hyperbolic conservation laws. The key element of the WENO method is to adaptively choose the stencils based on the polynomial interpolations. In this talk, we consider non-polynomial bases for the interpolation and show that the non-polynomial bases can improve the classical WENO order of accuracy. For this, we adopt infinitely smooth radial basis functions (RBFs). The RBF-WENO finite difference and finite volume method slightly perturb the reconstruction coefficients with RBFs as the reconstruction basis and enhance accuracy in the smooth region by locally optimizing the shape parameters. The optimization is obtained by considering the local flow conditions. Consequently the RBF-WENO methods provide more accurate reconstruction than the classical WENO reconstruction and provide sharper solution profiles near the jump discontinuity. We present several numerical examples including weak shock reflections. (Received July 24, 2017)