1147-65-212 **Yulong Xing*** (xing.205@osu.edu), Columbus, OH 43210. *Energy conserving local discontinuous Galerkin methods for the improved Boussinesq equation.*

The Boussinesq-type equations describe the propagation of weakly non-linear long waves in shallow waters and are widely applied to model water waves in shallow seas and harbors. In this presentation, we propose a high-order local discontinuous Galerkin method to solve the improved Boussinesq equation, coupled with both explicit leap-frog and implicit midpoint energy-conserving time discretization. The proposed full-discrete method can be shown to conserve the discrete versions of both mass and energy of the continuous solution. The error estimate with suboptimal order of convergence is provided for the semi-discrete method. Our numerical experiments demonstrate optimal rates of convergence as well as the mass and energy conserving property, and show that the errors of the numerical solutions do not grow significantly in time due to the energy conserving property. A series of numerical experiments are provided to show that the proposed method has the capability to simulate the interaction between two solitary waves, single wave break-up and blow-up behavior well. (Received January 10, 2019)