1090-35-327 **Hailiang Liu** (hliu@iastate.edu), Caver Hall 434, Iowa State University, Ames, IA 50011, and **Hui Yu*** (legendyu@iastate.edu), Carver Hall 438, Iowa State University, Ames, IA 50011. *The entropy satisfying discontinuous Galerkin methods for Fokker-Planck equations.*

Computation of Fokker-Planck equations with satisfying long time behavior is important in many applications and difficult in resolving solution structures induced by nonstandard forces. Entropy satisfying conservative methods are proven to be powerful to ensure both equilibrium preserving and mass conservation properties at the discrete level. Following [H. Liu and H. Yu, SIAM Journal on Numerical Analysis 2012, 50(3), 1207-1239], we present entropy satisfying discontinuous Galerkin methods to solve the Fokker-Planck equation of the finitely extensible nonlinear elastic dumbbell model for polymers, subject to homogeneous fluids. Both semidiscrete and fully discrete methods satisfy two desired properties: mass conservation and entropy satisfying in the sense that these schemes are shown to satisfy discrete entropy inequalities for the quadratic entropy. These ensure that the schemes are entropy satisfying and preserve the equilibrium solutions. Then we will discuss the extension to higher order approximations in the framework of DDG (Direct Discontinuous Galerkin), with the above properties. We will also introduce discontinuous Galerkin schemes preserving the positivity of probability density functions to Fokker-Planck equations. (Received March 04, 2013)