1056-65-518 **Michael Joseph Neilan*** (neilan@math.lsu.edu), Center for Computation and Technology, Louisiana State University, Baton Rouge, LA 70803, and **Susanne C. Brenner**, **Thirupathi Gudi** and **Li-yeng Sung**. *C^0 interior penalty methods for fully nonlinear Monge-Ampère type equations.*

In this talk, we formulate and study C^0 interior penalty Galerkin methods for the fully nonlinear Monge-Ampère equation $\det(D^2u) = f$ (> 0) and Gauss curvature equation $\det(D^2u) = (1 + |\nabla u|^2)^2$ with Dirichlet boundary conditions in two dimensions. The approach we take is based on the vanishing moment method which is a constructive way to approximate fully nonlinear second order PDEs. In the case of the Monge-Ampère equation, the vanishing moment approximation is the solution to the fourth order semi-linear equation $-\epsilon\Delta^2u^\epsilon + \det(D^2u^\epsilon) = f$ with appropriate boundary conditions. We briefly describe a proof of existence of the vanishing moment approximation u^ϵ as well derive convergence rates of the error $u - u^\epsilon$ provided that u is sufficiently smooth. We then construct C^0 symmetric interior penalty methods for the regularized problem. (Received September 11, 2009)