1145-65-2498 **Scott A Moe** (scott.moe@amd.com), Seattle, WA, **James A Rossmanith**, Ames, IA , and **David C Seal*** (seal@usna.edu), Department of Mathematics, 572C Holloway Road, Annapolis, MD 21402. *A high-order shock-capturing limiter for discontinuous Galerkin methods with applicability to Cartesian, curvilinear, and unstructured meshes.* Preliminary report.

The discontinuous Galerkin (DG) method is class of numerical methods that are state of the art for simulating mathematical models called hyperbolic conservation laws. Department of Defense applications for these models include high Mach number flows in aerospace applications, shallow water equations for storm surge models, Maxwell's equations for laser wave propagation and laser-induced plasma channels and space-weather plasma simulations relevant to support satellite communication infrastructure.

Hyperbolic PDEs often contain shocks and discontinuities in the exact solution, and therefore numerical methods need to address these issues. Moreover, the application of high-order numerical methods (that are able to resolve more features with fewer unknowns) exacerbates this issue given that the appearance of Gibb's phenomenon at the location of the discontinuity can lead to non-linear instabilities and failure of the numerical method to produce a solution. Here, we present a novel shock capturing limiter for the for the DG method, which works by selecting local upper and lower bounds for the solution. Results for multiple dimensions, as well as problems that require positivity-preservation of the solution are included. (Received September 25, 2018)