1106-65-1376 **Wing Tat Leung***, Department of Mathematics, Texas A&M University, College Station, TX 77843, **Yalchin Efendiev** (efendiev@math.tamu.edu), Department of Mathematics, Texas A&M University, College Station, TX 77845, and **Eric Chung**. *Multiscale model reduction using Discontinuous Generalized Multiscale Finite Element Methods.*

Due to the complex nature, direct numerical simulations on the fine grid are prohibitively expensive. It is therefore important to develop efficient and accurate methods that allow the use of coarse grids. We present a multiscale finite element method on a coarse grid. The proposed method is based on the Generalized Multiscale Finite Element Method (GMsFEM). To construct multiscale basis functions, we start with two snapshot spaces in each coarse-grid block where one represents the degrees of freedom on the boundary and the other represents the degrees of freedom in the interior. These local spectral problems are different from each other and their formulations are based on the analysis. Using the dominant modes from local spectral problems, multiscale basis functions are constructed to represent the solution space locally within each coarse block. These multiscale basis functions are coupled via the symmetric interior penalty discontinuous Galerkin method. Our methods' stability and spectral convergence are rigorously analyzed. For flow problems, we derive a-posteriori error estimates and develop an adaptive enrichment algorithm. (Received September 12, 2014)