

SIAM/APPLIED AND NUMERICAL ANALYSIS SEMINAR

Date: March 10, 2020

Speaker: Sara Pollock

Title: Goal-oriented adaptivity for the Generalized Multiscale Finite Element Method

Abstract: We will discuss the use of goal-oriented adaptivity within the Generalized Multiscale Finite Element Method. Standard finite element approximations to solutions of problems whose data contains multiple scales and high contrast can be prohibitively computationally expensive, due to the need to resolve fine scales throughout the domain to achieve an accurate approximation. To reduce the computational complexity, multiscale methods can be used to generate a collection of basis functions based on solutions to local fine-scale problems, by which a global approximation to the PDE solution can be formed. If the purpose of the simulation is to estimate a (presumably local) function of the solution, goal-oriented adaptivity can be used to select which local neighborhoods to enrich, in order to reduce the error in the quantity of interest. We will discuss how such goal-oriented strategies can be designed and implemented for Darcy flow problems featuring heterogeneous fields.