

# ACMS Applied Math Seminar

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**Thursday, March 24, 2022**

**3:30 PM – 4:30 PM EDT**

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## **Robust Preconditioners for Mixed-dimensional Problems**

Mixed-dimensional partial differential equations arise in many physical applications, such as flow in fractured porous media and flow in vascularized brain tissue. An essential component, and usually the most time-consuming part of simulating PDEs, is solving the large-scale and ill-conditioned linear systems of equations arising from discretizations. In this work, we generalize the traditional framework of designing preconditioners for the saddle point systems and develop effective preconditioners that are robust with respect to the physical and discretization parameters for mixed-dimensional problems. Numerical experiments are presented to support the theory and demonstrate the robustness of our preconditioners on realistic fracture networks and blood flow in the brain.



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