1147-65-139 **Wietse Boon**, **Ana Budiša** and **Xiaozhe Hu*** (xiaozhe.hu@tufts.edu), Department of Mathematics, Tufts University, Medford, MA 02155. *Robust Preconditioners for Mixed-dimensional Models of Flow in Fractured Porous Media.*

Mixed-dimensional partial differential equations arise in many physical applications including flow in fractured porous media, where the fractures and their intersections form a hierarchy of lower-dimensional submanifolds. 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 models for flow in fractured porous media. Preliminary numerical experiments are presented to support the theory and demonstrate the robustness of our preconditioners. (Received January 02, 2019)