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Xiaoming Wang* (wxm@math.fsu.edu). *Flow is karstic geometry.*

Karst type geometry is a particular type of configuration that consists of both conduit/channel (or vug/chamber) together with porous media. Many important applications involve fluid flows in karstic geometry. Well-known examples include contaminant transport in karst aquifer, oil recovery in karst oil reservoir, proton exchange membrane fuel cell technology, cardiovascular modeling, and carbon-dioxide sequestration among others. The mathematical study of flows in karst geometry is a challenge due to the coupling of the flows in the conduits and flows in the surrounding matrix which are governed by different physical processes, the possibly complex geometry of the network of conduits, the vastly disparate spatial and temporal scales, the strong heterogeneity and the enormous associated uncertainty with natural karst aquifer, and the multi-phase nature of many important applications. In this talk, we will present recent results on the modeling, analysis and simulation of single phase as well as two-phase flows in karstic geometry. (Received September 07, 2014)