1171-65-41 **Xiaobing Feng*** (xfeng@math.utk.edu), Department of Mathematics, 1403 Circle Drive, Knoxville, TN 37996. *Mixed finite element methods for stochastic Stokes equations with multiplicative noise.*

Besides the mathematical interests, stochastic Stokes (and Navier-Stokes) equations have been proposed to study turbulence flow under random forcing. Even in the simplest setting, their PDE solutions have very low regularity in time, which then poses a significant challenge for developing efficient and convergent numerical methods for the stochastic Stokes and (Navier-Stokes) equations. In particular, the most natural and popular class of numerical methods for those equations, namely mixed finite element methods, do not work well. In this talk, I shall present some recent developments in mixed finite elements for the stochastic Stokes equations with general multiplicative noise. The emphases will be on deriving error estimates in various strong norms for both the velocity and pressure approximations and on highlighting the differences with the deterministic case, as well as on presenting the new analysis techniques used to obtain these results. Numerical experiments will also be presented to validate the theoretical results. (Received August 06, 2021)