1077-35-327 **Qi Ye*** (qye3@iit.edu), Department of Applied Mathematics, Illinois Institute of Technology, Chicago, IL 60616, **Gregory Fasshauer** (fasshauer@iit.edu), Department of Applied Mathematics, Illinois Institute of Technology, Chicago, IL 60616, and **Igor Cialenco** (fasshauer@iit.edu), Department of Applied Mathematics, Illinois Institute of Technology, Chicago, IL 60616. *Approximation of Stochastic Partial Differential Equations by a Kernel-based Collocation Method.*

In this paper we present the theoretical framework needed to justify the use of a kernel-based collocation method (meshfree approximation method) to estimate the solution of high-dimensional stochastic partial differential equations. Using an implicit time stepping scheme, we transform stochastic parabolic equations into stochastic elliptic equations. Our main attention is concentrated on the numerical solution of the elliptic equations at each time step. The estimator of the solution of the elliptic equations is given as a linear combination of reproducing kernels derived from the differential and boundary operators of the PDE centered at collocation points to be chosen by the user. The random expansion coefficients are computed by solving a random system of linear equations. Numerical experiments demonstrate the feasibility of the method. (Received August 22, 2011)