1123-60-18 **John Harlim***, jharlim@psu.edu. *The Diffusion Forecasting Method.*

I will discuss a nonparametric modeling approach for forecasting stochastic dynamical systems on smooth manifolds embedded in Euclidean space. In the limit of large data, this approach converges to a Galerkin projection of the semigroup solution of the backward Kolmogorov equation of the underlying dynamics on a basis adapted to the invariant measure. This approach, which we called the "diffusion forecast", allows one to evolve the probability distribution of non-trivial dynamical systems with an equation-free modeling. If time permitted, I will also discuss a semi-parametric modeling framework to compensate for model error by learning an auxiliary dynamical model for the unknown parameters. (Received July 21, 2016)