The focus of the current presentation is on the use of statistical inference methods to predict efficient modeling with stochastic differential equations. I will present two applications of inference methods for stochastic processes: a) in wind power forecasting and b) in coarse-graining of molecular systems. Using an indirect inference approach, we construct a probabilistic wind power forecasting model based on numerical weather predictions and historical observations. I will also discuss the use of a path-space variational inference method to obtain optimal coarse-grained models for equilibrium and non-equilibrium molecular dynamics, given simulated microscopic level data.