1143-92-488 **Clark Bowman**, **Karen Larson**, **Alexander Roitershtein**, **Derek Stein** and **Anastasios Matzavinos*** (matzavinos@brown.edu), Division of Applied Mathematics, 182 George Street, Providence, RI 02912. *Bayesian uncertainty quantification for particle-based simulation of lipid bilayer membranes.*

A number of problems of interest in applied mathematics and biology involve the quantification of uncertainty in computational and real-world models. A recent approach to Bayesian uncertainty quantification using transitional Markov chain Monte Carlo (TMCMC) is extremely parallelizable and has opened the door to a variety of applications which were previously too computationally intensive to be practical. In this talk, we first explore the machinery required to understand and implement Bayesian uncertainty quantification using TMCMC. We then describe dissipative particle dynamics, a computational particle simulation method which is suitable for modeling biological structures on the subcellular level, and develop an example simulation of a lipid membrane in fluid. Finally, we apply the algorithm to a basic model of uncertainty in our lipid simulation, effectively recovering a target set of parameters (along with distributions corresponding to the uncertainty) and demonstrating the practicality of Bayesian uncertainty quantification for complex particle simulations. (Received August 20, 2018)