1145-65-302 **Kit Newton*** (kcnewton@math.wisc.edu), **Qin Li** and **Andrew Stuart**. *Diffusive Optical Tomography in the Bayesian Framework.*

Optical tomography, mostly used in medical imaging, is a technique for constructing optical properties in tested tissues via measurements of the incoming and outgoing light intensity. Mathematically, light propagation is modeled by the radiative transfer equation (RTE), and optical tomography amounts to reconstructing the scattering and absorption coefficients in the RTE using the boundary measurements. We study this problem in the Bayesian framework, and pay special attention to the strong scattering regime. Asymptotically, when this happens, the RTE is equivalent to the diffusion equation (DE), whose inverse problem is severely ill-posed. We study the stability deterioration as the equation changes regimes and prove the convergence of the inverse RTE to the inverse DE in both nonlinear and linear settings. (Received August 29, 2018)