1145-60-1925 **William A Massey*** (`wmassey@princeton.edu`), ORFE Department, Sherrerd Hall, Princeton University, Princeton, NJ 08544. *Dynamic Queueing Transience.*

Inspired by communication systems and healthcare services, we summarize the innovative stochastic analytic methods developed to understand the transient behavior of dynamic rate queues. The static, steady-state, equilibrium analysis for queues with constant rate parameters no longer applies here. For stochastic queueing models that are typically time-inhomogeneous or have time-varying parameters, their evolution is best summarized by deterministic dynamical systems.

Many of these new insights are obtained by applying a specific asymptotic method called uniform acceleration. This scaling analysis can be applied to the transition probabilities of the underlying dynamic rate Markovian models. When these same asymptotics are applied directly to the random sample path behavior of a large class of queueing models, they also yield both functional strong law of large numbers and functional central limit theorems that gives us our dynamical systems. We can also find these associated differential equations directly for many queueing models by appealing to the theory of Poisson random measures or Hermite polynomial closure approximations applied to Gaussian random variables. (Received September 24, 2018)