- **Motivation**

  - estimation and control over lossy networks figures prominently in many cyber-physical systems
  - central to the study of such systems is the behavior of *random* Lyapunov and Riccati recursions

- **Challenge**

  - tools for analyzing such systems are woefully lacking---ostensibly because the recursions are both nonlinear and random, and hence intractable to analyze exactly

- **Approach: Large Random Matrix Theory**

  - a *high-dimensional matrix-valued nonlinear and stochastic* recursion is replaced by a *scalar-valued deterministic functional* recursion (involving a suitable transform of the eigendistribution)

- **Benefits**
  - stability analysis, cost analysis (average and worst-case), *universal behavior* exhibited