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Title: MCMC in large-n and high-dimensional problems:  
Case studies and general principles  

Abstract:  
As a set of procedures, Bayes seemingly has a lot to offer in modern applications. Hierarchical modeling, shrinkage, automatic interval estimates, multiplicity control, and the ability to test complex hypotheses are often touted as advantages of the Bayesian paradigm. However, even if one wants to adopt a Bayesian approach to inference, computation often makes it impractical to do so. MCMC is costly, and alternatives provide good approximations only in limited settings. In this talk, I illustrate some reasons why MCMC commonly scales poorly in big-n or high-dimensional (large p) settings. Through case studies and a bit of theory, I elucidate some failure modes of commonly used MCMC algorithms for regression models. In each case, I propose an alternative algorithm that scales better with n and/or p. These examples support the hypothesis that careful application of the existing MCMC toolbox combined with thorough understanding of the problem is often sufficient to obtain an algorithm with good scaling properties without resorting to exotic computational tools.