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# In This Issue

## MARKOV CHAIN MONTE CARLO

One of the most active areas in statistical computing over the past few years has involved algorithms for generating observations from a posterior distribution, or more accurately, from a Markov chain with the posterior as its stationary distribution. In specifying how the observations are to be generated, these algorithms determined choices for the transition kernel of the Markov chain. Alternatives include the Gibbs sampler and the Metropolis algorithm, both of which are special cases in the broad class of chains discussed by Hastings in a 1970 paper. In their paper appearing in this issue, Julian Besag, Peter Green, David Higdon and Kerrie Mengersen begin by reviewing these methods and commenting on the choice among the sampling schemes.

Much of the early work on this topic arose in spatial statistics, which gets special emphasis by Besag, Green, Higdon, and Mengersen. The authors treat three substantial applications, thereby illustrating both the general power of these computational techniques and the usefulness of their own formulation and specific suggestions. Commentaries are provided by Arnoldo Frigessi; Alan Gelfand and Bradley Carlin; Charles Geyer; G. O. Roberts, S. K. Sahu, and W. R. Gilks; Wing Wong; and Bin Yu. They return to several of the important issues discussed by Besag et al. including the authors' emphasis on Bayesian methods, their choices of priors, the special role of Gibbs sampling, and the virtues of reversible chains; the discussants also make a variety of points about alternative versions of chains and their convergence.

## SELF-SIMILARITY OF ETHERNET TRAFFIC

The speed of communication through Local Area Networks (LANs) has been increasing, and is expected to increase dramatically in the near future. To make effective use of new technology, the behavior of LAN traffic must be understood. In their paper, Walter Willinger, Murad Taqqu, Will Leland and Daniel Wilson focus on Ethernet traffic and analyze an extensive, high-quality data set. They find that models based on self-similar processes—intuitively, processes that look the same when the scale is changed—fit the data well. A conclusion is that commonly used communications traffic models are woefully inadequate in many respects, at least for modeling certain kinds of LAN traffic. The authors go on to discuss efficient parameter estimation and computation for self-similar processes. This line of work poses new problems for queuing theory and analysis of high-speed networks.

## SURVIVAL IN DYNAMIC ENVIRONMENTS

In the reliability literature, the analysis of failure in the presence of time-dependent covariates (in the form of stresses) has received recent attention. In his review, Nozer Singpurwalla shows how stochastic processes have been used to model an item's "wear" or, alternatively, its failure rate (or hazard). Sometimes the covariates themselves are considered to follow stochastic processes. In addition, several components in a system may be analyzed simultaneously. Singpurwallla organizes the various approaches, emphasizing that modern computational methods should make feasible the use of previously intractable models.

## HIROTUGU AKAIKE

Students throughout statistics learn about the "Akaike Information Criterion" but few are aware of Akaike's immediate motivation, or the evolution of his thinking, in deriving it. That story is told here, in an interview conducted by David Findley and Emanuel Parzen. Akaike's education, his extensive involvement with engineering problems of prediction and control, and the origins of his influential contributions on these topics are also reviewed. During the conversation Akaike discusses aspects of his philosphical perspective on statistics and briefly describes his work as Director General of Japan's Institute of Statistical Mathematics.

## FRANK PROSCHAN

Like several other major figures in statistics, Frank Proschan began his higher education at City College in New York toward the end of the 1930's. During his interview, conducted by Myles Hollander with additional comments and queries by Albert Marshall, Proschan talks about his subsequent work in the U.S. government (where he began as a cement mixer) and then at Sylvania, where the problem of optimally designing a replacement

tool kit ultimately led to his Ph.D. dissertation topic on total positivity at Stanford. Proschan also discusses the interesting and supportive working environment he experienced at the Boeing Scientific Research Laboratories, highlights some of the extensive collaborative research he conducted after becoming a Professor of Statistics at Florida State University in 1970, and gives some thoughts on the writing of his five books, four of which were on aspects of reliability theory.