

## **INTRODUCTION**

### **SOME ASPECTS OF THE SHEFFIELD SYMPOSIUM**

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For several years the Institute of Mathematical Statistics (IMS) has attempted to focus special and extra attention on some of the more prominent directions in probability and its applications. In accordance with this initiative the Symposium on Applied Probability at Sheffield in August 1989 was sponsored jointly by the IMS and the University of Sheffield.

This volume contains several major papers of current interest in the important area of applied probability. The research topics covered include models in epidemiology, genetics, random fields, branching processes, random walks, directed polymers and evolution time-scales among others. The readers will find a broad array of interesting problems discussed by eminent scientists in these exciting fields of applied probability.

This volume contains 18 technical articles on various topics of current interest, in addition to the introductory articles by Joe and Chris on some of the historical background and the current and future developments in applied probability. A brief outline of the contents follows. Henry E. Daniels discusses perturbation approximations for epidemics, and Peter Whittle introduces processes with history-dependent transition intensities. Peter Jagers et al give an account of their thoughts on the time scale of evolution under an attractive title: "When did Joe's great ... grandfather live?" David Aldous studies random walk on finite graphs whereas J. D. Biggins discusses martingales in branching random walks. Niels Becker is concerned with the analysis of infectious disease data via martingales. D. R. Grey and Lu Zhunwei consider extinction probabilities in branching processes with random environments, and Andre Adler discusses accumulation points in a random walk. P. E. Greenwood and Mina Ossiander give a scholarly account of a central limit theorem for evolving random fields. Erwin Bolthausen discusses directed polymers in a random environment. Michael Phelan discusses the use of point processes in modeling and inference for random fields for rainfall. Kenneth Hochberg gives an interesting account of measure-valued pro-

cesses. John Kolassa and Joop Mijnheer discuss saddle point approximations and double stable integrals, respectively. The remaining four papers are on various aspects of models in genetics. David Branson studies an urn model for certain genetic processes, and Robert Griffiths discusses the ancestral graphs. Chris Cannings and G. T. Vickers give an account of genealogy patterns. Finally, Stanley Sawyer studies gene-conversion.

The excellent program of the Symposium, as represented by the selected papers in this volume, attracted many serious researchers to this Symposium which totalled over 150 participants. Another reason for the success of the Sheffield Symposium was that it is well recognized that Sheffield served as a major international center for the development of applied probability as a research area during 1965-1974 under the direction of Joe Gani. Furthermore, Sheffield continues to host the journals published by the Applied Probability Trust. During the symposium, a special banquet was held in Joe's honor. In his talk at the banquet, Joe gave an illuminating account of some of his efforts in developing the Department at Sheffield, and Chris Heyde delivered an address highlighting some of the many achievements of Joe Gani. Both Joe and Chris agreed to our request to contribute to this volume, and their articles which follow form an important part of this Introduction.