

INTRODUCTION TO THIS ISSUE

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This issue of the Rocky Mountain Journal of Mathematics is devoted to papers arising from the Conference on Deterministic Differential Equations and Stochastic Processes Models for Biological Systems held at the D. H. Lawrence Ranch, San Cristobal, New Mexico from August 1-5, 1977. The conference was sponsored by the Rocky Mountain Mathematics Consortium and funded by the National Science Foundation. Richard Griego and David Sanchez of the University of New Mexico were co-directors of the conference.

The conference featured the following invited lecturers:

1. Two lectures by Joel Cohen of Rockefeller University on graph theoretical models of food webs and on ergodic theorems of population dynamics. The abstracts of Professor Cohen's talks are presented in this issue.

2. Two lectures by Frank Hoppensteadt of the University of Utah on synchronization of cicada emergences and on slow selection analysis of genetics traits. The material of Professor Hoppensteadt's second talk is presented here.

3. Two lectures by Simon Levin of Cornell University on adaptations to heterogeneous environments and on diffusion-reaction type systems in modelling spatially distributed populations.

4. Two lectures by Michael Rosenzweig of the University of Arizona on competitive speciation and the evolution of niche space and on a density dependent theory of habitat selection.

5. A lecture by Fred Brauer of the University of Wisconsin on the harvesting of predator-prey systems. The substance of this talk is presented in this issue.

6. A lecture by Alan Perelson of the Los Alamos Scientific Laboratories on stochastic models for the evolution of multi-gene families. Dr. Perelson's talk is presented in this issue.

7. A lecture by Benjamin White of the California Institute of Technology on interacting species in random environments. This material is presented in this issue.

Dr. Stanislaw Ulam, Professor emeritus of the University of Colorado, presented a special informal after-dinner talk. His remarks on the nature of mathematical inquiry, computers and the future of mathematics were very well received and greatly appreciated. Also, Cleofes Vigil, noted Taos folklorist, presented a delightful sampling of New Mexican songs and folktales after dinner on the last day of the conference.

In addition there were a number of informal workshops and contributed papers on such topics as immunology, deterministic and stochastic models of biological systems, and biological optimization. A number of the participants submitted papers or summaries of their contributions and these are included in these proceedings.

The conference provided a setting for interaction between biologists and mathematicians, and indeed, there was an interchange that was stimulating and fruitful for both groups. A great variety of mathematical models, both deterministic and stochastic, for biological problems were presented and discussed. It is clear that biological problems pose formidable and exciting challenges to biologically inclined mathematicians and to biologists with a mathematical bent. Existing and new mathematical methods are being employed successfully in understanding biological phenomena. This conference illustrated the vitality of this field of scientific endeavor and the conference was a success in contributing, even if only in a small way, to further progress in this work.

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