



Foreword

The last twenty years have seen an enormous growth in the subject area of mathematical biology, which incorporates the application of mathematics to problems in ecology, medicine, and evolution, as well as biology. This growth has occurred, in part, in response to major technological advances in the life sciences. For example, advances in molecular and cellular biology have resulted in the rapid development of experimental research into the biochemical mechanisms underlying tissue disorders and diseases; large scale studies are being carried out to chart the dynamics of disease spread; data on pollution and environmental hazards in accumulating as more sophisticated measuring techniques are developed.

Mathematical modeling can play a crucial role in the life sciences by providing a theoretical framework within which this mass of experimental information can be analysed. In turn, the life sciences are the source of a great number of very interesting and challenging mathematical modelling problems. As the complexity of the modelling increases, our analytical tools and computational skills are stretched beyond their limits, resulting in exciting new developments. However, for theoretical models to be relevant and useful, it is vital that models are developed in collaboration with experimentalists, and that predictions resulting from the analyses of models are experimentally testable. This experimental feedback enhances our understanding of the phenomenon being modelled, which leads to more accurate hypotheses on which models can be built, resulting in more detailed model predictions. Only by this close interaction between theory and experiment can mathematics genuinely help to elucidate the underlying mechanisms that govern the phenomenon being modelled.

Mathematical biology is now a well established subject, as can be seen by the increasing number of centres for mathematical biology that are arising in universities throughout the world. The number of international conferences in the area is increasing, as are the number of young researchers, attracted into the field by the excitement of a new and growing subject.

This conference, the first international conference in biomathematics to be held in Bulgaria, brings together researchers from many different countries working on a diverse number of applications, ranging from medical applications, such as in physiology, immunology, neuroscience and biomedicine, to population dynamics and ecological and environmental modelling; from neural networks to evolutionary biology and genetics. On the more theoretical side, the advanced methodological and computational tools being developed to analyse models are also presented.

The breadth of interests of the participants at this meeting provides an excellent opportunity for the cross-fertilization of ideas which, it is hoped, will have an impact on the field.

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