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This book is about the ways in which many animals form groups, for instance, schools of fish, flocks of birds, and swarms of insects. Covering both invertebrate and vertebrate species, the authors investigate three-dimensional animal aggregations from a variety of disciplines, from physics to mathematics to biology.

Each of the four main sections of the book has an introductory chapter that lays the framework for subsequent chapters. The first section is devoted to the various methods, mainly optical and acoustic, used to collect three-dimensional data over time. The second section focuses on analytical methods used to quantify pattern, group kinetics, and interindividual interactions within the group. The section on behavioral ecology and evolution deals with the functions of aggregative behavior from the point of view of an inherently selfish individual member. The final section presents an alternative to the empirical study of animal aggregation, namely the use of models to elucidate how group dynamics at the individual level creates emergent patterns at the level of the group.

In keeping with the interdisciplinary nature of the subject, the book is designed to allow the reader to jump across chapters, and even across sections, without a loss of continuity.

Researchers interested in behavioral ecology or modeling biological systems would benefit from reading this book.

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# ANIMAL GROUPS IN THREE DIMENSIONS

*Edited by*

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To Akira Okubo

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