

## Book Reviews

### ***Biological Data Analysis: A Practical Approach (Practical Approach Series 115) by J. C. Fry***

*IRL Press at Oxford University Press, Oxford New York and Tokyo, 1992. 418 pages.*

Reviewed by Michael L. Johnson, Departments of Pharmacology and Internal Medicine, Box 448, University of Virginia Health Sciences Center, Charlottesville, VA

"This volume aims to allow biologists to carry out accurate statistical analysis and modelling with the minimum chance of making mistakes." (Preface) An error-free statistical analysis is obviously a requirement for all scientific endeavors. However, too few graduate students in biological disciplines are well versed in the application of statistical methodologies. Thus books such as the present example play an important role in the education of students. They are also important for the continuing education of established researchers, many of whom were also not well educated in statistics.

This book, like many other books, describes several classical statistical methods such as analysis of variance, bivariate regression, multiple regression, ordination, classification, and time series analysis. The distinguishing feature of this work is that it describes these from the perspective of biologists with examples that are of some interest to biologists. Many specific examples in the book use, and describe in some detail, commonly available software such as Minitab. The book is "aimed at final-year undergraduate students, masters degree students, postgraduate and professional biologists in industry, research and education." (Preface) It assumes that the reader already has some understanding of de-

scriptive statistics (e.g., means and variance) and elementary distributions (e.g., Gaussian and Poisson).

Also included is a brief introduction to dynamic and compartmental models. However, as the preface notes, "readers with special interest in this subject would need to read other books."

The usefulness of this book will depend upon the reader's application and interests. If the reader is interested in the latest nonlinear dynamic and chaos theory methods for the analysis of time series data then this is not the book. If the reader is interested in fitting time domain fluorescence lifetime data to mechanistic models that include terms for collisional quenching and diffusion then this is not the book. If the reader wishes to distinguish between different statistical thermodynamic mechanistic models of cooperativity in human hemoglobin then, again, this is not the book. However, an understanding of the techniques required for these complex statistical analyses is based on the elementary statistical methods outlined in this book. The scope of this book is by necessity limited, but the included topics are covered clearly and in sufficient detail to be useful to biological researchers. Therefore, this book may be of some interest to biologists as an introductory text.

### ***Introduction to Scanning Tunneling Microscopy by C. Julian Chen***

*Oxford University Press, New York, 1993. 472 pages. \$65.00*

Reviewed by Stuart M. Lindsay, Department of Physics and Astronomy, Arizona State University

If the last thing you heard about biological scanning tunneling microscopy was artifacts-on-graphite, it is time to look again. Even if you have no interest in the technique beyond the scanning tunneling microscope's (STM's) "simple" cousin (the atomic force microscope, AFM) you may well want this book. Proximal probe microscopes are, when used to their full potential, probes of the interatomic interactions between a probe and a sample. These interactions are not well described in classical terms. They are quantum mechanical and chemical in nature, and this is the text to read in order to grasp the fundamentals. To write the definitive book, Julian Chen has had to give coherence to a wide

body of new knowledge and had to do so in a way that is accessible to an inherently interdisciplinary audience. He has succeeded brilliantly. Unfortunately, from the perspective of readers of *Biophysical Journal*, "Biological Applications" merits a scant page. Chen has rightly sought to incorporate that which is "fundamental." One suspects that the controversy that surrounded much of the early biological work has disqualified it in his eyes. That having been said, a number of papers have been published since this book was prepared that demonstrate high-resolution images of biopolymers, membranes, and organic adlayers obtained by STM. STM images of DNA in its natural, hydrated state have far higher