there is so much pressure on a researcher to do chemistry with a purpose, sustainable chemistry, applied chemistry, chemistry for the societal wellbeing, and goodness only knows what else, it was a refreshing excursion for me to read a book in hard copy form, over a few months, on a topic that many would term old fashioned or even unnecessary. However, these unnecessary things are, to my view, a vital part of academic scholarship and this is what happily distinguishes academics from the rest of the world.

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Annual Review of Biophysics, 2016. Ken A. Dill and Xiqowei Zhuang (eds). Annual Reviews, 4139 El Camino Way, P. O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 45. vi + 401 pages. Price: US$ 102.

In recent days, biophysical techniques are very popular for scientific research areas where theoretical and practical physics and mathematics are used to study biological systems. These days biophysical methods have emerged as a dependable option for researchers working in the areas of computational and experimental biology to answer diverse biological questions, such as transcription dynamics, protein folding, structure and function of biomolecules.

The past two decades have witnessed tremendous advancements pertaining to scientific research in biophysical techniques, like spectroscopy, different types of imaging techniques, molecular dynamics and so on. However, there are very few books in existing literature that would serve as a comprehensive guide for the current biophysical techniques and applications for scientific researchers. A uniform review book in Biophysics is the need of the day for researchers. Several excellent papers and review articles are available on applications and methods of biophysical techniques, which cover biophysical application in medical sciences, membrane biophysics, protein crystallography, and different kinds of spectroscopy techniques, but most of them are scattered in different journals. Simultaneously, many biochemistry books cover certain chemical and structural aspects of bio-molecules. However, none of these papers, reviews or textbooks is sufficient to learn about modern aspects and approaches of newly developed biophysical techniques and applications. It is also very hard to find all of the new techniques together. The annual review book is an excellent resource for graduate, undergraduate and postgraduate students, researchers, educationists, and scientists, that will assist them in understanding the advanced biophysical techniques.

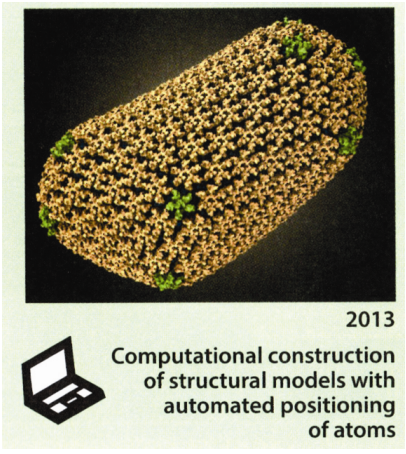
More of these kinds of biophysical review books are required for undergraduate students or researchers from different biological backgrounds, who work/enter into the discipline of biophysics. These biophysical review books will help researchers understand the newly developed biophysical techniques and their applications in biology and will also help reduce the high cost of the books, making them easily available to many researchers.

The book *Annual Review of Biophysics* by K. A. Dill and X. Zhuang is an excellent review book for researchers on recent technological advancements in biophysics. As a faculty scientist working in the field of biophysics, I appreciate the fact that the book covers most of the advanced biophysical topics, ranging from their usage in genomic studies to protein structure determination. This book illustrates how scientists are using biophysical techniques for imaging the specific genomic DNA in living cells, transcription dynamics in living cells, *in vivo* and *in vitro* protein folding and protein structure determination. This book also covers all aspects of using biophysical techniques for genomic studies to protein expression, folding and structural studies, which is an excellent effort by the authors and editors. These multidirectional views may help researchers and scientists to obtain all the advanced concepts of biophysical techniques in one book.

The book consists of 401 pages. It covers important areas in basic biophysics, bioenergetics, bioimaging techniques, computation biophysics and experimental membrane biophysics, which gives researchers adequate knowledge about current biophysical techniques.

The first part of the book covers mostly *in vivo* genomic studies. Recent biophysical experiments like single-molecule spectroscopy and microscopy, single-molecule imaging and live cell imaging give excellent dimension of the study of various biological problems, like nucleic acid dynamics, DNA–protein interaction, and imaging of specific genomic DNA. The second part of the book focuses on protein folding using some traditional biophysical methods like NMR, FRET, mass spectrometry, etc. Most of the reviews in this book focus on newly developed or modified aforesaid methods. The third part of the book focuses on recently developed computational methods, like Molecular Simulation, MDFF to determine atomic structure from cryo-EM and X-ray crystallography data. Also computer simulation study of nascent protein behaviour is an advanced concept in structural and functional studies of biomolecules which have been captured in this book. At the end of the book, the chapter on recently developed biophysical technique 'The Radical-Pair Mechanism of Magnetoreception' would have a high impact in sensory biology research. This chapter explains in details the chemical and physical aspects of the radical-pair mechanism. This could assist many biologists while studying sensory biology.

There are some inadequacies in the book. There is no preface for the book. Sometime this makes it difficult for the reader to understand the levels in the book. For high school graduates or undergraduates attempting to enter into this new field (e.g. biophysical research), it is quite difficult to understand the main targets of this book without a proper preface. This book is not a basic biophysics study textbook. This book is



more appropriate for a scientific researcher.

The authors of this book have contributed greatly and covered most of the advanced biophysical techniques. Unfortunately, the most advanced biophysical techniques, such as 'single particle cryo-electron microscopy' and 'cryo-electron tomography' have been completely ignored. There are three to four chapters, where authors explain computer simulation, flexile fitting and thermally activated transient receptor potential channels and in all cases the authors have used cryo-EM structures to proceed further in their experiments. However, in 'Computational Methodologies for Real-Space Structural Refinement of …' chapter, the author has mentioned a gold standard FSC calculation, cryo-EM map validation, Fourier Shell Correlation (FSC). However, in my point of view, it is quite difficult for a reader to understand these concepts without having a proper chapter on application of cryo-EM. From 2010 to 2014, there has been a tremendous advancement in cryo-EM research field and this is one of the heavily popular biophysical techniques in recent days for structural characterization of biomolecules. Hence I feel that cryo-EM should have been included in this book.

Third, 'Cell Geometry: How Cells Count and Measure Size' chapter is a bit challenging to comprehend. Some extra figures (introduction and results) can illustrate this chapter better than the present representation. If someone is not familiar with this particular research, it is hard to understand the same. Also, in the second chapter (p. 25), many experimental results are presented without any figures. For this readers have to visit original articles to extract the information. One or two extra figures might have helped the reader understand the topic easily.

While teaching biophysics and performing research in biophysics and biochemistry, teachers might find the lack of a proper review book, which covers most of the recent biophysical techniques and their applications, as a big obstacle in their efforts. I would recommend this book to my students and keep one book in my laboratory and university library. It is complete from all points of view and serves as an important link for a new entrant in biophysics to connect to the world of structure, function and interaction of biomolecules to understand the environment and our ecosystem.

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