

Preface

This is a continuation of the journey I embarked on with my first book on biophysics in 2017. A seed that was planted by the indefinite curiosity of the students I teach and the young scientists who try to amalgamate interdisciplinary approaches to enhance the worth of their research endeavors. These driving forces bear fruit in the form of the present book. There are various aspects of data analysis that have been emphasized in this book. The book is an interface that relates in-depth analysis of data generated from various biological platforms. The enormous amounts of data generated using several experimental approaches need to be interpreted in simple terms relating the biology and physics at the atomic level. The book is compiled with a focus on the target audience consisting of graduate students, young scientific professionals, and technicians from the industry sector who can use the data processing information for various techniques in this book to help them process their own data with ease.

The output files generated from various techniques are often not recognized by common user-friendly programs. When students read research papers they face a lot of difficulty in deriving the necessary information to process their raw data files. This book includes sample data files and explains the usage of equations and web servers cited in research articles to extract useful information from their own biological data. Details related to raw data files, data processing strategies, web-based sources relevant for data processing, and examples provide a unique perspective to the present effort. Unlike the other available books in the market on data analysis, which place more emphasis on computational and programming aspects, this book deals with biological aspects of data analysis underpinning the various experimental approaches used in modern biology.

The book is divided into 10 chapters dealing with different experimental techniques, namely mass spectroscopy, circular dichroism, fluorescence spectroscopy, high throughput sequencing, nuclear magnetic resonance, Fourier-transform infrared spectroscopy, microscopy, flow cytometry, isothermal titration calorimetry, and microbiome data analysis. Each chapter is a contribution from experts in the field thus enhancing the quality of the content and keeping the practical approach intact. It provides a quick guide for understanding experimental data. Each chapter begins with an introduction that guides the reader describing the structure, composition, and application of the chapter with the help of selective examples. The conclusion at the end of each chapter summarizes the key points and includes suggestions wherever required. However, an expert looking for a detailed explanation of anyone technique is advised to read further from suggested references given at the end of each chapter. I firmly believe that the book provides a valuable resource guide for students to plan and execute their own research experiments with a clear and simple understanding developed after reading this book.

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