PREFACE

In the *Biomedical Applications of Biophysics*, Volume 3 of the *Handbook of Modern Biophysics,* the authors have added to the topics introduced in Volume 1, *Fundamental Concepts in Biophysics*. These additional topics help trace the broad field of biophysics.

Patrice Koehl starts the book with an introduction to protein structure prediction based on energetics, homology modeling, and ab-initio calculations. Dickey and Faller follow with a "how-to approach" to model biomembranes. Brynda and Ames present the principles of magnetic resonance techniques, which researchers often use to solve protein and biomembrane structure. Brynda encapsulates the theoretical and methodological concepts of electron paramagnetic resonance spectroscopy. James Ames covers correspondingly the theory and application of biomolecular NMR spectroscopy. Because optical techniques can also reveal biomolecular structure, Jie Zheng discusses the commonly used fluorescence resonance energy transfer (FRET) in determining molecular distance. Chu and Lebrilla then turn their attention to a pivotal method of analytical chemistry, mass spectrometry. Green and Cheng show how transmission electron microscopy and computer-aided image processing can help visualize macromolecules in three dimensions. Finally, Weeks and Huser introduce to the reader the use of inelastic scattering of Raman spectroscopy to investigate the living cell.

Each chapter presents the fundamental physics concepts, describes the instrumentation or technique, and illustrates the application in studying current biomedical problems. With the addition of problem sets, further study, and references, the interested reader can use the chapters to launch an independent exploration of the ideas presented.

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