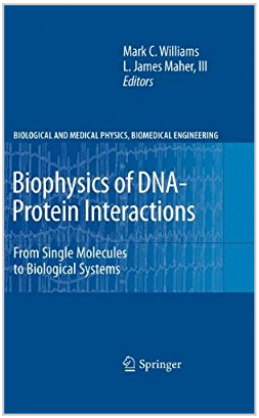

Biophysics of DNA-Protein Interactions: From Single Molecules to Biological Systems (Biological and Medical Physics, Biomedical Engineering)

From Springer

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Depite the rapid expansion of the field of biophysics, there are very few books that comprehensively treat specific topics in this area. Recently, the field of single molecule biophysics has developed very quickly, and a few books specifically treating single molecule methods are beginning to appear. However, the promise of single molecule biophysics is to contribute to the understanding of specific fields of biology using new methods. This book would focus on the specific topic of the biophysics of DNA-protein interactions, and would include the use of new approaches, including both bulk methods as well as single molecule methods. This would make the book attractive to anyone working in the general area of DNA-protein interactions, which is of course a much wider market than just single molecule biophysicists or even biophysicists.

The subject of the book will be the biophysics of DNA-protein interactions, and will include new methods and results that describe the physical mechanism by which proteins interact with DNA. For example, there has been much recent work on the mechanism by which proteins search for specific binding sites on DNA. A few chapters will be devoted to experiments and theory that shed light on this important problem. We will also cover proteins that alter DNA properties to facilitate interactions important for transcription or replication. Another section of the book will cover the biophysical mechanism by which motor proteins interact with DNA. Finally, we will cover larger protein-DNA complexes, such as replication forks, recombination complexes, DNA repair interactions, and their chromatin context.

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Editorial Review

From the Back Cover
This book presents a concise overview of current research on the biophysics of DNA-protein interactions. A wide range of new and classical methods are presented by authors investigating physical mechanisms by which proteins interact with DNA. For example, several chapters address the mechanisms by which proteins search for and recognize specific binding sites on DNA, a process critical for cellular function. Single molecule methods such as force spectroscopy as well as fluorescence imaging and tracking are described in these chapters as well as other parts of the book that address the dynamics of protein-DNA interactions. Other important topics include the mechanisms by which proteins engage DNA sequences and/or alter DNA structure. These simple but important model interactions are then placed in the broader biological context with discussion of larger protein-DNA complexes . Topics include replication forks, recombination complexes, DNA repair interactions, and ultimately, methods to understand the chromatin context of the cell nucleus. This book will be of interest to readers who wish to explore current biophysical approaches to DNA-protein interactions across multiple levels of biological complexity.

Users Review

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Chris Hernandez:

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