

Recent advances in single-molecule science have led to a new branch of science, single-molecule cellular biophysics, combining classical cell biology with cutting-edge single-molecule biophysics. This textbook explains the essential elements of this new discipline, from state-of-the-art single-molecule techniques to real-world applications in unravelling the inner workings of the cell.

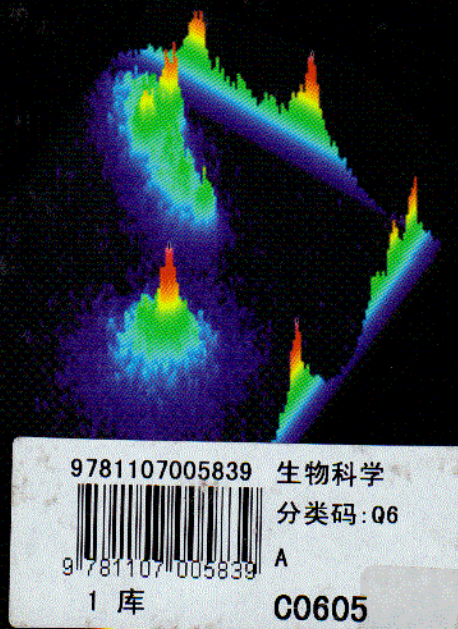
Every effort has been made to ensure the text can be easily understood by students from both the physical and life sciences.

- Mathematical derivations are kept to a minimum, whilst unnecessary biological terminology is avoided.
- Text boxes provide readers from either background with additional information.
- 100 end-of-chapter exercises are divided into those aimed at physical science students, those aimed at life science students, and those that can be tackled by students from both disciplines.

The use of case studies and real research examples makes this textbook indispensable for undergraduate and graduate students entering this exciting field.

Mark C. Leake is a biophysics group-leader at the University of Oxford, heading an interdisciplinary team in live cell single-molecule research using cutting-edge biophotonics and state-of-the-art genetics. His work is highly cited and he has won many fellowships and prizes.

Cover illustration: software reconstruction of the molecular structure, and step-wise angular dwell-time distribution of the flagellar rotary motor embedded in the cell membrane of bacteria, based on experimental data obtained using single-molecule cellular biophysics techniques. Image courtesy of Professor Akihiro Ishijima, Nano-Biophysics Laboratory, Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Japan.



9781107005839



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UNIVERSITY PRESS
www.cambridge.org

ISBN 978-1-107-00583-9



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