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# Zhuang Research Lab Xiaowei

## Zhuang

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## Single-molecule Techniques

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### MAYA NATHANIAL

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*Techniques and Applications* BoD –  
Books on Demand

In the last three decades, the fast development of single-molecule techniques has revolutionized the way we observe and understand biological processes. Some of these techniques have been further adapted as tools for bioanalysis. This book summarizes and details the frontiers of the development of these tools as well as their applications. The contributors are young and established researchers in their respective fields. The main content originates from the lecture notes of a chemistry graduate course taught by the book editor at Nanjing University. This book is suitable to be used as a textbook for a high-level undergraduate or an entry-level graduate course. The systematically written content provides a thorough illustration of the mechanisms of each methodology presented.

Covalent Organic Frameworks CSHL  
Press

Aggregation-Induced Emission (AIE): A Practical Guide introduces readers to the topic, guiding them through fundamental concepts and the latest advances in applications. The book covers concepts, principles and working mechanisms of AIE in AIE-active luminogens, with different classes of AIE luminogens reviewed, including polymers, three-dimensional frameworks (MOFs and COFs) and supramolecular gels. Special focus is given to the structure-property relationship, structural design strategies, targeted properties and application

performance. The book provides readers with a deep understanding, not only on the fundamental principles of AIE, but more importantly, on how AIE luminogens and AIE properties can be incorporated in material development. Provides the fundamental principles, design and synthesis strategies of aggregation induced emission materials Reviews the most relevant applications in materials design for stimuli-responsive materials, biomedical applications, chemo-sensing and optoelectronics Emphasizes structural design and its connection to aggregation induced emission properties, also exploring the structure-property relationship  
Science Yale University Press

The Mouse Nervous System provides a comprehensive account of the central nervous system of the mouse. The book is aimed at molecular biologists who need a book that introduces them to the anatomy of the mouse brain and spinal cord, but also takes them into the relevant details of development and organization of the area they have chosen to study. The Mouse Nervous System offers a wealth of new information for experienced anatomists who work on mice. The book serves as a valuable resource for researchers and graduate students in neuroscience. \* Visualization of brain white matter anatomy via 3D diffusion tensor imaging contrasts enhances relationship of anatomy to function \* Systematic consideration of the anatomy and connections of all regions of brain and spinal cord by the authors of the most cited rodent brain atlases \* A major section (12 chapters) on functional systems related to motor control, sensation, and behavioral and emotional

states, \* Full segmentation of 170120+ brain regions more clearly defines structure boundaries than previous point-and-annotate anatomical labeling, and connectivity is mapped in a way not provided by traditional atlases A detailed analysis of gene expression during development of the forebrain by Luis Puellas, the leading researcher in this area. \* Full coverage of the role of gene expression during development, and the new field of genetic neuroanatomy using site-specific recombinases \* Examples of the use of mouse models in the study of neurological illness

### **Virus Structure and Mechanics**

Humana

A comprehensive volume that brings together authoritative overviews of single molecule science techniques from a biological perspective.

Physical Virology Amer Chemical Society

This handbook describes experimental techniques to monitor and manipulate individual biomolecules, including fluorescence detection, atomic force microscopy, and optical and magnetic trapping. It includes single-molecule studies of physical properties of biomolecules such as folding, polymer physics of protein and DNA, enzymology and biochemistry, single molecules in the membrane, and single-molecule techniques in living cells.

### **Index Veterinarius** Frontiers Media SA

CRISPR/Cas is a recently described defense system that protects bacteria and archaea against invasion by mobile genetic elements such as viruses and plasmids. A wide spectrum of distinct CRISPR/Cas systems has been identified in at least half of the available prokaryotic genomes. On-going structural and functional analyses have resulted in a far greater insight into the functions and possible applications of

these systems, although many secrets remain to be discovered. In this book, experts summarize the state of the art in this exciting field.

### **Stimulated Raman Scattering**

#### **Microscopy** Royal Society of Chemistry

Although the process of understanding the biological functions of carbohydrates has developed slowly due to the lack of efficient approaches in obtaining and studying these structures, in the past two decades, remarkable advances have been made in chemical and chemoenzymatic synthesis of carbohydrates and glycoconjugates. The material presented in this volume shows how a better understanding of the structure and the function of carbohydrate-containing bacterial cell wall has revealed that carbohydrate-containing molecules and carbohydrate-like structures are useful as carbohydrate-based anti-microbial vaccines, anti-viral drugs, anti-coagulants, anti-cancer drugs, and potential anti-cancer vaccines. In addition, the text explores the important roles that novel glycolipids have been found to play in the immune system. Metabolic engineering has demonstrated itself as an efficient approach to probe and manipulate biological functions of carbohydrates both in vitro and in vivo. Automated glycan analysis, carbohydrate microarrays, and novel high-throughput screening methods have hastened the analysis and the understanding of carbohydrate-containing structures. Polypeptide-based glycopolymers have been developed for the study of multivalent binding events of carbohydrates and proteins. This text presents examples of these recent developments in using chemical techniques and tools to study glycobiology. This is an excellent

reference book for upper-division undergraduate students, graduate students, and researchers who are interested in carbohydrate-related medicinal chemistry, organic chemistry, biology, and chemical biology.

*Imaging Neurons* Jones & Bartlett Learning

This book brings a broad review of recent global developments in theory, instrumentation, and practical applications of electron microscopy. It was created by 13 contributions from experts in different fields of electron microscopy and technology from over 20 research institutes worldwide.

**13th International Conference, ICONIP 2006, Hong Kong, China, October 3-6, 2006, Proceedings, Part I** Single-Molecule Science From Super-Resolution Microscopy to DNA Mapping and Diagnostics

Now in its twelfth edition, Lewin's GENES continues to lead with new information and cutting-edge developments, covering gene structure, sequencing, organization, and expression. Leading scientists provide revisions and updates in their individual field of study offering readers current data and information on the rapidly changing subjects in molecular biology.

**Nobel Conference Lectures** Simon and Schuster

It is only recently, with the increasing interest in origami and folding in natural sciences and the humanities, that the fold as a new conception in a whole range of disciplines has begun to be conceived in a broader way. Folding as a material and structural process offers a new methodology to think about the close relationship of matter, form and code. It henceforth crosses out old dichotomies, such as the organic and the inorganic or nature and technology, and

blurs the boundaries between experimental, conceptual and historical approaches. This anthology aims to unfold this new interdisciplinary field and its disciplinary impact, ranging from materials science, biology, architecture, and mathematics to literature and philosophy.

**Aggregation-Induced Emission (AIE)**

Springer Science & Business Media

This student friendly text is a concise introduction to this key area of bioinorganic chemistry. The role of the transition metals in biological systems is currently a 'hot' area of research and all chemistry undergraduates should have an understanding of this area. Unlike other texts of the same subject this book is affordable and has been written in close consultation with University syllabuses in this area.

**On Folding** transcript Verlag

The three volume set LNCS 4232, LNCS 4233, and LNCS 4234 constitutes the refereed proceedings of the 13th International Conference on Neural Information Processing, ICONIP 2006, held in Hong Kong, China in October 2006. The 386 revised full papers presented were carefully reviewed and selected from 1175 submissions.

**Physical Review** Springer

This book explores a new challenge in virology: to understand how physical properties of virus particles (virions) and viruses (infected cells) affect the course of an infection. Insights from the emerging field of physical virology will contribute to understanding of the physical nature of viruses and cells, and will open new ways for anti-viral interference. Nine chapters and an editorial written by physicists, chemists, biologists and computational experts describe how virions serve as trail blazers in uncharted territory of cells.

The authors outline how particles change in composition as they interact with host cells. Such virus dynamics are crucial for virus entry into cells and infection. It influences the modern concepts of virus-host interactions, viral lineages and evolution. The volume gives numerous up-to-date examples of modern virology and provides a fascinating read for researchers, clinicians and students in the field of infectious diseases.

*Imaging* CRC Press

Scanning near-field optical microscopy (SNOM, also known as NSOM) is a new local probe technique with a resolving power of 10--50 nm. Not being limited by diffraction, near-field optics (NFO) opens new perspectives for optical characterization and the understanding of optical phenomena, in particular in biology, microelectronics and materials science. SNOM, after first demonstrations in '83/'84, has undergone a rapid development in the past two to four years. The increased interest has been largely stimulated by the wealth of optical properties that can be investigated and the growing importance of characterization on the nanometer scale in general. Examples include the use of fluorescence, birefringence and plasmon effects for applications in particular in biology, microelectronics and materials science, to name just a few. This volume emerged from the first international meeting devoted exclusively to NFO, and comprises a complete survey of the 1992 activities in the field, in particular the variety of instrumental techniques that are currently being explored, the demonstration of the imaging capabilities as well as theoretical interpretations - a highly nontrivial task. The comprehensive collection of papers devoted to these and related subjects

make the book a valuable tool for anybody interested in near-field optics.

**Who's Who in Science and Engineering 2008-2009** Cambridge University Press

The manipulation of cells and microparticles within microfluidic systems using external forces is valuable for many microscale analytical and bioanalytical applications.

Acoustofluidics is the ultrasound-based external forcing of microparticles with microfluidic systems. It has gained much interest because it allows for the simple label-free separation of microparticles based on their mechanical properties without affecting the microparticles themselves. *Microscale Acoustofluidics* provides an introduction to the field providing the background to the fundamental physics including chapters on governing equations in microfluidics and perturbation theory and ultrasound resonances, acoustic radiation force on small particles, continuum mechanics for ultrasonic particle manipulation, and piezoelectricity and application to the excitation of acoustic fields for ultrasonic particle manipulation. The book also provides information on the design and characterization of ultrasonic particle manipulation devices as well as applications in acoustic trapping and immunoassays. Written by leading experts in the field, the book will appeal to postgraduate students and researchers interested in microfluidics and lab-on-a-chip applications.

*Hi-C Data Analysis* CRC Press

The need to deal with complexity has become one of the salient characteristics of the postmodern era. In this original book, distinguished cell biologist Heinz Herrmann explores how we understand living and other complex systems. The conventional basis of understanding

rests on abstract general theories. Here, Herrmann proposes a new paradigm - conceptual continuity - as a means of comparing systems of divergent complexity and resolving problems in such complex systems as human societies. Herrmann envisions the inanimate world, life, and human existence as systems of increasing complexity that represent physical, biological, and sociopolitical realities. These systems may be related by a common form of understanding, conceptual continuity, that is established when two entities share a common element or form an intermediary complex. Herrmann compares the different ways that physics and biology reach conceptual continuity. In the ideal systems of physics, he says, the general abstractions of theories lead to the establishment of conceptual continuity. Yet this is not true in complex biological or sociopolitical systems, where identification of highly specific systems components is required to establish conceptual continuity. The author offers a historical survey and numerous examples to illustrate the range and meaning of conceptual continuity, and he proposes the paradigm not as an exclusive alternative but as a complementary mode of understanding complex systems.

Chemical Glycobiology Springer Science & Business Media

In recent years, imaging has rapidly become a tremendously valuable approach in nearly every field of biological research. Finding the right method and optimizing it for data collection can be a daunting process, even for an established imaging laboratory. *Imaging: A Laboratory Manual* is the cornerstone of a new laboratory manual series, designed as an

essential guide for investigators who need these visualization techniques. This first volume is meant as a general reference for all fields, and describes the theory and practice of a wide array of imaging methods. From the basic chapters on optics, equipment and labeling to detailed explanations of advanced, cutting-edge methods like PALM, STORM, light sheet and high speed microscopy, *Imaging: A Laboratory Manual* is a vital resource for the modern biology laboratory.

### **The National Faculty Directory**

Springer Science & Business Media

Since Jan. 1901 the official proceedings and most of the papers of the American Association for the Advancement of Science have been included in *Science*. *A Laboratory Manual* Springer Science & Business Media

Faculties, publications and doctoral theses in departments or divisions of chemistry, chemical engineering, biochemistry and pharmaceutical and/or medicinal chemistry at universities in the United States and Canada.

From Super-Resolution Microscopy to DNA Mapping and Diagnostics Marquis Whos Who

This book describes the fundamental concepts, the latest developments and the outlook of the field of nanozymes (i.e., the catalytic nanomaterials with enzymatic characteristics). As one of today's most exciting fields, nanozyme research lies at the interface of chemistry, biology, materials science and nanotechnology. Each of the book's six chapters explores advances in nanozymes. Following an introduction to the rise of nanozymes research in the course of research on natural enzymes and artificial enzymes in Chapter 1, Chapters 2 through 5 discuss different nanomaterials used to mimic various

natural enzymes, from carbon-based and metal-based nanomaterials to metal oxide-based nanomaterials and other nanomaterials. In each of these chapters, the nanomaterials' enzyme mimetic activities, catalytic mechanisms and key applications are covered. In closing, Chapter 6 addresses the current challenges and outlines further directions for nanozymes. Presenting

extensive information on nanozymes and supplemented with a wealth of color illustrations and tables, the book offers an ideal guide for readers from disparate areas, including analytical chemistry, materials science, nanoscience and nanotechnology, biomedical and clinical engineering, environmental science and engineering, green chemistry, and novel catalysis.