Methods In Molecular Biophysics Structure Dynamic

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Biophysics of Membrane Proteins - Vincent Postis 2020-08-14
This volume provides recent advances in the field of biophysics of membrane proteins. Chapters are divided into several parts: detailing biochemistry and functional analysis, experimental and theoretical structural determinations, membrane protein dynamics, and conformation studies. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Authoritative and cutting-edge, Biophysics of Membrane Proteins: Methods and Protocols aims to provide comprehensive protocols with notes to help further the understanding of key membrane protein structure and function for students, academics, and industrial researchers.
Fundamentals of Molecular Structural Biology - Subrata Pal 2019-08-13
Fundamentals of Molecular Structural Biology reviews the mathematical and physical foundations of molecular structural biology. Based on these fundamental concepts, it then describes molecular structure and explains basic genetic mechanisms. Given the increasingly interdisciplinary nature of research, early career researchers and those shifting into an adjacent field often require a "fundamentals" book to get them up-to-speed on the foundations of a particular field. This book fills that niche. Provides a current and easily digestible resource on molecular structural biology, discussing both foundations and the latest advances Addresses critical issues surrounding macromolecular structures, such as structure-based drug discovery, single-particle analysis, computational molecular biology/molecular dynamic simulation, cell signaling and immune response, macromolecular assemblies, and systems biology Presents discussions that ultimately lead the reader toward a more detailed understanding of the basis and origin of disease
Molecular Simulations and Biomembranes - Mark S. P. Sansom 2010
The need for information in the understanding of membrane systems has been caused by three things - an increase in computer power; methodological developments and the recent expansion in the number of researchers working on it worldwide. However, there has been no up-to-date book that covers the application of simulation methods to membrane systems directly and this book fills an important void in the market. It provides a much needed update on the current methods and applications as well as highlighting recent advances in the way computer simulation can be applied to the field of membranes and membrane proteins. The objectives are to show how simulation methods can provide an important contribution to the understanding of these systems. The scope of the book is such that it covers simulation of membranes and membrane proteins, but also covers the more recent methodological developments such as coarse-grained molecular dynamics and multiscale approaches in systems

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biology. Applications embrace a range of biological processes including ion channel and transport proteins. The book is wide ranging with broad coverage and a strong coupling to experimental results wherever possible, including colour illustrations to highlight particular aspects of molecular structure. With an internationally respected list of authors, its publication is timely and it will prove indispensable to a large scientific readership.

Nanoscience and its Applications - Osvaldo de Oliveira, Jr 2016-12-30

Nanoscience and Its Applications explores how nanoscience is used in modern industry to increase product performance, including an understanding of how these materials and systems, at the molecular level, provide novel properties and physical, chemical, and biological phenomena that have been successfully used in innovative ways in a wide range of industries. This book is an important reference source for early-career researchers and practicing materials scientists and engineers seeking a greater understanding on how nanoscience can be used in modern industries. Provides a detailed overview of how nanoscience is used to increase product efficiency in a variety of fields, from agribusiness to medicine, Shows how nanoscience can help product developers increase product performance whilst reducing costs Illustrates how nanoscience has been used innovatively in a great variety of disciplines, giving those working in many different industries ideas as to how nanoscience might answer important questions

Protein Physics - Alexei V. Finkelstein 2016-06-22

Protein Physics: A Course of Lectures covers the most general problems of protein structure, folding and function. It describes key experimental facts and introduces concepts and theories, dealing with fibrous, membrane, and water-soluble globular proteins, in both their native and denatured states. The book systematically summarizes and presents the results of several decades of worldwide fundamental research on protein physics, structure, and folding, describing many physical models that help readers make estimates and predictions of physical processes that occur in proteins. New to this revised edition is the inclusion of novel information on amyloid aggregation, natively disordered proteins, protein folding in vivo, protein motors, misfolding, chameleon proteins, advances in protein engineering & design, and advances in the modeling of protein folding. Further, the book provides problems with solutions, many new and updated references, and physical and mathematical appendices. In addition, new figures (including stereo drawings, with a special appendix showing how to use them) are added, making this an ideal resource for graduate and advanced undergraduate students and researchers in academia in the fields of biophysics, physics, biochemistry, biologists, biotechnology, and chemistry. Fully revised and expanded new edition based on the latest research developments in protein physics Written by the world's top expert in the field Deals with fibrous, membrane, and water-soluble globular proteins, in both their native and denatured states Summarizes, in a systematic form, the results of several decades of worldwide fundamental research on protein physics and their structure and folding Examines experimental data on protein structure in the post-genome era

Methods in Molecular Biophysics - Nathan R. Zaccai 2017-05-18

Current techniques for studying biological macromolecules and their interactions are based on the application of physical methods, ranging from classical thermodynamics to more recently developed techniques for the detection and manipulation of single molecules. Reflecting the advances made in biophysics research over the past decade, and now including a new section on medical imaging, this new edition describes the physical methods used in modern biology. All key techniques are covered, including mass spectrometry, hydrodynamics, microscopy and imaging, diffraction and spectroscopy, electron microscopy, molecular dynamics simulations and nuclear magnetic resonance. Each method is explained in detail using examples of real-world applications. Short asides are provided throughout to ensure that explanations are accessible to life scientists, physicists and those with medical backgrounds. The book remains an unparalleled and comprehensive resource for graduate students of biophysics and medical

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physics in science and medical schools, as well as for research scientists looking for an introduction to techniques from across this interdisciplinary field.

Dynamics of Proteins and Nucleic Acids - J. Andrew McCammon 1988-04-29

This book is a self-contained introduction to the theory of atomic motion in proteins and nucleic acids. An understanding of such motion is essential because it plays a crucially important role in biological activity. The authors, both of whom are well known for their work in this field, describe in detail the major theoretical methods that are likely to be useful in the computer-aided design of drugs, enzymes and other molecules. A variety of theoretical and experimental studies is described and these are critically analyzed to provide a comprehensive picture of dynamic aspects of biomolecular structure and function. The book will be of interest to graduate students and research workers in structural biochemistry (X-ray diffraction and NMR), theoretical chemistry (liquids and polymers), biophysics, enzymology, molecular biology, pharmaceutical chemistry, genetic engineering and biotechnology.

Molecular Biophysics for the Life Sciences - Norma Allewell 2013-09-28

This volume provides an overview of the development and scope of molecular biophysics and in-depth discussions of the major experimental methods that enable biological macromolecules to be studied at atomic resolution. It also reviews the physical chemical concepts that are needed to interpret the experimental results and to understand how the structure, dynamics, and physical properties of biological macromolecules enable them to perform their biological functions. Reviews of research on three disparate biomolecular machines—DNA helicases, ATP synthases, and myosin--illustrate how the combination of theory and experiment leads to new insights and new questions.

Postdoctoral Research Fellowship Opportunities - National Institutes of Health (U.S.) 1995

Using the Biological Literature - Diane Schmidt 2014-04-14

The biological sciences cover a broad array of literature types, from younger fields like molecular biology with its reliance on recent journal articles, genomic databases, and protocol manuals to classic fields such as taxonomy with its scattered literature found in monographs and journals from the past three centuries. Using the Biological Literature: A Practical Guide, Fourth Edition is an annotated guide to selected resources in the biological sciences, presenting a wide-ranging list of important sources. This completely revised edition contains numerous new resources and descriptions of all entries including textbooks. The guide emphasizes current materials in the English language and includes retrospective references for historical perspective and to provide access to the taxonomic literature. It covers both print and electronic resources including monographs, journals, databases, indexes and abstracting tools, websites, and associations—providing users with listings of authoritative informational resources of both classical and recently published works. With chapters devoted to each of the main fields in the basic biological sciences, this book offers a guide to the best and most up-to-date resources in biology. It is appropriate for anyone interested in searching the biological literature, from undergraduate students to faculty, researchers, and librarians. The guide includes a supplementary website dedicated to keeping URLs of electronic and web-based resources up to date, a popular feature continued from the third edition.

Biological Water - Gertz I. Likhtenshtein 2021-10-21

This book embraces all physiochemical aspects of the structure and molecular dynamics of water, focusing on its role in biological objects, e.g. living cells and tissue, and in the formation of functionally active structures of biological molecules and their ensembles. Water is the single most abundant chemical found in all living things. It offers a detailed look into the latest modern physical methods for studying the molecular structure and dynamics of the water and provides a critical analysis of the existing literature data on the properties of water in biological objects. Water as a chemical reagent and as a medium for the formation of conditions for enzymatic catalysis is a core focus of this

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book. Although well suited for active researchers, the book as a whole, as well as each chapter on its own, can be used as fundamental reference material for graduate and undergraduate students throughout chemistry, physics, biophysics and biomedicine.

Advances in Molecular Biophysics - Keira O'Donnell 2020-09-22

Molecular biophysics is an interdisciplinary domain of research which combines the principles of physics, chemistry, mathematics, engineering and biology. It aims to explain bimolecular systems and biological functions in terms of dynamic behaviour, molecular structure and structural organization. This field seeks to understand biological processes and functions at different levels of complexity, such as from viruses to small living systems, and from single molecules to supramolecular structures. The study of allosteric interactions, molecular forces, molecular associations, cable theory and Brownian motion are also addressed by molecular biophysics. Procedures that enable imaging and manipulation of living structures aid research in molecular biophysics. Spectroscopic techniques comprising of laser Raman, FT-NMR, FT-infrared, spin label electron spin resonance, etc. are widely used to understand structural dynamics of biomolecules and their intermolecular interactions. This book is a compilation of chapters that discuss the most vital concepts and emerging trends in the field of molecular biophysics. The various advancements in this field are glanced at and their applications as well as ramifications are looked at in detail. Students, researchers, experts and all associated with molecular biophysics will benefit alike from this book.

Diffusion and Electrophoretic NMR - Peter Stilbs 2019-08-19

Diffusion and Eletrophoretic NMR experiments resolve chemical compounds based on their molecular motion. This publication introduces the basics of these methods and explains how they can be used to measure the size of molecules and aggregates, to determine degree of polymerization and to solve other chemical problems. Supplied with many case studies, the book is a must-have for students and researchers who work with practical NMR measurements.

Protein Structure - Eshel Faraggi 2012-04-20

Since the dawn of recorded history, and probably even before, men and women have been grasping at the mechanisms by which they themselves exist. Only relatively recently, did this grasp yield anything of substance, and only within the last several decades did the proteins play a pivotal role in this existence. In this expose on the topic of protein structure some of the current issues in this scientific field are discussed. The aim is that a non-expert can gain some appreciation for the intricacies involved, and in the current state of affairs. The expert meanwhile, we hope, can gain a deeper understanding of the topic.

Biophysical Characterization of Proteins in Developing Biopharmaceuticals - Damian J. Houde 2019-11-13

Biophysical Characterization of Proteins in Developing Biopharmaceuticals, Second Edition, presents the latest on the analysis and characterization of the higher-order structure (HOS) or conformation of protein based drugs. Starting from the very basics of protein structure, this book explains the best way to achieve this goal using key methods commonly employed in the biopharmaceutical industry. This book will help today’s industrial scientists plan a career in this industry and successfully implement these biophysical methodologies. This updated edition has been fully revised, with new chapters focusing on the use of chromatography and electrophoresis and the biophysical characterization of very large biopharmaceuticals. In addition, best practices of applying statistical analysis to biophysical characterization data is included, along with practical issues associated with the concept of a biopharmaceutical’s developability and the technical decision-making process needed when dealing with biophysical characterization data. Presents basic protein characterization methods and tools applicable to (bio)pharmaceutical research and development Highlights the capabilities and limitations of each technique Discusses the underlining science of each tool Empowers industrial biophysical chemists by providing a roadmap for applying biophysical tools Outlines the needs for new characterization and analytical tools in the biopharmaceutical industry

Biophysical Techniques in Drug Discovery -

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Angeles Canales 2017-11-14
Biophysical techniques are used in many key stages of the drug discovery process including in screening for new receptor ligands, in characterising drug mechanisms, and in validating data from biochemical and cellular assays. This book provides an overview of the biophysical methods applied in drug discovery today, including traditional techniques and newer developments. Perspectives from academia and industry across a spectrum of techniques are brought together in a single volume. Small and biotherapeutic approaches are covered and strengths and limitations of each technique are presented. Case studies illustrate the application of each technique in real applied examples. Finally, the book covers recent developments in areas such as electron microscopy with discussions of their possible impact on future drug discovery. This is a go-to volume for biophysicists, analytical chemists and medicinal chemists providing a broad overview of techniques of contemporary interest in drug discovery.

Advances in Protein Molecular and Structural Biology Methods - Timir Tripathi 2022-01-14
Advances in Protein Molecular and Structural Biology Methods offers a complete overview of the latest tools and methods applicable to the study of proteins at the molecular and structural level. The book begins with sections exploring tools to optimize recombinant protein expression and biophysical techniques such as fluorescence spectroscopy, NMR, mass spectrometry, cryo-electron microscopy, and X-ray crystallography. It then moves towards computational approaches, considering structural bioinformatics, molecular dynamics simulations, and deep machine learning technologies. The book also covers methods applied to intrinsically disordered proteins (IDPs)followed by chapters on protein interaction networks, protein function, and protein design and engineering. It provides researchers with an extensive toolkit of methods and techniques to draw from when conducting their own experimental work, taking them from foundational concepts to practical application. Presents a thorough overview of the latest and emerging methods and technologies for protein study Explores biophysical techniques, including nuclear magnetic resonance, X-ray crystallography, and cryo-electron microscopy Includes computational and machine learning methods Features a section dedicated to tools and techniques specific to studying intrinsically disordered proteins

Biophysics DeMYSTiFied - Daniel Goldfarb 2010-12-06
Learn BIOPHYSICS without expending a lot of ENERGY! Interested in unraveling the physics of living things? Here's your starting point. Biophysics Demystified is the fast and easy way to understand this fascinating topic. Written in a step-by-step format, this practical guide begins with an introduction to the science of biophysics, covering biophysical techniques and applications. Next, you'll learn the principles of physics, biology, and chemistry required to understand biophysics, including free energy, entropy, and statistical mechanics. Biomolecules and the forces that influence their structure and conformation are also covered, as are protein, nucleic acid, and membrane biophysics. Detailed examples and concise explanations make it easy to understand the material, and end-of-chapter quizzes and a final exam help reinforce key concepts. It's a no-brainer! You'll get: Molecular, subcellular, physiological, anatomical, and environmental biophysics The laws of thermodynamics as they apply to biophysical systems Forces affecting conformation in biological molecules The composition and structure of carbohydrates, lipids, proteins, and nucleic acids The fluid mosaic model Simple enough for a beginner, but challenging enough for an advanced student, Biophysics Demystified makes this interdisciplinary subject easy to master.

Introduction to Biophysical Methods for Protein and Nucleic Acid Research - Jay A. Glasel 1995-11-20
The first of its kind, Introduction to Biophysical Methods for Protein and Nucleic Acid Research serves as a text for the experienced researcher and student requiring an introduction to the field. Each chapter presents a description of the physical basis of the method, the type of information that may be obtained with the method, how data should be analyzed and interpreted and, where appropriate, practical tips about procedures and equipment. Key Features * Modern Use of Mass Spectroscopy *

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NMR Spectroscopy * Molecular Modeling and Graphics * Macintosh and DOS/Windows 3.x disks

RNA Turnover in Eukaryotes: Nucleases, Pathways and Analysis of mRNA Decay - Lynne E. Maquat 2009-01-30

Specific complexes of protein and RNA carry out many essential biological functions, including RNA processing, RNA turnover, RNA folding, as well as the translation of genetic information from mRNA into protein sequences. Messenger RNA (mRNA) decay is now emerging as an important control point and a major contributor to gene expression. Continuing identification of the protein factors and cofactors, and mRNA instability elements responsible for mRNA decay allow researchers to build a comprehensive picture of the highly orchestrated processes involved in mRNA decay and its regulation. Covers the nonsense-mediated mRNA decay (NMD) or mRNA surveillance pathway Expert researchers introduce the most advanced technologies and techniques to identify mRNA processing, transport, localization and turnover, which are central to the process of gene expression Offers step-by-step lab instructions, including necessary equipment and reagents

Methods in Molecular Biophysics - Igor N. Serdyuk 2017-05-18

A comprehensive graduate textbook explaining key physical methods in biology, reflecting the very latest research in this fast-moving field.

Handbook of Single-Molecule Biophysics - Peter Hinterdorfer 2009-12-24

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.

Biophysical Techniques - Iain Campbell 2012-02-16

Biophysical Techniques explains in a readily-accessible way the basics of the various biophysical methods available so students can understand the principles behind the different methods used, and begin to appreciate which tools can be used to probe different biological questions, and the pros and cons of each.

Methods in Molecular Biophysics - Igor N. Serdyuk 2007-03-29

Our knowledge of biological macromolecules and their interactions is based on the application of physical methods, ranging from classical thermodynamics to recently developed techniques for the detection and manipulation of single molecules. These methods, which include mass spectrometry, hydrodynamics, microscopy, diffraction and crystallography, electron microscopy, molecular dynamics simulations, and nuclear magnetic resonance, are complementary; each has its specific advantages and limitations. Organised by method, this textbook provides descriptions and examples of applications for the key physical methods in modern biology. It is an invaluable resource for undergraduate and graduate students of molecular biophysics in science and medical schools, as well as research scientists looking for an introduction to techniques beyond their specialty. As appropriate for this interdisciplinary field, the book includes short asides to explain physics aspects to biologists and biology aspects to physicists.

Molecular Biology - Jordanka Zlatanova 2015-11-23

Recipient of the CHOICE Outstanding Academic Title (OAT) Award.Molecular Biology: Structure and Dynamics of Genomes and Proteomes illustrates the essential principles behind the transmission and expression of genetic information at the level of DNA, RNA, and proteins.This textbook emphasizes the experimental basis of discovery and the most recent a

Handbook of Molecular Biophysics - Henrik G. Bohr 2009-05-26

This handbook and reference condenses the biophysics and biomedical contents of the renowned Encyclopedia of Applied Physics in one handy volume. Twenty-eight carefully written overview articles cover the latest research, including single molecule spectroscopy, biosensors and cellular biomechanics. Readers benefit from concise summaries of the fundamentals, methods and applications, backed by detailed tables of contents for quick access, and glossaries of

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terms, as well as detailed lists of references and further reading. For libraries and R&D teams in academia and industry.

The Bacterial Flagellum - Tohru Minamino 2017-04-08

This volume examines the structure and dynamics of the bacterial flagellum using bacterial genetics, molecular biology, biochemistry, structural biology, biophysics, cell biology, and molecular dynamics simulation. The chapters are divided into 4 parts: Part I describes flagellar type III protein exports, assembly, and gene regulation in S. enterica; Part II explains how to isolate the flagella from the bacterial cell bodies, and further explains how to conduct high-resolution structural and functional analyses of the flagellar motor; Part III talks about how to measure flagellar motor rotation over a wide range of external load, how to measure ion motive force across the cytoplasmic membrane, and how to measure dynamic properties of the flagellar motor proteins by fluorescence microscopy with single molecule precision; and Part IV explores the structure and function of Spirochetal, Vibrio, Shewanella, and Magnetococcus flagellar motors. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Cutting-edge and comprehensive, The Bacterial Flagellum: Methods and Protocols aims to provide valuable and vital research to aid in the investigation of the bacterial flagellum resulting from various bacterial species.

Molecular Structures and Structural Dynamics of Prion Proteins and Prions - Jiapu Zhang 2015-09-14

This monograph is the first easy-to-read-and-understand book on prion proteins' molecular dynamics (MD) simulations and on prions' molecular modelling (MM) constructions. It enables researchers to see what is crucial to the conformational change from normal cellular prion protein (PrPC) to diseased infectious prions (PrPSc), using MD and MM techniques. As we all know, prion diseases, caused by the body's own proteins, are invariably fatal and highly infectious neurodegenerative diseases effecting humans and almost all animals for a major public health concern. Prion contains no nucleic acids and it is a misshapen or conformation-changed protein that acts like an infectious agent; thus prion diseases are called “protein structural conformational” diseases. PrPC is predominant in α-helices but PrPSc are rich in β-sheets in the form as amyloid fibrils; so very amenable to be studied by MD techniques. Through MD, studies on the protein structures and the structural conversion are very important for revealing secrets of prion diseases and for structure-based drug design or discovery. Rabbits, dogs, horses and buffaloes are reported to be the few low susceptibility species to prion diseases; this book's MD studies on these species are clearly helpful to understand the mechanism underlying the resistance to prion diseases. PrP(1-120) usually has no clear molecular structures; this book also studies this unstructured region through MD and especially MM techniques from the global optimization point of view. This book is ideal for practitioners in computing of biophysics, biochemistry, biomedicine, bioinformatics, cheminformatics, materials science and engineering, applied mathematics and theoretical physics, information technology, operations research, biostatistics, etc. As an accessible introduction to these fields, this book is also ideal as a teaching material for students.

An Introduction to Single Molecule Biophysics - Yuri L. Lyubchenko 2017-11-22

This book gives an accessible, detailed overview on techniques of single molecule biophysics (SMB), showing how they are applied to numerous biological problems associated with understanding the molecular mechanisms of DNA replication, transcription, and translation, as well as functioning of molecular machines. It covers major single molecule imaging and probing techniques, highlighting key strengths and limitations of each method using recent examples. The chapters begin with a discussion of single molecule fluorescence techniques followed by an overview of the atomic force microscope and its use for direct time-lapse visualization of dynamics of molecular complexes at the nanoscale, as well as applications in measurements of interactions

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between molecules and mechanical properties of isolated molecules and their complexes. The next chapters address magnetic tweezers and optical tweezers, including instrumentation, fundamentals of operation, and applications. A final chapter turns to nanopore transport and nanopore-based DNA sequencing technology that will play a major role in next-generation genomics and healthcare applications.

Methods of Molecular Analysis in the Life Sciences - Andreas Hofmann 2014-06-19

An accessible overview of the most popular and cutting-edge methods for studying the properties of molecules and their interactions.

Compendium of Biophysics - Andrey B. Rubin 2017-07-13

Following up on his first book, Fundementals of Biophysics, the author, a well-known scientist in this area, builds on that foundation by offering the biologist or scientist an advanced, comprehensive coverage of biophysics. Structuring the book into four major parts, he thoroughly covers the biophysics of complex systems, such as the kinetics and thermodynamic processes of biological systems, in the first part. The second part is dedicated to molecular biophysics, such as biopolymers and proteins, and the third part is on the biophysics of membrane processes. The final part is on photobiological processes. This ambitious work is a must-have for the veteran biologist, scientist, or chemist working in this field, and for the novice or student, who is interested in learning about biophysics. It is an emerging field, becoming increasingly more important, the more we learn about and develop the science. No library on biophysics is complete without this text and its precursor, both available from Wiley-Scrivener.

Report of the Committee on Proposal Evaluation for Allocation of Supercomputing Time for the Study of Molecular Dynamics - National Academies of Sciences, Engineering, and Medicine 2017-10-27

This report describes the work of the Committee on Proposal Evaluation for Allocation of Supercomputing Time for the Study of Molecular Dynamics, Eighth Round. The committee evaluated submissions received in response to a Request for Proposals (RFP) for biomolecular simulation time on Anton 2, a supercomputer specially designed and built by D.E. Shaw Research (DESRES). Over the past five years, DESRES has made an Anton or Anton 2 system housed at the Pittsburgh Supercomputing Center (PSC) available to the non-commercial research community, based on the advice of previous National Research Council committees. As in prior rounds, the goal of the eighth RFP for simulation time on Anton 2 is to continue to facilitate breakthrough research in the study of biomolecular systems by providing a massively parallel system specially designed for molecular dynamics simulations. The program seeks to continue to support research that addresses important and high impact questions demonstrating a clear need for Anton's special capabilities. Report of the Committee on Proposal Evaluation for Allocation of Supercomputing Time for the Study of Molecular Dynamics, Eighth Round is the report of the committee's evaluation of proposals based on scientific merit, justification for requested time allocation, and investigator qualifications and past accomplishments. This report identifies the proposals that best met the selection criteria.

Mass Spectrometry in Structural Biology and Biophysics - Igor A. Kaltashov 2012-04-03

The definitive guide to mass spectrometry techniques in biology and biophysics The use of mass spectrometry (MS) to study the architecture and dynamics of proteins is increasingly common within the biophysical community, and Mass Spectrometry in Structural Biology and Biophysics: Architecture, Dynamics, and Interaction of Biomolecules, Second Edition provides readers with detailed, systematic coverage of the current state of the art. Offering an unrivalled overview of modern MS-based armamentarium that can be used to solve the most challenging problems in biophysics, structural biology, and biopharmaceuticals, the book is a practical guide to understanding the role of MS techniques in biophysical research. Designed to meet the needs of both academic and industrial researchers, it makes mass spectrometry accessible to professionals in a range of fields, including biopharmaceuticals. This new edition has been significantly expanded and updated to include the most recent experimental methodologies and techniques, MS applications

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in biophysics and structural biology, methods for studying higher order structure and dynamics of proteins, an examination of other biopolymers and synthetic polymers, such as nucleic acids and oligosaccharides, and much more. Featuring high-quality illustrations that illuminate the concepts described in the text, as well as extensive references that enable the reader to pursue further study, Mass Spectrometry in Structural Biology and Biophysics is an indispensable resource for researchers and graduate students working in biophysics, structural biology, protein chemistry, and related fields.

Molecular and Cellular Biophysics - Meyer B. Jackson 2006-01-12

Advanced biophysics textbook focusing on how physical concepts can be applied to biological problems.

Experiments and Simulations: A Pas de Deux to Unravel Biological Function - Massimiliano Bonomi 2022-01-19

Spin-Label Electron Paramagnetic Resonance Spectroscopy - Derek Marsh 2019-12-09

Spin-label electron paramagnetic resonance (EPR) spectroscopy is a versatile molecular probe method that finds wide application in molecular biophysics and structural biology. This book provides the first comprehensive summary of basic principles, spectroscopic properties, and use for studying biological membranes, protein folding, supramolecular structure, lipid-protein interactions, and dynamics. The contents begin with discussion of fundamental theory and practice, including static spectral parameters and conventional continuous-wave (CW) spectroscopy. The development then progresses, via nonlinear CW-EPR for slower motions, to the more demanding time-resolved pulse EPR, and includes an in-depth treatment of spin relaxation and spectral line shapes. Once the spectroscopic fundamentals are established, the final chapters acquire a more applied character. Extensive appendices at the end of the book provide detailed summaries of key concepts in magnetic resonance and chemical physics for the student reader and experienced practitioner alike. Key Features: Indispensable reference source for the understanding and interpretation of spin-label spectroscopic data in its different aspects. Tables of fundamental spectral parameters are included throughout. Forms the basis for an EPR graduate course, extending up to a thorough coverage of advanced topics in Specialist Appendices. Includes all necessary theoretical background. The primary audience is research workers in the fields of molecular biophysics, structural biology, biophysical chemistry, physical biochemistry and molecular biomedicine. Also, physical chemists, polymer physicists, and liquid-crystal researchers will benefit from this book, although illustrative examples used are often taken from the biomolecular field. Readers will be postgraduate researchers and above, but include those from other disciplines who seek to understand the primary spin-label EPR literature.

Structure, Dynamics, Interactions and Evolution of Biological Macromolecules - C. Helene 2012-12-06

Proceedings of a Colloquium held at Orléans, France, July 5-9, 1982

Advances in Protein and Peptide Sciences - Ben M. Dunn 2013-10-30

Advances in Protein and Peptide Sciences is a book series focused on leading-edge research on the structure, physical properties, and functions of proteins and peptides. The series presents highly cited contributions first published in the journal Current Protein and Peptide Science. Authors of these contributions have updated their work with new experimental data and references following their initial research. Each volume highlights a number of important topics in current research in the field of protein and peptide chemistry and molecular biology, including membrane proteins and their interactions with ligands, computational methods, and proteins in disease and biotechnology.

Guide to Programs - National Science Foundation (U.S.). 1992

Computational Chemistry Methods in Structural Biology - 2011-09-13

Published continuously since 1944, the Advances in Protein Chemistry and Structural Biology serial has been a continuous, essential resource for protein chemists. Covering reviews of methodology and research in all aspects of protein chemistry, including

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purification/expression, proteomics, modeling and structural determination and design, each volume brings forth new information about protocols and analysis of proteins while presenting the most recent findings from leading experts in a broad range of protein-related topics. This volume features articles on Computational Chemistry methods in Structural Biology. Essential resource for protein chemists This volume features articles on Computational Chemistry methods in Structural Biology

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