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Self-Organization in Biological Systems Energy and Information Transfer in Biological Systems Self-organization in Biological Systems Polymerization in Biological Systems Chaos in Biological Systems Energy in Biological Systems Information Processing and Biological Systems Information in Biological Systems Biological Systems Models of Life Motion in Biological Systems Nanostructures in Biological Systems Systems and Synthetic Biology Analysis of Free Radicals in Biological Systems Introduction to a Biological Systems Science Transport Phenomena in Biological Systems Biological Systems in Vertebrates, Vol. 1 Silicon and Siliceous Structures in Biological Systems Metal Ions in Biological Systems Fields, Forces, and Flows in Biological Systems Metal Ions in Biological Systems Nanoscale Technology in Biological Systems The Dynamics of Biological Systems Mathematical Modeling of Complex Biological Systems Charge Transfer Complexes in Biological Systems Complex Fluids in Biological Systems NMR in Biological Systems Control Mechanisms in Development Principles of Biological Regulation Morphogenesis and Pattern Formation in Biological Systems Structuring Biological Systems Molecular Mechanisms of Autonomy in Biological Systems Metal Ions in Biological Systems Information Processing in Biological Systems Reactive Oxygen Species in Biological Systems: An Interdisciplinary Approach Calcium Oxalate in Biological Systems Metal Ions in Biological Systems Principles and Models of Biological Transport Tunneling in Biological Systems The Nature of Biological Systems as Revealed by Thermal Methods

Self-Organization in Biological Systems 2020-05-26

the synchronized flashing of fireflies at night the spiraling patterns of an aggregating slime mold the anastomosing network of army ant trails the coordinated movements of a school of fish researchers are finding in such patterns phenomena that have fascinated naturalists for centuries a fertile new approach to understanding biological systems the study of self organization this book a primer on self organization in biological systems for students and other enthusiasts introduces readers to the basic concepts and tools for studying self organization and then examines numerous examples of self organization in the natural world self organization refers to diverse pattern formation processes in the physical and biological world from sand grains assembling into rippled dunes to cells combining to create highly structured tissues to individual insects working to create sophisticated societies what these diverse systems hold in common is the proximate means by which they acquire order and structure in self organizing systems pattern at the global level emerges solely from interactions among lower level components remarkably even very complex structures result from the iteration of surprisingly simple behaviors performed by individuals relying on only local information this striking conclusion suggests important lines of inquiry to what degree is environmental rather than individual complexity responsible for group complexity to what extent have widely differing organisms adopted similar convergent strategies of pattern formation how specifically has natural selection determined the rules governing interactions within biological systems broad in scope thorough yet accessible this book is a self contained introduction to self organization and complexity in biology a field of study at the forefront of life sciences research

Energy and Information Transfer in Biological Systems 2003

this volume contains papers based on the workshop on energy and information transfer in biological systems how physics could enrich biological understanding held in italy in 2002 the meeting was a forum aimed at evaluating the potential and outlooks of a modern physics approach to understanding and describing biological processes especially regarding the transition from the microscopic chemical scenario to the macroscopic functional configurations of living matter in this frame some leading researchers presented and discussed several basic topics such as the photon interaction with biological systems also from the viewpoint of photon information processes and of possible applications the influence of electromagnetic fields on the self organization of biosystems including the nonlinear mechanism for energy transfer and storage and the influence of the structure of water on the properties of biological matter

Self-organization in Biological Systems 2003-09-17

biological structures built through mechanisms involving self organization are examined in this text examples of such structures are termite mounds which provide their inhabitants with a secure stable environment the text looks at why how self organization occurs in nature

Polymerization in Biological Systems 2009-09-16

the novartis foundation series is a popular collection of the proceedings from novartis foundation symposia in which groups of leading scientists from a range of topics across biology chemistry and medicine assembled to present papers and discuss results the novartis foundation originally known as the ciba foundation is well known to scientists and clinicians around the world

Chaos in Biological Systems 2013-06-29

in recent years experimental and numerical studies have shown that chaos is a widespread phenomenon throughout the biological hierarchy ranging from simple enzyme reactions to ecosystems although a coherent picture of the fundamental mechanisms responsible for chaotic dynamics has started to appear it is not yet clear what the implications of such dynamics are for biological systems in general in some systems it appears that chaotic dynamics are associated with a pathological condition in other systems the pathological condition has regular periodic dynamics whilst the normal non pathological condition has chaotic dynamics since chaotic behaviour is so ubiquitous in nature and since the phenomenon raises some fundamental questions about its implications for biology it seemed timely to organize an interdisciplinary meeting at which leading scientists could meet to exchange ideas to evaluate the current state of the field and to stipulate the guidelines along which future research should be directed the present volume contains the contributions to the nato advanced research workshop on chaos in biological systems held at dyffryn house st nicholas cardiff u k december 8 12 1986 at this meeting 38

researchers with highly different backgrounds met to present their latest results through lectures and posters and to discuss the applications of non linear techniques to problems of common interest in spite of their involvement in the study of chaotic dynamics for several years many of the participants met here for the first time

Energy in Biological Systems 1991-07-31

this series is designed for junior undergraduates and diploma students in all biological sciences covering the field of modern biochemistry and integrating animal plant and microbial topics this volume focuses on the generation of biologically usable energy in living systems

Information Processing and Biological Systems 2011-03-10

living beings require constant information processing for survival in cells information is being processed and propagated at various levels from the gene regulatory network to chemical pathways to the interaction with the environment how this is achieved and how information is coded is still poorly understood for example what a cell interprets as information in the temporal level of an mrna and what is interpreted as noise remains an open question recently information theoretical methods and other tools developed in the context of engineering and natural sciences have been applied to study diverse biological processes this book covers the latest findings on how information is processed in various biological processes ranging from information processing and propagation in gene regulatory networks to information processing in natural language an overview is presented of the state of the art in information processing in biological systems and the opinion of current leaders in this research field on future research directions

Information in Biological Systems 1984-10-11

this account of information theory the means by which biological information is transmitted from generation to generation is written for students of all branches of natural sciences it gives a comprehensive description and connects the various sciences involved the argument put forward is that man cannot be the result of some mechanistic coincidence there must be a plan underlying the evolution of life which extends darwin s theory of the survival of the fittest and which is reflected by modern ecology the author intends to persuade the reader to feel respect and admiration for the magnificent world of living beings

Biological Systems 1969

reflecting the major advances that have been made in the field over the past decade this book provides an overview of current models of biological systems the focus is on simple quantitative models highlighting their role in enhancing our understanding of the strategies of gene regulation and dynamics of information transfer along signalling pathways as well as in unravelling the interplay between function and evolution the chapters are self contained each describing key methods for studying the quantitative aspects of life through the use of physical models they focus in particular on connecting the dynamics of proteins and dna with strategic decisions on the larger scale of a living cell using e coli and phage lambda as key examples encompassing fields such as quantitative molecular biology systems biology and biophysics this book will be a valuable tool for students from both biological and physical science backgrounds

Models of Life 2014-10-02

describes the physico chemical laws underlying various kinds of motion in biological systems with particular emphasis on the mathematics involved each chapter covers one type of biological motion employing mathematics no more advanced than elementary calculus explained are biological phenomena such as osmotic pressure frictional resistance diffusion motion in electrical fields potentials at interfaces transport across membranes and entropy driven processes also covered are viscosity conversion of chemical to mechanical energy and critical concentrations

Motion in Biological Systems 1989

this book is a survey on the theoretical as well as experimental results on nanostructures in biological systems it shows how a unifying approach starting from single particle energy deriving free energy of the

system and determining the equilibrium by minimizing the free energy can be applied to describe electrical and elastic phenomena it helps the readers to use this basic transparent and simple approach to develop additional new systems and interactions and describes the theoretical and experimental aspects together so that they support each other in broadening the knowledge on biological systems it suggests potential use of this knowledge in clinically relevant phenomena such as hemostasis inflammation and spreading of cancer and describes some applications in nanotoxicology such as the interactions between biological membranes and inorganic nanostructures

Nanostructures in Biological Systems 2015-07-07

this textbook has been conceptualized to provide a detailed description of the various aspects of systems and synthetic biology keeping the requirements of m sc and ph d students in mind also it is hoped that this book will mentor young scientists who are willing to contribute to this area but do not know from where to begin the book has been divided into two sections the first section will deal with systems biology in terms of the foundational understanding highlighting issues in biological complexity methods of analysis and various aspects of modelling the second section deals with the engineering concepts design strategies of the biological systems ranging from simple dna rna fragments switches and oscillators molecular pathways to a complete synthetic cell will be described finally the book will offer expert opinions in legal safety security and social issues to present a well balanced information both for students and scientists

Systems and Synthetic Biology 2014-12-15

in addition several assays are provided to assess the chemical damage induced by reactive oxygen species in critical cellular targets in vitro and in humans in vivo

Analysis of Free Radicals in Biological Systems 1995-11-29

presenting engineering fundamentals and biological applications in a unified way this book provides learners with the skills necessary to develop and critically analyze models of biological transport and reaction processes midwest

Introduction to a Biological Systems Science 1971

gives an account of the morphologies of vertebrate respiratory organs and attempts to explicate the basis of the common and different structural and functional designs and stratagems that have evolved for acquisition of molecular oxygen the book has been written with a broad readership in mind students of biology as well as experts in the discipl

Transport Phenomena in Biological Systems 2004

the publication of this book was undertaken with two purposes in view to bring together information on the deposition by living organisms of unique skeletal structures composed of amorphous silica and to review recent data on the involvement of silicon in physiological and biochemical processes although widely varying viewpoints are represented all the contributors are very interested in the events involved in the formation of siliceous structures and their function data presented deal with these questions in a variety of plant and animal systems and at levels ranging from the evolutionary to the biochemical and ultrastructural innovations in electron microscopy and indeed the advent of electron microscopy itself have stimulated many ultra structural studies of silica deposition work which has deepened and widened the interest in those organisms which routinely produce glassy skeletons the question of how silicon participates in biological systems involves a spectrum of fields that includes the chemistry of silicon per se its biogeochemistry biochemistry ecology and so forth in this book however attention is focused up on the biological aspects of silicon and siliceous structures with emphasis on the evolutionary phylogeny morphology and distribution of siliceous structures on the cellular aspects of silica deposition and on the physiological and biochemical roles of silicon this volume represents the first compilation of such data because such a variety of subjects and fields are covered the reader will have to glean for himself some of the comparative aspects of the data

Biological Systems in Vertebrates, Vol. 1 2019-04-23

this volume is devoted to the research area regarding the biological properties of metal alkyl derivatives

offering an authoritative account of this subject by 16 scientists in 11 chapters biological properties of metal alkyl derivatives highlights in detail derivatives of germanium tin lead arsenic antimony selenium tellurium cobalt vitamin b12 derivatives and nickel coenzyme f430 including the role of mainly micro organisms in their formation the derivatives of indium thallium bismuth various transition metals and mercury are also covered to some extent as are those of the non metals silicon phosphorus and sulfur and the haloperoxidase route of the biogenesis of halomethanes by fungi and plants the properties of these alkyl derivatives their biosynthesis including mechanistic aspects their appearance in waters rivers lakes oceans and sediments and their physiological and toxic effects are summarized

Silicon and Siliceous Structures in Biological Systems

1981-12-14

fields forces and flows in biological systems describes the fundamental driving forces for mass transport electric current and fluid flow as they apply to the biology and biophysics of molecules cells tissues and organs basic mathematical and engineering tools are presented in the context of biology and physiology the chapters are structured in a framework that moves across length scales from molecules to membranes to tissues examples throughout the text deal with applications involving specific biological tissues cells and macromolecules in addition a variety of applications focus on sensors actuators diagnostics and microphysical measurement devices e g biomems nems microfluidic devices in which transport and electrokinetic interactions are critical this textbook is written for advanced undergraduate and graduate students in biological and biomedical engineering and will be a valuable resource for interdisciplinary researchers including biophysicists physical chemists materials scientists and chemical electrical and mechanical engineers seeking a common language on the subject

Metal Ions in Biological Systems 1993-01-19

continues the tradition of excellence established in previous volumes in this acclaimed series volume 36 focuses on the vibrant research area concerning the interrelation between free radicals and metal ions and their resulting effects on life processes it offers an authoritative and timely account of this fascinating area of research in 21 chapters

Fields, Forces, and Flows in Biological Systems 2011-03-08

nanoscale technology in biological systems reviews recent accomplishments in the field of nanobiology and introduces the application of nanoscale matrices to human biology it focuses on the applications of nanotechnology fabrication to biomedical devices and discusses new physical methods for cell isolation and manipulation and intracellular commu

Metal Ions in Biological Systems 1999-03-10

the book presents nine mini courses from a summer school dynamics of biological systems held at the university of alberta in 2016 as part of the prestigious seminar series séminaire de mathématiques supérieures sms it includes new and significant contributions in the field of dynamical systems and their applications in biology ecology and medicine the chapters of this book cover a wide range of mathematical methods and biological applications they explain the process of mathematical modelling of biological systems with many examples introduce advanced methods from dynamical systems theory present many examples of the use of mathematical modelling to gain biological insight discuss innovative methods for the analysis of biological processes contain extensive lists of references which allow interested readers to continue the research on their own integrating the theory of dynamical systems with biological modelling the book will appeal to researchers and graduate students in applied mathematics and life sciences

Nanoscale Technology in Biological Systems 2004-12-20

this book describes the evolution of several socio biological systems using mathematical kinetic theory specifically it deals with modeling and simulations of biological systems whose dynamics follow the rules of mechanics as well as rules governed by their own ability to organize movement and biological functions it proposes a new biological model focused on the analysis of competition between cells of an aggressive host and cells of a corresponding immune system proposed models are related to the generalized boltzmann equation the book may be used for advanced graduate courses and seminars in biological systems modeling

2023-06-02

The Dynamics of Biological Systems 2019-10-02

examining the role played by partial charge transfer in biology this work offers a theoretical basis of the physics and chemistry of charge transfer complex formation especially the function of excited states it discusses drug interactions highlighting interaction between different types of antibiotics and suggests ways for the synthesis of pharmaceutical products with reduced side effects

Mathematical Modeling of Complex Biological Systems 2006-08-17

this book serves as an introduction to the continuum mechanics and mathematical modeling of complex fluids in living systems the form and function of living systems are intimately tied to the nature of surrounding fluid environments which commonly exhibit nonlinear and history dependent responses to forces and displacements with ever increasing capabilities in the visualization and manipulation of biological systems research on the fundamental phenomena models measurements and analysis of complex fluids has taken a number of exciting directions in this book many of the world's foremost experts explore key topics such as macro and micro rheological techniques for measuring the material properties of complex biofluids and the subtleties of data interpretation experimental observations and rheology of complex biological materials including mucus cell membranes the cytoskeleton and blood the motility of microorganisms in complex fluids and the dynamics of active suspensions challenges and solutions in the numerical simulation of biologically relevant complex fluid flows this volume will be accessible to advanced undergraduate and beginning graduate students in engineering mathematics biology and the physical sciences but will appeal to anyone interested in the intricate and beautiful nature of complex fluids in the context of living systems

Charge Transfer Complexes in Biological Systems 1997-05-20

during teaching nmr to students and researchers we felt the need for a text book which can cover modern trends in the application of nmr to biological systems this book covers the entire area of nmr in biological sciences biomolecules cells and tissues animals plants and drug design as well as being useful to researchers this is an excellent book for teaching a course on nmr in biological systems

Complex Fluids in Biological Systems 2014-11-27

the school of life sciences was formed from the departments of botany microbiology and zoology together with staff members in biochemistry from both the department of chemistry and from the former department of biochemistry and nutrition in the college of agriculture as well as staff members in the college of agriculture's department of plant pathology our whole notion was to build a core unit in biology that would cross the lines between the college of arts and sciences and the college of agriculture in order to combine strengths which exist in both areas despite the administrative difficulties that could have stood in the way of this development it has proved to be a very workable concept and we are delighted at the way things are going why should the university be building additional strengths in biology at this time first of all we all recognize that agriculture is of vital importance not only to nebraska but to the entire world

NMR in Biological Systems 2009-09-03

regulatory processes in biological systems flow processes in the steady dynamic behavior the transient response introduction to feedback the steady state feedback systems dynamic behavior sinusoidal signals stability distinctive features of homeostatic systems nonlinear systems biochemical control

Control Mechanisms in Development 1975-10

a central goal of biology is to decode the mechanisms that underlie the processes of morphogenesis and pattern formation concerned with the analysis of those phenomena this book integrates experimental and theoretical aspects of biology for the construction and investigation of models of complex processes it offers an interdisciplinary approach to the pattern formation problems and provides a scope of forthcoming integrated biology including experiments and theories

Principles of Biological Regulation 1973

structuring biological systems focuses on the important components of biological systems in order to develop genetic algorithms for modeling purposes the book considers the characteristics of biological systems from the artificial intelligence point of view examines modeling examples of complex biological systems such as molecular level modeling a model of renal hemodynamics and cognitive aspects of modeling describes the entropy based probability distribution for modeling of environmental and biological systems and presents a detailed analysis of modeling cancer phenomena structuring biological systems will benefit students and researchers interested in an interdisciplinary approach to complex problems of biological systems as well as biologists chemists engineers research physicians and computer scientists

Morphogenesis and Pattern Formation in Biological Systems 2013-11-11

this book presents a novel molecular description for understanding the regulatory mechanisms behind the autonomy and self organization in biological systems chapters focus on defining and explaining the regulatory molecular mechanisms behind different aspects of autonomy and self organization in the sense of autonomous coding data processing structure mass formation and energy production in a biological system subsequent chapters discuss the cross talk among mechanisms of energy and mass and information transformation in biological systems other chapters focus on applications regarding therapeutic approaches in regenerative medicine molecular mechanisms of autonomy in biological systems is an indispensable resource for scientists and researchers in regenerative medicine stem cell biology molecular biology tissue engineering developmental biology biochemistry biophysics bioinformatics as well as big data sciences complexity and soft computing

Structuring Biological Systems 1992-04-30

volume 35 covers the biological cycling of iron in oceans the transport of iron in microorganisms fungi and plants the roles and properties of siderophores the regulation of iron transport and uptake in animals plants and microorganisms and more

Molecular Mechanisms of Autonomy in Biological Systems 2019-08-23

this volume contains the greater part of the papers submitted to the information processing in biology portion of the 1983 orbis scientiae then dedicated to the eightieth year of professor p a m dirac before the volume could be published professor dirac passed away on october 20 1984 thereby changing the dedication of this volume and its companion on high energy physics to his everlasting memory the last orbis scientiae as it was often in the past was shared by two frontier fields in this case by high energy physics and information processing in biology demonstrating the universality of scientific principles and goals the interaction amongst scientists of diverse interests can only enhance the fruitfulness of their efforts the editors take pride in the modest contribution of orbis scientiae towards this goal it is a pleasure to acknowledge the typing of these proceedings by regelio rodriguez and helga billings and the customary excellent supervision by the latter the efficient preparation and organization of the conference was due largely to the skill and dedication of linda scott as in the past orbis scientiae 1983 received nominal support from the united states department of energy and the national science foundation

Metal Ions in Biological Systems 1998-01-09

reactive oxygen species ros which include free radicals peroxides singlet oxygen ozone and nitrogen monoxide and dioxide free radicals is an area of intense research this volume covers 1 the destruction of cellular function by ros resulting in pathological states 2 the protection by ros of an organism against invading organisms that cause infections and 3 the role of ros in normal physiological processes designed for beginning graduate students this book gives a concise overview of the field

Information Processing in Biological Systems 2011-12-25

written by leaders in their fields calcium oxalate in biological systems comprehensively discusses current
2023-06-02 7/9 when dinosaurs die a guide to understanding death

information about the importance of this compound in animals plants fungi and microorganisms both in vivo and in vitro methods of crystallization as well as crystallization systems are discussed researchers who pioneered the field contribute their invaluable knowledge for the first time about oxalate bacteria and their importance this is an essential reference for both plant and animal scientists concerned with human and animal kidney disease

Reactive Oxygen Species in Biological Systems: An Interdisciplinary Approach 1999-01-31

metal ions in biological systems is devoted to increasing our understanding of the relationship between the chemistry of metals and life processes the volumes reflect the interdisciplinary nature of bioinorganic chemistry and coordinate the efforts of researchers in the fields of biochemistry inorganic chemistry coordination chemistry environmental chemistry biophysics pharmacy and medicine volumes deal with such topics as the formation stability structure and reactivity of biological compounds of low and high molecular weight containing metal ions the metabolism and transport of metal ions and their complexes and new models of complicated natural structures and processes devoted solely to the vibrant research area of nickel and its role in biology volume 23 offers a comprehensive account of this important subject from the perspectives of 24 distinguished international authorities in 11 stimulating in depth chapters nickel and its role in biology covers nickel and its function in the environment in aquatic systems in plants as well as its metabolism in man and animals treats nickel ion binding to amino acids and peptides examines nickel in proteins and enzymes including hydrogenases considers the interaction of nickel with nucleic acids and their constituents displays thoroughly the toxicology of nickel compounds and describes the analysis of nickel in biological materials with more than 1 400 references to assist further research nickel and its role in biology is an essential resource for scientists and students in several disciplines including biochemistry bioinorganic inorganic and coordination chemistry biophysics molecular biology enzymology pharmacology clinical chemistry nutrition and toxicology book jacket

Calcium Oxalate in Biological Systems 1995-10-20

focus organization and content this book like the first edition deals with the mass transport processes that take place in living systems with a focus on the normal behavior of eukaryotic cells and the organisms they constitute in their normal physiological environment as a consequence of this focus the structure and content of the book differ from those of traditional transport texts we do not start with the engineering principles of mass transport which are well presented elsewhere and then seek biological applications of these principles rather we begin with the biological processes themselves and then develop the models and analytical tools that are needed to describe them this approach has several consequences first of all it drives the content of the text in a direction distinctively different from conventional transport texts this is because the tools and models needed to describe complex biological processes are often different from those employed to describe more well characterized inanimate systems many biological processes must still be described phenomenologically using methodologies like nonequilibrium thermodynamics simple electrical analogs employing a paucity of parameters can be more useful for characterization and prediction than complex theories based on the behavior of more well defined systems on a laboratory bench by allowing the biology to drive the choice of analysis tools and models the latter are consistently presented in the context of real biological systems and analysis and biology are interwoven throughout

Metal Ions in Biological Systems 1988-03-30

Principles and Models of Biological Transport 2008-12-15

Tunneling in Biological Systems 1979

The Nature of Biological Systems as Revealed by Thermal Methods 2009-09-03

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