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Physical Biology of the Cell
Intelligent and Fuzzy Techniques for Emerging Conditions and Digital Transformation
Bioevaluation of World Transport Networks
Physarum Machines
Dictyostelids
The Practice of Art and AI
Biodiversity of Fungi
Genetics and Molecular Biology

NADIA GILL

Natural Computing and Beyond UCL Press
This open access book focuses on the development of methods, interoperable and integrated ICT tools, and survey techniques for optimal management of the building process. The construction sector is facing an increasing demand for major innovations in terms of digital dematerialization and technologies such as the Internet of Things, big data, advanced manufacturing, robotics, 3D printing, blockchain technologies and artificial intelligence. The demand for simplification and transparency in information management and for the rationalization and optimization of very fragmented and splintered processes is a key driver for digitization. The book describes the contribution of the ABC Department of the Polytechnic University of Milan (Politecnico di Milano) to R&D activities regarding methods and ICT tools for the interoperable management of the different phases of the building process, including design, construction, and management. Informative case studies complement the theoretical discussion. The book will be of interest to all stakeholders in the building process - owners, designers, constructors, and faculty managers - as well as the research sector.
Decolonizing Science in Latin American Art Random House
Physical Biology of the Cell is a textbook for a first course in physical biology or biophysics for undergraduate or graduate students. It maps the huge and complex landscape of cell and molecular biology from the distinct perspective of physical biology. As a key organizing principle, the proximity of topics is based on the physical concepts that
Advances in Swarm Intelligence Springer
This book constitutes the proceedings of the 13th International Conference on Cellular Automata for Research and Industry, ACRI 2018, held in Como, Italy, in September 2018. The 47 full papers presented in this volume were carefully reviewed and selected from 64 submissions. This volume contains invited contributions and accepted papers from the main track and from the three organized workshops. The volume is organized in the following topics: biological systems modeling; simulation and other applications of CA; multi-agent systems; pedestrian and traffic dynamics; synchronization and control; theory and cryptography; asynchronous cellular automata; and crowds, traffic and cellular automata.
Handbook of Memristor Networks Springer Science & Business Media
NEW YORK TIMES BESTSELLER • A “brilliant [and] entrancing” (The Guardian) journey into the hidden lives of fungi—the great connectors of the living world—and their astonishing and intimate roles in human life, with the power to heal our bodies, expand our minds, and help us address our most urgent environmental problems. “Grand and dizzying in

how thoroughly it recalibrates our understanding of the natural world."—Ed Yong, author of An Immense World ONE OF THE BEST BOOKS OF THE YEAR—Time, BBC Science Focus, The Daily Mail, Geographical, The Times, The Telegraph, New Statesman, London Evening Standard, Science Friday When we think of fungi, we likely think of mushrooms. But mushrooms are only fruiting bodies, analogous to apples on a tree. Most fungi live out of sight, yet make up a massively diverse kingdom of organisms that supports and sustains nearly all living systems. Fungi provide a key to understanding the planet on which we live, and the ways we think, feel, and behave. In the first edition of this mind-bending book, Sheldrake introduced us to this mysterious but massively diverse kingdom of life. This exquisitely designed volume, abridged from the original, features more than one hundred full-color images that bring the spectacular variety, strangeness, and beauty of fungi to life as never before. Fungi throw our concepts of individuality and even intelligence into question. They are metabolic masters, earth makers, and key players in most of life's processes. They can change our minds, heal our bodies, and even help us remediate environmental disaster. By examining fungi on their own terms, Sheldrake reveals how these extraordinary organisms—and our relationships with them—are changing our understanding of how life works. Winner of the Wainwright Prize, the Royal Society Science Book Prize, and the Guild of Food Writers Award • Shortlisted for the British Book Award • Longlisted for the Rathbones Folio Prize

The Mathematics of Life

Springer Nature

In this book, practicing physicians and experts in anticipation present arguments for a new understanding of medicine. Their contributions make it clear that medicine is the decisive test for anticipation. The reader is presented with a provocative hypothesis: If medicine will align itself with the anticipatory condition of life, it can prompt the most important revolution in our time. To this end, all stakeholders—medical practitioners, patients, scientists, and technology developers—will have to engage in the conversation. The book makes the case for the transition from expensive, and only marginally effective, reactive treatment through "spare parts" (joint replacements, organ transplants) and reliance on pharmaceuticals (antibiotics, opiates) to anticipation-informed healthcare. Readers will understand why the current premise of treating various behavioral conditions (attention deficit disorder, hyperactivity, schizophrenia) through drugs has to be re-evaluated from the perspective of anticipation. In the manner practiced today, medicine generates dependence and long-lasting damage to those it is paid to help. As we better understand the nature of the living, the proactive view of healthcare, within which the science and art of healing fuse, becomes a social and political mandate.

Living Technology

Springer

This book is concerned with computing in

materio: that is, unconventional computing performed by directly harnessing the physical properties of materials. It offers an overview of the field, covering four main areas of interest: theory, practice, applications and implications. Each chapter synthesizes current understanding by deliberately bringing together researchers across a collection of related research projects. The book is useful for graduate students, researchers in the field, and the general scientific reader who is interested in inherently interdisciplinary research at the intersections of computer science, biology, chemistry, physics, engineering and mathematics.
Computational Matter Springer
Since their discovery in 1869, the dictyostelids have attracted the attention of scientists in a wide variety of fields. This interest has stemmed from their peculiar lifestyle and developmental properties, which were shaped by the evolutionary forces that generated multicellularity during eukaryotic evolution. More recently, the dictyostelids have gained attention due to the striking similarities found at the genomic, cellular and biochemical levels with human cells, which has propelled the species Dictyostelium discoideum to become a model system for biology and medicine in many laboratories. This book covers the latest advances in our knowledge of these extraordinary organisms with topics spanning from their evolutionary history, ecology and diversity to the recent discoveries regarding their cellular and molecular biology.
Collision-Based Computing World Scientific
Sequence - Evolution - Function is an introduction to the computational approaches that play a critical role in the emerging new branch of biology known as functional genomics. The book provides the reader with an understanding of the principles and approaches of functional genomics and of the potential and limitations of computational and experimental approaches to genome analysis. Sequence - Evolution - Function should help bridge the "digital divide" between biologists and computer scientists, allowing biologists to better grasp the peculiarities of the emerging field of Genome Biology and to learn how to benefit from the enormous amount of sequence data available in the public databases. The book is non-technical with respect to the computer methods for genome analysis and discusses these methods from the user's viewpoint, without addressing mathematical and algorithmic details. Prior practical familiarity with the basic methods for sequence analysis is a major advantage, but a reader without such experience will be able to use the book as an introduction to these methods. This book is perfect for introductory level courses in computational methods for comparative and functional genomics.
Myxomycetes Springer
This book introduces art projects that resulted from unconventional explorations, curious experiments and their creative translations into sensorial experiences. Using electronic and digital art, bioart, sculpture and installations, sound and performance, the authors

are removing boundaries between natural and artificial, real and imaginary, science and culture. The invited artists and researchers come from cutting-edge fields of art production that focuses on creating aesthetic experiences and performative situations. Their artworks create a spatial aesthetic experience for visitors by manifesting themselves in physical space. Experiencing the Unconventional is a unique selection of works by artists not based on formal similarities, but on investigative practices. It offers in-depth insights and first-hand working experiences into current production of art works at the edge of art, science and technology. Contents:Epistemological Machines and Protocomputing (Mitchell Whitelaw and Ralf Baecker)The Crystal World (Jonathan Kemp)Nigredo: Configuring Human and Technological Bodies (Marco Donnarumma)Sensing Spatial Experiences. The Essential Nature of Things (Sonia Cillari)Perfect Paul: On Freedom of Facial Expression (Arthur Elsenaar)Hacking the Universe (Frederik De Wilde)Mesoscopic Ripples in the Neural Sea (Evelina Domnitch and Dmitry Gelfand)Vanitas Machine (Verena Friedrich)Interview with Verena FriedrichConnections Continuum: A Life (Saša Spačal)A New State of the Living (Dmitry Bulatov)That Which Lives in Me (Dmitry Bulatov and Alexey Chebykin)Robotics and Design: Towards a New Symbiosis in Gilberto Esparza's Artwork (Reynaldo Thompson and Tirtha P Mukhopadhyay)Pancreas. All Flesh (Candyman)Demons of Art (Interview with Thomas Feuerstein by Hartmut Böhme)Metabodies — Exploring Social Networks on Our Body (Sonja Bäumel and Manuel Selg)Re-Imagining the Biological Membrane (Juan M Castro)Bodymetries. Mapping the Human Body Through Amorphous Intelligence (Theresa Schubert, Michael Markert, Moritz Dreβler, Andrew Adamatzky)The Engineer's Report: "Swarm Cities" and Other Synthetic Companions (Francisco Gallardo and Álvaro Castro-Castilla)Der Zermesser (Leo Peschta)Interview with Leo Peschta Readership: Artists and scientists interested in removing boundaries between their work.Key Features:Brings together established and emerging artists from Europe, the Americas and AsiaProvides in-depth insight and first hand working experiences into art works at the edge of art, science and technologyKeywords:Media Art;Electronic Art;Bioart;Unconventional Computing;Science;Technology;Robotics;Body Sensors

Information Arts Springer This book presents recent research in intelligent and fuzzy techniques. Emerging conditions such as pandemic, wars, natural disasters and various high technologies force people for significant changes in business and social life. The adoption of digital technologies to transform services or businesses, through replacing non-digital or manual processes with digital processes or replacing older digital technology with newer digital technologies through intelligent systems is the main scope of this book. It focuses on revealing the reflection of digital transformation in our business and social life

under emerging conditions through intelligent and fuzzy systems. The latest intelligent and fuzzy methods and techniques on digital transformation are introduced by theory and applications. The intended readers are intelligent and fuzzy systems researchers, lecturers, M.Sc. and Ph.D. students studying digital transformation. Usage of ordinary fuzzy sets and their extensions, heuristics and metaheuristics from optimization to machine learning, from quality management to risk management makes the book an excellent source for researchers.

From Pattern Formation to Material Computation Biomedical Engineering

An introduction to the work and ideas of artists who use—and even influence—science and technology. A new breed of contemporary artist engages science and technology—not just to adopt the vocabulary and gizmos, but to explore and comment on the content, agendas, and possibilities. Indeed, proposes Stephen Wilson, the role of the artist is not only to interpret and to spread scientific knowledge, but to be an active partner in determining the direction of research. Years ago, C. P. Snow wrote about the "two cultures" of science and the humanities; these developments may finally help to change the outlook of those who view science and technology as separate from the general culture. In this rich compendium, Wilson offers the first comprehensive survey of international artists who incorporate concepts and research from mathematics, the physical sciences, biology, kinetics, telecommunications, and experimental digital systems such as artificial intelligence and ubiquitous computing. In addition to visual documentation and statements by the artists, Wilson examines relevant art-theoretical writings and explores emerging scientific and technological research likely to be culturally significant in the future. He also provides lists of resources including organizations, publications, conferences, museums, research centers, and Web sites.

Drawing Futures Springer

This unique book provides a comprehensive introduction to computational mathematics, which forms an essential part of contemporary numerical algorithms, scientific computing and optimization. It uses a theorem-free approach with just the right balance between mathematics and numerical algorithms. This edition covers all major topics in computational mathematics with a wide range of carefully selected numerical algorithms, ranging from the root-finding algorithm, numerical integration, numerical methods of partial differential equations, finite element methods, optimization algorithms, stochastic models, nonlinear curve-fitting to data modelling, bio-inspired algorithms and swarm intelligence. This book is especially suitable for both undergraduates and graduates in computational mathematics, numerical algorithms, scientific computing, mathematical programming, artificial intelligence and engineering optimization. Thus, it can be used as a textbook and/or reference book.

Cellular Automata John Wiley & Sons

This book identifies all the

species one is likely to encounter, with extensive information on their structural features, distribution, and ecological associations. Superbly illustrated, including keys, it is an introduction to their biology as well as a field guide. This book is only available through print on demand. All interior art is black and white.

Anticipation and Medicine

Springer Nature

In the first edition of Genetics and Molecular Biology, renowned researcher and award-winning teacher Robert Schleif produced a unique and stimulating text that was a notable departure from the standard compendia of facts and observations. Schleif's strategy was to present the underlying fundamental concepts of molecular biology with clear explanations and critical analysis of well-chosen experiments. The result was a concise and practical approach that offered students a real understanding of the subject. This second edition retains that valuable approach--with material thoroughly updated to include an integrated treatment of prokaryotic and eukaryotic molecular biology. Genetics and Molecular Biology is copiously illustrated with two-color line art. Each chapter includes an extensive list of important references to the primary literature, as well as many innovative and thought-provoking problems on material covered in the text or on related topics. These help focus the student's attention of a variety of critical issues. Solutions are provided for half of the problems. Praise for the first edition: "Schleif's Genetics and Molecular Biology... is a remarkable achievement. It is an advanced text, derived from material taught largely to postgraduates, and will probably be thought best suited to budding professionals in molecular genetics. In some ways this would be a pity, because there is also gold here for the rest of us... The lessons here in dealing with the information explosion in biology are that an ounce of rationale is worth a pound of facts and that, for educational value, there is nothing to beat an author writing about stuff he knows from theinside."--Nature. "Schleif presents a quantitative, chemically rigorous approach to analyzing problems in molecular biology. The text is unique and clearly superior to any currently available."--R.L. Bernstein, San Francisco State University. "The greatest strength is the author's ability to challenge the student to become involved and get below the surface."--Clifford Brunk, UCLA

Handbook Of Unconventional Computing (In 2 Volumes)

Hatje Cantz

In the quest to understand and model the healthy or sick human body, re searchers and medical doctors are utilizing more and more quantitative tools and techniques. This trend is pushing the envelope of a new field we call Biomedical Computing, as an exciting frontier among signal processing, pattern recognition, optimization, nonlinear dynamics, computer science and biology, chemistry and medicine. A conference on Biocomputing was held during February 25-27, 2001 at the University of Florida. The conference was sponsored by the Center for Applied Optimization, the Computational Neuroengineering Center, the Biomedical En gineering Program

(through a Whitaker Foundation grant), the Brain Institute, the School of Engineering, and the University of Florida Research & Graduate Programs. The conference provided a forum for researchers to discuss and present new directions in Biocomputing. The well-attended three days event was highlighted by the presence of top researchers in the field who presented their work in Biocomputing. This volume contains a selective collection of ref ereed papers based on talks presented at this conference. You will find seminal contributions in genomics, global optimization, computational neuroscience, FMRI, brain dynamics, epileptic seizure prediction and cancer diagnostics. We would like to take the opportunity to thank the sponsors, the authors of the papers, the anonymous referees, and Kluwer Academic Publishers for making the conference successful and the publication of this volume possible. Panos M. Pardalos and Jose C.

Reaction-Diffusion Computers Elsevier

Embracing Biology's Complexity, At Last -- Learning by Making: DNA and Protein Nanotechnology -- Nano in Medicine -- Recreating Tissues and Organs -- Conclusions : Life Changes Everything.

Slime Mould in Arts and Architecture Basic Books

Presents a set of unique chapters written by leading artists, architects and scientists, which resulted from creative translations of the slime mould behaviour into forms and sounds, unconventional investigations and sensorial experiences and the slime mould ability to remove boundaries between living and artificial, solid & fluid, science & arts

Nano Comes to Life Springer Nature

This is a discovery book about plants. It is for students In the first section, introduction to plants, there are sev of botany and botanical illustration and everyone inter eral sources for various types of drawings. Hypotheti ested in plants. Here is an opportunity to browse and cal diagrams show cells, organelles, chromosomes, the choose subjects of personal inter. est, to see and learn plant body indicating tissue systems and experiments about plants as they are described. By adding color to with plants, and flower placentation and reproductive the drawings, plant structures become more apparent structures. For example, there is no average or stan and show how they function in life. The color code dard-looking flower; so to clearly show the parts of a clues tell how to color for definition and an illusion of flower (see 27), a diagram shows a stretched out and depth. For more information, the text explains the illus exaggerated version of a pink (Dianthus) flower (see trations. The size of the drawings in relation to the true 87). A basswood (Tifia) flower is the basis for diagrams size of the structures is indicated by X 1 (the same size) of flower types and ovary positions (see 28). Another to X 3000 (enlargement from true size) and X n/n source for drawings is the use of prepared microscope (reduction from true size). slides of actual plant tissues.

Calcium: The Molecular Basis of Calcium Action in Biology and Medicine World Scientific

his two-volume set LNCS 12689-12690 constitutes the refereed proceedings of the 12th International

Conference on Advances in Swarm Intelligence, ICSI 2021, held in Qingdao, China, in July 2021. The 104 full papers presented in this volume were carefully reviewed and selected from 177 submissions. They cover topics such as: Swarm Intelligence and Nature-Inspired Computing; Swarm-based Computing Algorithms for Optimization; Particle Swarm Optimization; Ant Colony Optimization; Differential Evolution; Genetic Algorithm and Evolutionary Computation; Fireworks Algorithms; Brain Storm Optimization Algorithm; Bacterial Foraging Optimization Algorithm; DNA Computing Methods; Multi-Objective Optimization; Swarm Robotics and Multi-Agent System; UAV Cooperation and Control; Machine Learning; Data Mining; and Other Applications.

Explorations in Basic Biology Springer Science & Business Media

This book is devoted to Slime mould Physarum polycephalum, which is a large single cell capable for distributed sensing, concurrent information processing, parallel computation and decentralized actuation. The ease of culturing and experimenting with Physarum makes this slime mould an ideal substrate for real-world implementations of unconventional sensing and computing devices The book is a treatise of theoretical and experimental laboratory studies on sensing and computing properties of slime mould, and on the development of mathematical and logical theories of Physarum behavior. It is shown how to make logical gates and circuits, electronic devices (memristors, diodes, transistors, wires, chemical and tactile sensors) with the slime mould. The book demonstrates how to modify properties of Physarum computing circuits with functional nano-particles and polymers, to interface the slime mould with field-programmable arrays, and to use Physarum as a controller of microbial fuel cells. A unique multi-agent model of slime is shown to serve well as a software slime mould capable for solving problems of computational geometry and graph optimization. The multiagent model is complemented by cellular automata models with parallel accelerations. Presented mathematical models inspired by Physarum include non-quantum implementation of Shor's factorization, structural learning, computation of shortest path tree on dynamic graphs, supply chain network design, p-adic computing and syllogistic reasoning. The book is a unique composition of vibrant and lavishly illustrated essays which will inspire scientists, engineers and artists to exploit natural phenomena in designs of future and emergent computing and sensing devices. It is a 'bible' of experimental computing with spatially extended living substrates, it spanstopics from biology of slime mould, to bio-sensing, to unconventional computing devices and robotics, non-classical logics and music and arts.