

# Fractal Concepts In Surface Growth

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**The Science of Disasters** - Armin Bunde  
2002-08-07

This book tackles these questions by applying advanced methods from statistical physics and related fields to all types of non-linear dynamics prone to disaster. It gives readers an insight into the problems of catastrophes and is one of the first books on the theories of disaster. Based on physical and mathematical theories, the general

principles of disaster appearance are explained.  
[The Fractal Geometry of the Brain](#) - Antonio Di Ieva  
2016-08-03

Reviews the most intriguing applications of fractal analysis in neuroscience with a focus on current and future potential, limits, advantages, and disadvantages. Will bring an understanding of fractals to clinicians and researchers also if they do not have a mathematical background,

and will serve as a good tool for teaching the translational applications of computational models to students and scholars of different disciplines. This comprehensive collection is organized in four parts: (1) Basics of fractal analysis; (2) Applications of fractals to the basic neurosciences; (3) Applications of fractals to the clinical neurosciences; (4) Analysis software, modeling and methodology.

**Abrasive Technology** - Jun Wang 1999-11-10

Abrasive technology is becoming increasingly important in precision manufacturing. This volume contains more than 70 refereed technical papers contributed by worldwide academic researchers and industrial practitioners, on the latest development in abrasive technology. Specifically, it covers the mechanics and mechanisms of abrasive processes as well as the technologies and applications related to abrasive jet machining, nano-machining, grinding, polishing, honing and lapping. It also includes topics on high-speed machining, eco-machining

and laser micro-machining technologies. The discussion on the practical applications of abrasive technology and the associated theories makes this book useful for academic researchers and industrial practitioners. Contents: Grinding ELID Polishing, Honing and Lapping Dressing and Truing Finishing and ECM Abrasive Jet and Flow Machining Mechanics of Machining High-Speed and Eco-Machining Nano-Machining and Laser Micro-Machining Surface Integrity Machines and Measurements Novel Technologies and Materials Readership: Academics and professionals in industrial manufacturing, mechanical engineering and materials science.

Keywords: Grinding; Flow Machining; Nano-Machining; Laser Micro-Machining; Machines; Industrial; Manufacturing

**Adsorption on Silica Surfaces** - Eugene

Papirer 2000-04-05

"Progresses from theoretical issues to applications. Contains a historical overview, in-

depth considerations of various scenarios of silica adsorption, and results from the latest research. Invaluable for broad coverage of the expanding field of silica research."

The Inorganic Chemistry of Materials - Paul J. van der Put 2013-06-29

P.J. van der Put offers students an original introduction to materials chemistry that integrates the full range of inorganic chemistry. Technologists who need specific chemical facts to manipulate matter will also find this work invaluable as an easy-to-use reference. The text includes practical subjects of immediate use for materials such as bonding, morphogenesis, and design that more orthodox materials science volumes often leave out.

**The Physics of Complex Systems** - F. Mallamace 1997

This volume focuses on the area of the physics of complex systems and provides both an overview of the field and more detailed examination of those topics within the field that are currently of

greatest interest to researchers. The properties of complex systems play an important role in a variety of different and overlapping areas in physics, chemistry, biology, mathematics and technology. The research field of complex systems is very broad, but this volume attempts to be comprehensive. This book is a useful reference work for researchers in this area, whether graduate students or advanced academics. Up-to-date reviews of cutting-edge topics are provided, compiled by leading authorities and designed to both broaden the reader's insight and encourage the exploration of new problems in related fields. An overview of the present status of the physics of complex systems is provided on the following general topics: (1) scaling behaviours; (2) supramolecular systems; (3) aggregation, aggregation kinetics and disorderly growth mechanisms; (4) granularly matter; (5) polymers, associating polymers, polyelectrolytes and gels; (6) amphiphiles, emulsions, colloids, membranes

and interface phenomena; (7) molecular motors; (8) phase separation and out of equilibrium dynamics; (9) turbulence, chaos and chaotic dynamics; (10) glass transition, supercooled fluids and (11) geometrically constrained dynamics.

**Dynamics of Fluctuating Interfaces and Related Phenomena** - Doochul Kim 1997  
"Roughening dynamics of various interface problems has been an attractive topic recently. The subject is related to many interdisciplinary branches in nonequilibrium statistical physics such as crystal growth, vortex dynamics, fractals and chaos, and self-organized critical phenomena. This volume includes pedagogical reviews of the scaling concepts in fluctuating surfaces, current theories on epitaxial growth phenomena and interface dynamics in disordered media, and many other related topics. Thus it serves as a valuable reference for both graduate students and researchers in statistical physics and materials science."--

Publisher's website.

**International School on Crystal Growth of Technologically Important Electronic Materials** - K. Byrappa 2003

**Fractal Geometry in Biological Systems** - Philip M. Iannaccone 1996-07-25

Fractal Geometry in Biological Systems was written by the leading experts in the field of mathematics and the biological sciences together. It is intended to inform researchers in the bringing about the fundamental nature of fractals and their widespread appearance in biological systems. The chapters explain how the presence of fractal geometry can be used in an analytical way to predict outcomes in systems, to generate hypotheses, and to help design experiments. The authors make the mathematics accessible to a wide audience and do not assume prior experience in this area.

Evolution of Thin Film Morphology - Matthew Pelliccione 2008-01-29

The focus of this book is on modeling and simulations used in research on the morphological evolution during film growth. The authors emphasize the detailed mathematical formulation of the problem. The book will enable readers themselves to set up a computational program to investigate specific topics of interest in thin film deposition. It will benefit those working in any discipline that requires an understanding of thin film growth processes.

### **Fractal Concepts in Condensed Matter**

**Physics** - Tsuneyoshi Nakayama 2013-06-29

Concisely and clearly written by two foremost scientists, this book provides a self-contained introduction to the basic concepts of fractals and demonstrates their use in a range of topics. The authors' unified description of different dynamic problems makes the book extremely accessible.

### **Characterization of Amorphous and Crystalline Rough Surface -- Principles and Applications** - 2000-10-23

The structure of a growth or an etch front on a

surface is not only a subject of great interest from the practical point of view but also is of fundamental scientific interest. Very often surfaces are created under non-equilibrium conditions such that the morphology is not always smooth. In addition to a detailed description of the characteristics of random rough surfaces, Experimental Methods in the Physical Sciences, Volume 37, Characterization of Amorphous and Crystalline Rough Surface-Principles and Applications will focus on the basic principles of real and diffraction techniques for quantitative characterization of the rough surfaces. The book thus includes the latest development on the characterization and measurements of a wide variety of rough surfaces. The complementary nature of the real space and diffraction techniques is fully displayed. Key Features \* An accessible description of quantitative characterization of random rough surfaces and growth/etch fronts \* A detailed description of the principles,

experimentation, and limitations of advanced real-space imaging techniques (such as atomic force microscopy) and diffraction techniques (such as light scattering, X-ray diffraction, and electron diffraction) \* Characterization of a variety of rough surfaces (e.g., self-affine, mounded, anisotropic, and two-level surfaces) accompanied by quantitative examples to illustrate the essence of the principles \* An insightful description of how rough surfaces are formed \* Presentation of the most recent examples of the applications of rough surfaces in various areas

**Advances in Computer Simulation Studies on Crystal Growth** - Hiroki Nada 2018-11-16

This book is a printed edition of the Special Issue "Advances in Computer Simulation Studies on Crystal Growth" that was published in Crystals

**Encyclopedia of Surface and Colloid Science**

- - Arthur T. Hubbard 2002-07-18

This comprehensive reference collects

fundamental theories and recent research from a wide range of fields including biology, biochemistry, physics, applied mathematics, and computer, materials, surface, and colloid science-providing key references, tools, and analytical techniques for practical applications in industrial, agricultural, and forensic processes, as well as in the production of natural and synthetic compounds such as foods, minerals, paints, proteins, pharmaceuticals, polymers, and soaps.

**Mechanisms and Principles of Epitaxial Growth in Metallic Systems: Volume 528** -

Luc T. Wille 1998-08-06

The MRS Symposium Proceeding series is an internationally recognised reference suitable for researchers and practitioners.

**Future Of Fractals - Proceedings Of The International Conference** - Miyazima Sasuke

1997-07-01

A large portion of the book can be used as a textbook for graduate and upper level

undergraduate students in mathematics, communication engineering, computer science and other fields. The remaining part can be used as references for specialists. Explicit construction and computation of finite fields are emphasized. In particular, the construction of irreducible polynomials and normal basis of finite field is included. A detailed treatment of optimal normal basis and Galoi's rings is included. It is the first time that the galois rings are in book form.

Low Molecular Mass Gelators - Koji Araki  
2005-08-02

With contributions be numerous experts.

**Handbook of Crystal Growth** - Tatau  
Nishinaga 2014-11-04

Volume IA Handbook of Crystal Growth, 2nd Edition (Fundamentals: Thermodynamics and Kinetics) Volume IA addresses the present status of crystal growth science, and provides scientific tools for the following volumes: Volume II (Bulk Crystal Growth) and III (Thin Film Growth and

Epitaxy). Volume IA highlights thermodynamics and kinetics. After historical introduction of the crystal growth, phase equilibria, defect thermodynamics, stoichiometry, and shape of crystal and structure of melt are described. Then, the most fundamental and basic aspects of crystal growth are presented, along with the theories of nucleation and growth kinetics. In addition, the simulations of crystal growth by Monte Carlo, ab initio-based approach and colloidal assembly are thoroughly investigated. Volume IB Handbook of Crystal Growth, 2nd Edition (Fundamentals: Transport and Stability) Volume IB discusses pattern formation, a typical problem in crystal growth. In addition, an introduction to morphological stability is given and the phase-field model is explained with comparison to experiments. The field of nanocrystal growth is rapidly expanding and here the growth from vapor is presented as an example. For the advancement of life science, the crystal growth of protein and other

biological molecules is indispensable and biological crystallization in nature gives many hints for their crystal growth. Another subject discussed is pharmaceutical crystal growth. To understand the crystal growth, in situ observation is extremely powerful. The observation techniques are demonstrated. Volume IA Explores phase equilibria, defect thermodynamics of Si, stoichiometry of oxides and atomistic structure of melt and alloys Explains basic ideas to understand crystal growth, equilibrium shape of crystal, rough-smooth transition of step and surface, nucleation and growth mechanisms Focuses on simulation of crystal growth by classical Monte Carlo, ab-initio based quantum mechanical approach, kinetic Monte Carlo and phase field model. Controlled colloidal assembly is presented as an experimental model for crystal growth. Volume IIB Describes morphological stability theory and phase-field model and comparison to experiments of dendritic growth Presents

nanocrystal growth in vapor as well as protein crystal growth and biological crystallization Interprets mass production of pharmaceutical crystals to be understood as ordinary crystal growth and explains crystallization of chiral molecules Demonstrates in situ observation of crystal growth in vapor, solution and melt on the ground and in space

### **Advances in Imaging and Electron Physics -**

Peter W. Hawkes 2003-05-20

Image processing and a major contribution on microscopy dominate the latest volume of these advances. This volume looks at theory and it's application in a practical sense, with a full account of the methods used and realistic detailed application. The authors do this by examining the latest developments, historic illustrations and mathematical fundamentals of the exciting developments in imaging and applying them to realistic practical situations. Addressing and solving daily issues faced by researchers, consultants and engineers

working in this field, makes this book essential reading \*Emphasizes broad and in depth article collaborations between world-renowned scientists in the field of image and electron physics \*Emphasises theory and it's application in a practical sense \*Provides the FIRST full statement of a radical new approach to 'phase calibration' and the solution of this important and difficult problem, pioneered by A, Lannes *Fractal Growth Phenomena* - Tam s Vicsek 1992 The investigation of phenomena involving fractals has gone through a spectacular development in the last decade. Many physical, technological and biological processes have been shown to be related to and described by objects with non-integer dimensions. The physics of far-from-equilibrium growth phenomena represents one of the most important fields in which fractal geometry is widely applied. During the last couple of years considerable experimental, numerical and theoretical information has accumulated concerning such processes. This

book, written by a well-known expert in the field, summarizes the basic concepts born in the studies of fractal growth and also presents some of the most important new results for more specialized readers. It also contains 15 beautiful color plates demonstrating the richness of the geometry of fractal patterns. Accordingly, it may serve as a textbook on the geometrical aspects of fractal growth and it treats this area in sufficient depth to make it useful as a reference book. No specific mathematical knowledge is required for reading this book which is intended to give a balanced account of the field.

Mathematics of Complexity and Dynamical Systems - Robert A. Meyers 2011-10-05

Mathematics of Complexity and Dynamical Systems is an authoritative reference to the basic tools and concepts of complexity, systems theory, and dynamical systems from the perspective of pure and applied mathematics. Complex systems are systems that comprise many interacting parts with the ability to

generate a new quality of collective behavior through self-organization, e.g. the spontaneous formation of temporal, spatial or functional structures. These systems are often characterized by extreme sensitivity to initial conditions as well as emergent behavior that are not readily predictable or even completely deterministic. The more than 100 entries in this wide-ranging, single source work provide a comprehensive explication of the theory and applications of mathematical complexity, covering ergodic theory, fractals and multifractals, dynamical systems, perturbation theory, solitons, systems and control theory, and related topics. Mathematics of Complexity and Dynamical Systems is an essential reference for all those interested in mathematical complexity, from undergraduate and graduate students up through professional researchers.

**Fractals and Disordered Systems** - Armin Bunde 2012-12-06

Fractals and disordered systems have recently

become the focus of intense interest in research. This book discusses in great detail the effects of disorder on mesoscopic scales (fractures, aggregates, colloids, surfaces and interfaces, glasses and polymers) and presents tools to describe them in mathematical language. A substantial part is devoted to the development of scaling theories based on fractal concepts. In ten chapters written by leading experts in the field, the reader is introduced to basic concepts and techniques in disordered systems and is led to the forefront of current research. This second edition has been substantially revised and updates the literature in this important field. [Fractals in Engineering](#) - Jacques Lévy-Véhel 2005-12-06

The application of fractals in the engineering sciences is evolving swiftly and the editors have turned to Springer for the third time to bring you the latest research emerging from the rapid growth in techniques available for the employment of the ideas of fractals and

complexity to a variety of disciplines in and associated with the engineering field. The strong potential of this research can be seen in real industrial situations with recent progress being made in areas such as chemical engineering, internet traffic, physics and finance. Image processing continues to be a major field of application for fractal analysis and is well-represented here. It is important to note that the applications models are presented with a firm basis in theoretical argument, the qualitative observation of fractal phenomena no longer being sufficient. Consisting of papers written by a world-wide pool of experts, the multidisciplinary approach of this third volume will be of particular interest to industrial researchers and practitioners as well as to academics from many backgrounds. Fractals in Engineering: New Trends in Theory and Applications continues the publication of engineering-related research in fractal techniques begun in Fractals in Engineering and

Fractals: Theory and Applications in Engineering (Springer London 1997 and 1999).

**Computer Simulations of Surfaces and Interfaces** - Burkhard Dünweg 2013-03-07  
Studies of surfaces and interactions between dissimilar materials or phases are vital for modern technological applications. Computer simulation methods are indispensable in such studies and this book contains a substantial body of knowledge about simulation methods as well as the theoretical background for performing computer experiments and analyzing the data. The book is self-contained, covering a range of topics from classical statistical mechanics to a variety of simulation techniques, including molecular dynamics, Langevin dynamics and Monte Carlo methods. A number of physical systems are considered, including fluids, magnets, polymers, granular media, and driven diffusive systems. The computer simulation methods considered include both standard and accelerated versions. The simulation methods

are clearly related to the fundamental principles of thermodynamics and statistical mechanics. Encyclopedia of Surface and Colloid Science - P. Somasundaran 2006

*Thin Film Growth* - Zexian Cao 2011-07-18

Thin film technology is used in many applications such as microelectronics, optics, hard and corrosion resistant coatings and micromechanics, and thin films form a uniquely versatile material base for the development of novel technologies within these industries. Thin film growth provides an important and up-to-date review of the theory and deposition techniques used in the formation of thin films. Part one focuses on the theory of thin film growth, with chapters covering nucleation and growth processes in thin films, phase-field modelling of thin film growth and surface roughness evolution. Part two covers some of the techniques used for thin film growth, including oblique angle deposition, reactive

magnetron sputtering and epitaxial growth of graphene films on single crystal metal surfaces. This section also includes chapters on the properties of thin films, covering topics such as substrate plasticity and buckling of thin films, polarity control, nanostructure growth dynamics and network behaviour in thin films. With its distinguished editor and international team of contributors, Thin film growth is an essential reference for engineers in electronics, energy materials and mechanical engineering, as well as those with an academic research interest in the topic. Provides an important and up-to-date review of the theory and deposition techniques used in the formation of thin films Focuses on the theory and modelling of thin film growth, techniques and mechanisms used for thin film growth and properties of thin films An essential reference for engineers in electronics, energy materials and mechanical engineering Encyclopedia of Interfacial Chemistry - 2018-03-29

Encyclopedia of Interfacial Chemistry: Surface Science and Electrochemistry summarizes current, fundamental knowledge of interfacial chemistry, bringing readers the latest developments in the field. As the chemical and physical properties and processes at solid and liquid interfaces are the scientific basis of so many technologies which enhance our lives and create new opportunities, its important to highlight how these technologies enable the design and optimization of functional materials for heterogeneous and electro-catalysts in food production, pollution control, energy conversion and storage, medical applications requiring biocompatibility, drug delivery, and more. This book provides an interdisciplinary view that lies at the intersection of these fields. Presents fundamental knowledge of interfacial chemistry, surface science and electrochemistry and provides cutting-edge research from academics and practitioners across various fields and global regions

*Fractal Frontiers: Fractals In The Natural And Applied Sciences* - Novak Miroslav M 1997-03-29

This popular science book shows that chemists do have a sense of humor, and this book is a celebration of the quirky side of scientific nomenclature. Here, some molecules are shown that have unusual, rude, ridiculous or downright silly names. Written in an easy-to-read style, anyone — not just scientists — can appreciate the content. Each molecule is illustrated with a photograph and/or image that relates directly or indirectly to its name and molecular structure. Thus, the book is not only entertaining, but also educational./a

Fractals and Chaos - Paul S. Addison 1997-01-01  
Fractals and Chaos: An Illustrated Course provides you with a practical, elementary introduction to fractal geometry and chaotic dynamics-subjects that have attracted immense interest throughout the scientific and engineering disciplines. The book may be used in part or as a whole to form an introductory

course in either or both subject areas. A prominent feature of the book is the use of many illustrations to convey the concepts required for comprehension of the subject. In addition, plenty of problems are provided to test understanding. Advanced mathematics is avoided in order to provide a concise treatment and speed the reader through the subject areas. The book can be used as a text for undergraduate courses or for self-study.

*Fractals in Molecular Biophysics* - T. Gregory Dewey 1998-02-19

Historically, science has sought to reduce complex problems to their simplest components, but more recently it has recognized the merit of studying complex phenomena in situ. Fractal geometry is one such appealing approach, and this book discusses its application to complex problems in molecular biophysics. The book provides a detailed, unified treatment of fractal aspects of protein and structure dynamics, fractal reaction kinetics in biochemical systems,

sequence correlations in DNA and proteins, and descriptors of chaos in enzymatic systems. In an area that has been slow to acknowledge the use of fractals, this is an important addition to the literature, offering a glimpse of the wealth of possible applications to complex problems.

**Fractal Concepts in Surface Growth** - A.- L. Barabási 1995-04-13

This book brings together two of the most exciting and widely studied subjects in modern physics: namely fractals and surfaces. To the community interested in the study of surfaces and interfaces, it brings the concept of fractals. To the community interested in the exciting field of fractals and their application, it demonstrates how these concepts may be used in the study of surfaces. The authors cover, in simple terms, the various methods and theories developed over the past ten years to study surface growth. They describe how one can use fractal concepts successfully to describe and predict the morphology resulting from various growth

processes. Consequently, this book will appeal to physicists working in condensed matter physics and statistical mechanics, with an interest in fractals and their application. The first chapter of this important new text is available on the Cambridge Worldwide Web server:

<http://www.cup.cam.ac.uk/onlinepubs/Textbooks/textbookstop.html>

Fractals, Scaling and Growth Far from Equilibrium - Paul Meakin 1998

A comprehensive, 1998 account of the practical aspects and pitfalls of the applications of fractal modelling in the physical sciences.

*Bursts* - Albert-Laszlo Barabasi 2010-04-29

A revolutionary new theory showing how we can predict human behavior-from a radical genius and bestselling author Can we scientifically predict our future? Scientists and pseudo scientists have been pursuing this mystery for hundreds and perhaps thousands of years. But now, astonishing new research is revealing patterns in human behavior previously thought

to be purely random. Precise, orderly, predictable patterns... Albert Laszlo Barabasi, already the world's preeminent researcher on the science of networks, describes his work on this profound mystery in *Bursts*, a stunningly original investigation into human nature. His approach relies on the digital reality of our world, from mobile phones to the Internet and email, because it has turned society into a huge research laboratory. All those electronic trails of time stamped texts, voicemails, and internet searches add up to a previously unavailable massive data set of statistics that track our movements, our decisions, our lives. Analysis of these trails is offering deep insights into the rhythm of how we do everything. His finding? We work and fight and play in short flourishes of activity followed by next to nothing. The pattern isn't random, it's "bursty." Randomness does not rule our lives in the way scientists have assumed up until now. Illustrating this revolutionary science, Barabasi artfully weaves together the

story of a 16th century burst of human activity-a bloody medieval crusade launched in his homeland, Transylvania-with the modern tale of a contemporary artist hunted by the FBI through our post 9/11 surveillance society. These narratives illustrate how predicting human behavior has long been the obsession, sometimes the duty, of those in power. Barabási's astonishingly wide range of examples from seemingly unrelated areas include how dollar bills move around the U.S., the pattern everyone follows in writing email, the spread of epidemics, and even the flight patterns of albatross. In all these phenomena a virtually identical, mathematically described bursty pattern emerges. Bursts reveals what this amazing new research is showing us about where individual spontaneity ends and predictability in human behavior begins. The way you think about your own potential to do something truly extraordinary will never be the same.

*Fractal Physiology* - James B Bassingthwaight  
2013-05-27

I know that most men, including those at ease with the problems of the greatest complexity, can seldom accept even the simplest and most obvious truth if it be such as would oblige them to admit the falsity of conclusions which they have delighted in explaining to colleagues, which they have proudly taught to others, and which they have woven, thread by thread, into the fabric of their lives. Joseph Ford quoting Tolstoy (Gleick, 1987) We are used to thinking that natural objects have a certain form and that this form is determined by a characteristic scale. If we magnify the object beyond this scale, no new features are revealed. To correctly measure the properties of the object, such as length, area, or volume, we measure it at a resolution finer than the characteristic scale of the object. We expect that the value we measure has a unique value for the object. This simple idea is the basis of the calculus, Euclidean geometry,

and the theory of measurement. However, Mandelbrot (1977, 1983) brought to the world's attention that many natural objects simply do not have this preconceived form. Many of the structures in space and processes in time of living things have a very different form. Living things have structures in space and fluctuations in time that cannot be characterized by one spatial or temporal scale. They extend over many spatial or temporal scales.

### **Fractals and Chaos in Chemical Engineering**

- Massimiliano Giona 1997

"This volume is a collection of the papers presented at the International Conference on Fractal Concepts and the Application of Chaos in Chemical Engineering Problems. The book provides a detailed description of the current research on the application of fractal concepts, nonlinear dynamics and disordered systems in chemical engineering, with emphasis on interdisciplinary connections with related fields, such as control theory of nonlinear systems,

dynamic theory of fractals, transport theory and physical chemistry of heterogeneous materials." -Publisher's website.

### **Low-Energy Ion Irradiation of Materials -**

Bernd Rauschenbach 2022-08-19

This book provides a comprehensive introduction to all aspects of low-energy ion-solid interaction from basic principles to advanced applications in materials science. It features a balanced and insightful approach to the fundamentals of the low-energy ion-solid surface interaction, focusing on relevant topics such as interaction potentials, kinetics of binary collisions, ion range, radiation damages, and sputtering. Additionally, the book incorporates key updates reflecting the latest relevant results of modern research on topics such as topography evolution and thin-film deposition under ion bombardment, ion beam figuring and smoothing, generation of nanostructures, and ion beam-controlled glancing angle deposition. Filling a gap of almost 20 years of relevant

research activity, this book offers a wealth of information and up-to-date results for graduate students, academic researchers, and industrial scientists working in these areas.

**Network Science** - Albert-László Barabási

2016-07-21

Illustrated throughout in full colour, this pioneering text is the only book you need for an introduction to network science.

**Stochastic Processes in Physics, Chemistry, and Biology** - Jan A. Freund 2008-01-11

The theory of stochastic processes originally grew out of efforts to describe Brownian motion quantitatively. Today it provides a huge arsenal of methods suitable for analyzing the influence of noise on a wide range of systems. The credit for acquiring all the deep insights and powerful methods is due mainly to a handful of physicists and mathematicians: Einstein, Smoluchowski, Langevin, Wiener, Stratonovich, etc. Hence it is no surprise that until recently the bulk of basic and applied stochastic research was devoted to

purely mathematical and physical questions. However, in the last decade we have witnessed an enormous growth of results achieved in other sciences - especially chemistry and biology - based on applying methods of stochastic processes. One reason for this stochastic boom may be that the realization that noise plays a constructive rather than the expected deteriorating role has spread to communities beyond physics. Besides their aesthetic appeal these noise-induced, noise-supported or noise-enhanced effects sometimes offer an explanation for so far open problems (information transmission in the nervous system and information processing in the brain, processes at the cell level, enzymatic reactions, etc.). They may also pave the way to novel technological applications (noise-enhanced reaction rates, noise-induced transport and separation on the nanoscale, etc.). Key words to be mentioned in this context are stochastic resonance, Brownian motors or ratchets, and noise-supported

phenomena in excitable systems.

**Computational Methods in Surface and Colloid Science** - Malgorzata Borowko  
2019-04-23

This volume presents computer simulation methods and mathematical modelling of physical processes used in surface science research. It offers in-depth analysis of advanced theoretical approaches to behaviours of fluids in contact with porous, semiporous and nonporous solid surfaces. The book also explores interfacial systems for a wide variety of p

**Dynamics Of Fluctuating Interfaces And Related Phenomena: Proceedings Of The 4th Ctp Workshop On Statistical** - Kim

Doochul 1997-09-05

Roughening dynamics of various interface problems has been an attractive topic recently. The subject is related to many interdisciplinary branches in nonequilibrium statistical physics such as crystal growth, vortex dynamics, fractals and chaos, and self-organized critical phenomena. This volume includes pedagogical reviews of the scaling concepts in fluctuating surfaces, current theories on expitaxial growth phenomena and interface dynamics in disordered media, and many other related topics. Thus it serves as a valuable reference for both graduate students and researchers in statistical physics and materials science.