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Non-Newtonian properties on bubble dynamics and cavitation are fundamentally different from those of Newtonian fluids. The most significant effect arises from the dramatic increase in viscosity of polymer solutions in an extensional flow, such as that generated about a spherical bubble during its growth or collapse phase. In addition, many biological fluids, such as blood, synovial fluid, and saliva, have non-Newtonian properties and can display significant viscoelastic behaviour. This monograph

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elucidates general aspects of bubble dynamics and cavitation in non-Newtonian fluids and applies them to the fields of biomedicine and bioengineering. In addition it presents many examples from the process industries. The field is strongly interdisciplinary and the numerous disciplines involved have and will continue to overlook and reinvent each others' work. This book helps researchers to think intuitively about the diverse physics of these systems, to attempt to bridge the various communities involved, and to convey the interest, elegance, and variety of physical phenomena that manifest themselves on the micrometer and microsecond scales.

Atomization and sprays are used in a wide range of industries: mechanical, chemical, aerospace, and civil engineering; material science and metallurgy; food; pharmaceutical, forestry, environmental

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protection; medicine; agriculture; meteorology and others. Some specific applications are spray combustion in furnaces, gas turbines and rockets, spray drying and cooling, air conditioning, powdered metallurgy, spray painting and coating, inhalation therapy, and many others. The Handbook of Atomization and Sprays will bring together the fundamental and applied material from all fields into one comprehensive source. Subject areas included in the reference are droplets, theoretical models and numerical simulations, phase Doppler particle analysis, applications, devices and more. The work shows the fascination of topology- and geometry-governed properties of self-rolled micro- and nanoarchitectures. The author provides an in-depth representation of the advanced theoretical and numerical models for analyzing key effects, which underlie

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*engineering of transport, superconducting
and optical properties of micro- and
nanoarchitectures.*

*Emerging Technologies for Nanoparticle
Manufacturing*

Theory and Applications

Journal of Heat Transfer

Micro- and Nanobubbles

Index Medicus

Cavitation in Biomedicine

Nanotechnology is a 'catch-all' description of activities at the level of atoms and molecules that have applications in the real world. A nanometre is a billionth of a metre, that is, about 1/80,000 of the diameter of a human hair, or 10 times the diameter of a hydrogen

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atom. Nanotechnology is now used in precision engineering, new materials development as well as in electronics; electromechanical systems as well as mainstream biomedical applications in areas such as gene therapy, drug delivery and novel drug discovery techniques. This book presents carefully selected abstracts of the last 5 years in this frontier field. Special access is provide by author, title and subject indexes.

blends materials,

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fabrication, and structure issues of developing nanobio devices in a single volume. treats major nanobio application areas such as drug delivery, molecular diagnostics, and imaging. chapters written by the leading researchers in the field.

Computational Fluid Dynamics (CFD) uses advanced numerical models to predict flow, mixing and (bio)-chemical reactions. In drinking water engineering, CFD is increasingly applied to predict the performance of

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treatment installations and to optimise these installations. A lack of understanding of the hydraulics in drinking water treatment systems has resulted in suboptimal design of installations. The formation of unwanted disinfection-by-products and the energy consumption or use of chemicals is therefore higher than necessary. The aim of this work is to better understand the hydraulic and (bio)-chemical processes in drinking water treatment installations using

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experimental and numerical techniques. By combining these techniques, CFD modelling is further developed as a tool to evaluate the performance of these installations. This leads to new insights in the applicability of models in ozone and UV systems, and new insights in design concepts of these systems. CFD modelling proves to be a powerful tool to understand the hydrodynamic and (bio)-chemical processes in drinking water systems. If applied properly,

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accounting for the complex
turbulent motions and
validated by experiments,
this tool leads to a
better design of UV
reactors, ozone systems
and other systems dictated
by hydraulics.

Fundamentals and
Applications

Cancer Theranostic
Nanomedicine

Topological and
Geometrical Effects

Drug Delivery

Ultrasound Imaging and
Therapy

17th IEEE international
conference on micro
electro mechanical systems

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Proceedings of the muTAS 2000 Symposium, held in Enschede, The Netherlands, 14-18 May 2000

Microbubbles and nanobubbles have several characteristics that are comparable with millimeter- and centimeter-sized bubbles. These characteristics are their small size, which results in large surface area and high bioactivity, low rising velocity, decreased friction drag, high internal pressure, large gas dissolution capacity, negatively charged surface, and ability to be crushed and form free radicals.

Microbubbles and nanobubbles have found applications in a variety of fields such as engineering, agriculture, environment, food, and medicine.

Microbubbles have been successfully used in aquacultures of oysters in Hiroshima, scallops in Hokkaido, and pearls in Mie Prefecture, Japan. This

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field has shown a strong potential for growth. This book comprehensively discusses microbubbles and nanobubbles and their application in aquaculture, environment, engineering, medicine, stock raising, agriculture, and marine industry. It presents their potential as a new technology that can be utilized globally.

With the invention of scanning probe techniques in the early 1980s, scientists can now play with single atoms, single molecules, and even single bonds. Force, dynamics, and function can now be probed at the single-molecule level. *Molecular Manipulation with Atomic Force Microscopy (AFM)* presents a series of topics that discuss concepts and methodologies used to manipulate and study single (bio)molecules with AFM. The first part is dedicated to the pulling of single molecules with force

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spectroscopy to investigate molecular interactions, mechanics, and mechanochemical processes, and the second part to the manipulation, repositioning, and targeted delivery of single molecules on substrates. Single molecule manipulation is an exciting area of research which made important breakthroughs in nanoscience and which could find potential applications in a diverse range of disciplines, including chemistry, biology, physics, material and polymer science, and engineering. New and experienced AFM researchers looking for applications beyond imaging will find a wealth of information in this informative volume.

Proceedings of the uTAS '98

Workshop, held in Banff, Canada,
13-16 October 1998

A Summary of Research 1995

Encyclopedia Of Two-phase Heat

Transfer And Flow I: Fundamentals
And Methods (A 4-volume Set)
Handbook of Ultrasonics and
Sonochemistry

Chemical Abstracts

Journal of the Royal Society, Interface

Immunosensing for Detection of Protein Biomarkers not only introduces the principles, methods, and classification of immunoassay, but also presents the latest achievements in areas such as electrochemical immunosensors, nanoprobe-based immunoassay, chemiluminescence immunoassay, electrochemiluminescent immunoassay, multianalyte immunoassay, optical imaging for immunoassay, signal

amplification for immunoassay, and so on. In recent years, immunosensing and immunoassay methods have attracted considerable interest due to their applications in different fields, particularly clinical diagnosis. Although a large number of academic papers in immunosensing and immunoassay have been published in different journals recently, it is still a difficult and time-consuming task for researchers, especially those new to the area, to understand the principles, methods, and research progress of immunosensing. Based on the research experience of the

authors and their research groups, this book offers readers with new research ideas to develop immunosensing methodology. As a monograph, it offers deeper and more complete coverage than review papers, which only report certain aspects of progress. Grounded in the research experience of Professor Ju's research group, the book focuses on immunosensing for detection of protein biomarkers, summarizing understanding, research, and practice on immunosensing methodology in detection of protein biomarkers. Presents the latest research and thinking on immunosensing for detection of

protein biomarkers Offers current techniques, and looks to the development of new methodologies Offers the latest developments in various aspects of immunosensing, including electrochemiluminescent immunoassay, multianalyte immunoassay, optical imaging immunoassay, and signal amplification immunoassay Offers readers new ideas to research and develop immunosensing methodologies for the future

This volume provides a comprehensive state-of-the art assessment of the fundamentals of the Microscale heat transfer and transport phenomena and

heat transfer and applications in Microsystems. The modern trend toward miniaturization of devices requires a better understanding of heat mass transfer phenomena in small dimensions. Devices having dimensions of order of microns are being developed for use of cooling of integrated circuits, and in biochemicals-biomedical applications and cryogenics. Microelectromechanical systems (MEMS) have an important impact in medicine, bioengineering, information technologies and other industries. This book provides an overview of nanoparticle production

methods, scale-up issues drawing attention to industrial applicability, and addresses their successful applications for commercial use. There is a need for a reference book which will address various aspects of recent progress in the methods of development of nanoparticles with a focus on polymeric and lipid nanoparticles, their scale-up techniques, and challenges in their commercialization. There is no consolidated reference book that discusses the emerging technologies for nanoparticle manufacturing. This book focuses on the following major aspects of emerging technologies for nano particle

manufacturing. I. Introduction and Biomedical Applications of Nanoparticles II. Polymeric Nanoparticles III. Lipid Nanoparticles IV. Metallic Nanoparticles V. Quality Control for Nanoparticles VI. Challenges in Scale-Up Production of Nanoparticles VII. Injectable Nanosystems VIII. Future Directions and Challenges
Leading scientists are selected as chapter authors who have contributed significantly in this field and they focus more on emerging technologies for nanoparticle manufacturing, future directions, and challenges.

Fundamentals and Advances in

**Energy, Food, Feed, Fertilizer,
and Bioactive Compounds
Proceedings of the NATO
Advanced Study Institute on
Microscale Heat Transfer -
Fundamentals and Applications
in Biological and
Microelectromechanical
Systems, Cesme-Izmir, Turkey,
18-30 July, 2004
Journal of Computational and
Theoretical Nanoscience
Drinking Water Disinfection
Techniques
technical digest ; Maastricht,
january 25-29, 2004 ; IEEE
international MEMS 2004
conference, Maastricht
Cumulated Index Medicus
Drug Delivery is the latest**

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and most up-to-date text on drug delivery and offers an excellent working foundation for students and clinicians in health professions and graduate students including nursing, pharmacy, medicine, dentistry, as well as researchers and scientists. Presenting this complex content in an organized and concise format, Drug Delivery allows students to gain a strong understanding of the key concepts of drug delivery. This text focuses on the basic concepts of drug delivery while thoroughly examining various topics such

as: CNS delivery Gene
delivery Ocular delivery
World-wide research on drug
delivery Recent advances in
drug delivery A significant
advancement has been made
in the field of drug delivery.
This text provides a detailed
overview of drug delivery
systems, routes of drug
administration and
development of various
formulations. The cutting
edge research being carried
out in this field will be
compiled and a focus on
worldwide research on drug
delivery and targeting at the
molecular, cellular, and organ

levels will also be summarized. Each new print copy includes access to the Navigate Companion Website including: Chapter Quizzes, Interactive Glossary, Crossword Puzzles , Interactive Flashcards, and Matching Exercises

Animal Cell Technology: Products of Today, Prospects for Tomorrow is a collection of papers that discusses the advancement and future of biotechnology. The book presents a total of 164 materials that are organized into 22 sections. The coverage of the text includes

the various methodologies involved in animal cell technology, such as post translational modifications; kinetics and modeling; and measurement and assay. The book also covers product safety and consistency testing; products from animal cells in culture; and apoptosis and cell biology. The text will be of great use to biologists, biotechnicians, and biological engineers. Readers who have an interest in the advancement of biotechnology will also benefit from the book.

Water is our natural heritage,

our miracle of life. However, our increasingly technological society has become indifferent to water. Far from being pure, modern drinking water around the world contains many undesirable chemical and bacterial contaminants. The existing techniques employed for the disinfection of water are either energy-intensive or have by-products harmful to human health. Drinking Water Disinfection Techniques reviews these processes and explores novel technologies for water disinfection synergistic with existing

techniques. The book covers a wide audience and gives a comprehensive review of various physical, chemical, and hybrid techniques commonly used for the disinfection of water as well as newer emerging technologies in terms of their mode of action, scale of operation, efficacy, merits, and demerits. It broadly addresses the issues related to water disinfection in three sections: Disinfection techniques—chemical, physical, and hybrid (combination)—and their likely scale of operation efficacy

Disinfection by-product as a function of water source and the type of treatment
Emerging and novel techniques, including new work on cavitation, an economical, energy-efficient, and simple alternative to the conventional methods of disinfection
Drinking Water Disinfection Techniques effectively combines the chemical, physical, biological, and engineering principles of water disinfection in one text. Discussing both conventional and novel techniques used for disinfection and the economics involved, the book

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gives a comprehensive review of various physical, chemical, and hybrid techniques used for disinfection to create potable water.

With Biomedical and
Bioengineering Applications
Heating Metal Nanoparticles
Using Light

The Journal of the Acoustical
Society of America

The Science of Inkjet and
Droplets

The sciences and
engineering. B

Dissertation Abstracts
International

Micro-TAS '98 is the third of a

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series of symposia initiated by MBSA (University of Twente) in 1994, on the subject of miniaturizing, and integrating within a monolithic structure, the chemical, biochemical and biological procedures commonly used for analysis and synthesis. The primary tool used to develop micro-total analysis systems (mu-TAS) has been micro-photolithographic patterning and micromachining. These powerful tools of Micro System Technology (MST or MEMS) have been applied in highly imaginative ways to develop microchip chemical arrays, fully integrated pump and fluid manifolds, and electrokinetically driven micro-channel systems to be

used for genetic analysis, clinical diagnostics and environmental monitoring, and to integrate reactions as diverse as the polymerase chain reaction (PCR) and the large volume, partial oxidation of ammonia. This text illustrates the rapid expansion of the field, the extensive industrial involvement, the increasing number of participating researchers, the expanding range of concepts and applications that utilize MST and microfluidic devices, and new MST-compatible plastic micro-machining to meet the needs of the life science community. This volume contains the proceedings of the Third International Symposium on Micro-Total Analysis Systems, mu-

TAS '98, held on October 13-16 in Banff, Alberta, Canada. State-of-the-art invited and contributed papers presented by the world's leading mu- TAS research groups provide a highly informative picture of the growth since 1994 and of the promising future of this exciting and rapidly growing field.

Advances in Heat Transfer Elsevier
This book surveys recent advances in theranostics based on magnetic nanoparticles, ultrasound contrast agents, silica nanoparticles and polymeric micelles. It presents magnetic nanoparticles, which offer a robust tool for contrast enhanced MRI imaging, magnetic targeting, controlled drug delivery, molecular imaging guided gene therapy,

magnetic hyperthermia, and controlling cell fate. Multifunctional ultrasound contrast agents have great potential in ultrasound molecular imaging, multimodal imaging, drug/gene delivery, and integrated diagnostics and therapeutics. Due to their diversity and multifunctionality, polymeric micelles and silica-based nanocomposites are highly capable of enhancing the efficacy of multimodal imaging and synergistic cancer therapy. This comprehensive book summarizes the main advances in multifunctional nanoprobe for targeted imaging and therapy of gastric cancer, and explores the clinical translational prospects and

challenges. Although more research is needed to overcome the substantial obstacles that impede the development and availability of nanotheranostic products, such nontrivial nanoagents are expected to revolutionize medical treatments and help to realize the potential of personalized medicine to diagnose, treat, and follow-up patients with cancer. Zhifei Dai is a Professor at the Department of Biomedical Engineering, College of Engineering, Peking University, China.

Computational Methods to Study
the Structure and Dynamics of
Biomolecules and Biomolecular
Processes

Principles and Techniques
Fundamentals of Microfabrication
and Nanotechnology, Three-
Volume Set
BioMEMS and Biomedical
Nanotechnology
Microscale Heat Transfer -
Fundamentals and Applications
Molecular Manipulation with Atomic
Force Microscopy

Plasmonics is an important branch of optics concerned with the interaction of metals with light. Under appropriate illumination, metal nanoparticles can exhibit enhanced light absorption, becoming nanosources of heat that can be precisely controlled. This book provides an overview of the exciting new field of thermoplasmonics and a detailed discussion of its theoretical

underpinning in nanophotonics. This topic has developed rapidly in the last decade, and is now a highly-active area of research due to countless applications in nanoengineering and nanomedicine. These important applications include photothermal cancer therapy, drug and gene delivery, nanochemistry and photothermal imaging. This timely and self-contained text is suited to all researchers and graduate students working in plasmonics, nano-optics and thermal-induced processes at the nanoscale.

This book provides a comprehensive overview of modern computer-based techniques for analyzing the structure, properties and dynamics of biomolecules and biomolecular

processes. It is organized in four main parts; the first one deals with methodology of molecular simulations; the second one with applications of molecular simulations; the third one introduces bioinformatics methods and the use of experimental information in molecular simulations; the last part reports on selected applications of molecular quantum mechanics. This second edition has been thoroughly revised and updated to include the latest progresses made in the respective field of research.

This book offers a systematic introduction to the engineering principles and techniques of cavitation in biomedicine on the basis of its physics and mechanism. Adopting an interdisciplinary approach, it covers

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areas of interest ranging from physics and engineering to the biological and medical sciences. Individual chapters introduce the fundamentals of cavitation, describe its characterization, control and imaging techniques, and present cavitation-enhanced thermal and mechanical effects and their applications. Intended as both a reference work for graduate students, and as a guide for scientists and engineers who work with cavitation in biomedicine, it provides a broad and solid foundation of knowledge. The aim is to bridge the different disciplines involved, and to promote cross-discipline research, thus encouraging innovations in the scientific research and engineering applications alike. Dr. Mingxi Wan is a

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professor at Department of Biomedical Engineering, Xi'an Jiao Tong University, Xi'an, Shaanxi, China; Dr. Yi Feng works at Department of Biomedical Engineering, Xi'an Jiao Tong University, Xi'an, Shaanxi, China; Dr. Gail ter Haar is a professor at The Institute of Cancer Research, Sutton, Surry, UK.

Micro Total Analysis Systems '98
Animal Cell Technology

Thermoplasmonics

Single-molecule DNA Dynamics

Revealed by Nanopore Analysis

Handbook of Microalgae-Based

Processes and Products

Nanotechnology Abstracts

Now in its third edition,

Fundamentals of Microfabrication
and Nanotechnology continues to

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provide the most complete MEMS coverage available. Thoroughly revised and updated the new edition of this perennial bestseller has been expanded to three volumes, reflecting the substantial growth of this field. It includes a wealth of theoretical and practical information on nanotechnology and NEMS and offers background and comprehensive information on materials, processes, and manufacturing options. The first volume offers a rigorous theoretical treatment of micro- and nanosciences, and includes sections on solid-state physics, quantum mechanics, crystallography, and fluidics. The second volume presents a very large set of manufacturing techniques for micro- and nanofabrication and

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covers different forms of lithography, material removal processes, and additive technologies. The third volume focuses on manufacturing techniques and applications of Bio-MEMS and Bio-NEMS. Illustrated in color throughout, this seminal work is a cogent instructional text, providing classroom and self-learners with worked-out examples and end-of-chapter problems. The author characterizes and defines major research areas and illustrates them with examples pulled from the most recent literature and from his own work.

Advances in Heat Transfer fills the information gap between regularly scheduled journals and university level textbooks by providing in-depth

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review articles over a broader scope than in journals or texts. The articles, which serve as a broad review for experts in the field, will also be of great interest to non-specialists who need to keep up-to-date with the results of the latest research. It is essential reading for all mechanical, chemical and industrial engineers working in the field of heat transfer, graduate schools or industry. Provides an overview of review articles on topics of current interest Bridges the gap between academic researchers and practitioners in industry A long-running and prestigious series The aim of the two-set series is to present a very detailed and up-to-date reference for researchers and practicing engineers in the fields of

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mechanical, refrigeration, chemical, nuclear and electronics engineering on the important topic of two-phase heat transfer and two-phase flow. The scope of the first set of 4 volumes presents the fundamentals of the two-phase flows and heat transfer mechanisms, and describes in detail the most important prediction methods, while the scope of the second set of 4 volumes presents numerous special topics and numerous applications, also including numerical simulation methods. Practicing engineers will find extensive coverage to applications involving: multi-microchannel evaporator cold plates for electronics cooling, boiling on enhanced tubes and tube bundles, flow pattern based methods for

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predicting boiling and condensation inside horizontal tubes, pressure drop methods for singularities (U-bends and contractions), boiling in multiport tubes, and boiling and condensation in plate heat exchangers. All of these chapters include the latest methods for predicting not only local heat transfer coefficients but also pressure drops. Professors and students will find this 'Encyclopedia of Two-Phase Heat Transfer and Flow' particularly exciting, as it contains authored books and thorough state-of-the-art reviews on many basic and special topics, such as numerical modeling of two-phase heat transfer and adiabatic bubbly and slug flows, the unified annular flow boiling model, flow pattern maps,

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condensation and boiling theories,
new emerging topics, etc.

Micro Total Analysis Systems 2000
Fundamentals of Inkjet Printing
DNA Replication Stress and Cell Fate
Volume I: Biological and Biomedical
Nanotechnology
Self-rolled Micro- and
Nanoarchitectures

Computational Fluid Dynamics in
Drinking Water Treatment

**From droplet formation to
final applications, this
practical book presents
the subject in a
comprehensive and clear
form, using only content
derived from the latest
published results.**

Starting at the very

beginning, the topic of fluid mechanics is explained, allowing for a suitable regime for printing inks to subsequently be selected. There then follows a discussion on different print-head types and how to form droplets, covering the behavior of droplets in flight and upon impact with the substrate, as well as the droplet's wetting and drying behavior at the substrate. Commonly observed effects, such as the coffee ring effect, are included as well as printing in the

third dimension. The book concludes with a look at what the future holds. As a unique feature, worked examples both at the practical and simulation level, as well as case studies are included. As a result, students and engineers in R&D will come to fully understand the complete process of inkjet printing.

The aim of this handbook is to summarize the recent development in the topic of ultrasonics and sonochemistry, especially in the areas of functional materials and processing

applications. This handbook will benefit the readers as a full and quick technical reference with a high-level historic review of technology, detailed technical descriptions and the latest practical applications. This handbook is divided into five main sections: fundamentals of ultrasonics and sonochemistry, biomaterials, food processing, catalysts, wastewater remediation. Each section and chapter is written by reputable

international scholars and industrial experts. The handbook comprehensively covers the fundamentals of sonochemistry along with key applications. The handbook strives to be a self-contained, easily-understandable reference that will also include up to date knowledge based on research articles. This handbook serves to provide a quick and reliable knowledge for new comers from chemistry, bioengineering, food processing, environmental engineering, in both academia and in industrial

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fields.

The Handbook of Microalgae-based Processes and Products provides a complete overview of all aspects involved in the production and utilization of microalgae resources at commercial scale. Divided into four parts (fundamentals, microalgae-based processes, microalgae-based products, and engineering approaches applied to microalgal processes and products), the book explores the microbiology and metabolic aspects of microalgae, microalgal production

systems, wastewater treatment based in microalgae, CO2 capture using microalgae, microalgae harvesting techniques, and extraction and purification of biomolecules from microalgae. It covers the largest number of microalgal products of commercial relevance, including biogas, biodiesel, bioethanol, biohydrogen, single-cell protein, single-cell oil, biofertilizers, pigments, polyunsaturated fatty acids, bioactive proteins, peptides and amino acids,

bioactive polysaccharides, sterols, bioplastics, UV-screening compounds, and volatile organic compounds. Moreover, it presents and discusses the available engineering tools applied to microalgae biotechnology, such as process integration, process intensification, and techno-economic analysis applied to microalgal processes and products, microalgal biorefineries, life cycle assessment, and exergy analysis of microalgae-based processes and products. The coverage

of a broad range of potential microalgae processes and products in a single volume makes this handbook an indispensable reference for engineering researchers in academia and industry in the fields of bioenergy, sustainable development, and high-value compounds from biomass, as well as graduate students exploring those areas. Engineering professionals in bio-based industries will also find valuable information here when planning or implementing the use of microalgal

technologies. Covers theoretical background information and results of recent research. Discusses all commercially relevant microalgae-based processes and products. Explores the main emerging engineering tools applied to microalgae processes, including techno-economic analysis, process integration, process intensification, life cycle assessment, and exergy analyses. Cavitation in Non-Newtonian Fluids Bubbles, Droplets and Micelles for Acoustically-

**Mediated Drug/Gene
Delivery**

**Immunosensing for
Detection of Protein
Biomarkers**

**Advances in Heat Transfer
Advances in
Nanotheranostics II**

Up-to-Date Details on Using
Ultrasound Imaging to Help
Diagnose Various Diseases Due to
improvements in image quality
and the reduced cost of advanced
features, ultrasound imaging is
playing a greater role in the
diagnosis and image-guided
intervention of a wide range of
diseases. Ultrasound Imaging and
Therapy highlights the latest

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advances in usin

From Bioinformatics to Molecular
Quantum Mechanics

Handbook of Atomization and
Sprays

Products of Today, Prospects for
Tomorrow