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Agriculture

Agricultural Economics and Resource Management

Sustainable and Organic Agriculture

Computational Intelligence for Sustainable Development
Brojo Kishore Mishra, PhD (Professor, Department of Computer Science & Engineering, Associate Dean (International Affairs), GIET University, Odisha, India)

In series: Agriculture Issues and Policies
Publication Date: 11/17/2022
426 pp.
Hardcover: 979-8-88697-198-9. $230.00
e-book: 979-8-88697-346-4. $230.00

This book covers the latest advances in the field of computational intelligence with a special focus on Sustainable Development Goals (SDG) such as promoting sustainable agriculture, good health, clean water and sanitation, affordable and clean energy, sustainable cities and communities, sustainable industrialization and innovation, and sustainable use of terrestrial ecosystems. This book would be an excellent resource for data scientists, engineers, students and professors of higher education, computer scientists, researchers, and academicians.

Crops

Diseases of Fruit and Plantation Crops and Their Sustainable Management
Mujeebur Rahman Khan, PhD (Professor, Aligarh Muslim University, Uttar Pradesh, India) and Ziaul Haque, PhD (Assistant Professor, Department of Plant Protection, Aligarh Muslim University, India)

In series: Agriculture Issues and Policies
Publication Date: 10/20/2022
530 pp.
Hardcover: 978-1-68507-978-9. $310.00
e-book: 979-8-88697-297-9. $310.00

The perineal nature, huge foliage and extensive root system of fruit crops offer conducive conditions for survival and colonization of plant pathogens. Plant diseases in fruit crops are of common occurrence and account for up to 10-20% yield losses. The present book embodies 18 chapters covering major diseases of important temperate fruit crops (almond, apple, apricot, cherry, peach, pear, pistachio, plums, strawberry, walnut, etc.), subtropical and tropical fruit crops (aonla, avocado, bael, banana, cashew, citrus, fig, grapes, guava, jackfruit, jamun, jujube, kiwi, litchi, loquat, mango, papaya, passion-fruit, pineapple, pomegranate, sapota, etc.) and plantation crops (Coconut, Coffee, Date palm, Oil palm, Rubber, Tea, etc.), highlighting the aetiology, symptoms, disease cycle, economic importance, distribution, and management aspects with advanced and sustainable approaches. The present book shall serve as an important reference source to UG/PG students, academics, professionals, scientists, researchers and extension personnel dealing with plant diseases in universities and institutes, bureaus, directorates, research stations etc.

Emerging Environmental Applications of Nanozymes
Dr. Seema Nara and Smriti Singh

In series: Environmental Science, Engineering and Technology
Expected Publication Date: 03/20/2023
Softcover: 979-8-88697-552-9. $95.00
e-book: 979-8-88697-592-5. $95.00
This book will cover all aspects of using nanozymes for environmental safety, monitoring and remediation. It will uncover the way nanozymes are being used for sensing different categories of environmental pollutants like pesticides, heavy metals, organic pollutants or microbes. Further, it will provide information on using nanozymes for extraction, removal or remediation of pollutants from soil or water samples and their degradation to relatively safer by-products. This book will also include the challenges to be met by nanozymes and their future prospects.

**Jute: Cultivation, Properties and Uses**  
*Matthieu Issa*

In series: *Agriculture Issues and Policies*  
Publication Date: 12/15/2022  
144 pp.  
Softcover: 979-8-88697-490-4. $95.00  
e-book: 979-8-88697-505-5. $95.00

This volume contains five chapters discussing the cultivation, properties, and uses of jute fiber. Chapter One is an overview of the manufacturing processes of jute fiber-based composites. Chapter Two discusses methods of chemical modification of the properties of jute fiber for lifecycle enhancement in wastewater treatment. Chapter Three examines in a scope beyond traditional applications the progress, challenges, and prospects of jute fiber as a green adsorbent. Chapter Four provides a review of the processing of jute fiber from extraction to products. Chapter Five discusses potential applications of jute in projects of environmental recovery and environmental conservation.

**Legumes: Nutritional Value, Health Benefits and Management**  
*Dr. Phetole Mangena, PhD*

In series: *Agriculture Issues and Policies*  
Expected Publication Date: 03/15/2023  
Softcover: 979-8-88697-558-1. $95.00  
e-book: 979-8-88697-583-3. $95.00

One of the most important scientific contributions to future generations that the current generation must leave to its successors is a protected, improved and sustainable genetic diversity of legume crop plants. This endeavor can be augmented by establishing efficiently analyzed morpho-physiological and molecular data that provide concrete insights that underline mechanisms playing a critical role in enabling crops to effectively react and respond to biotic and abiotic stresses. Research projects involving genetic improvement of legumes represents some of the advances and technologies aimed at providing new avenues to efficiently improve the growth and yield of these crops. This book consists of eight well-structured and written chapters which discuss different perspectives and management of legume crops. The book embodies a diversity of views, bringing new ideas and sharing new important original information involving cultivation, physiology, nutritional quality, medicinal benefits, traditional uses and in vivo priming for enhanced legume production. This book is intended for use as a reference book for both undergraduate and postgraduate students, together with researchers in the field.

**Farming**

**Research Advancements in Organic Farming**  
*Dr. Jatindra Nath Bhakta and Dr. Sukanta Rana*

In series: *Agriculture Issues and Policies*  
Expected Publication Date: 03/15/2023  
Hardcover: 979-8-88697-519-2. $230.00  
e-book: 979-8-88697-580-2. $230.00

The present book, entitled Research Advancement in Organic Farming, focuses on advanced approaches of organic farming practices for sustainable production of crops and protection of the environment from pollution caused by conventional farming practices. Organic farming is a holistic self-sustaining approach that recycles its own organic wastes in a natural way in an agro-ecosystem for healthier production and a healthier environment. The inclusion of advanced green techniques and human skills in organic farming magnifies its production. Conservation of biodiversity, soil, water, and air and maintenance of local hydrological and nutrient cycles are the great benefits of it. Consequently, pollution-free safe organic crops are produced and the environment is conserved in organic farming systems. Organic farming contributes 1 to 2% of global food production. The demand for organic products in the world market is rising from day to day. On account of the above, the objectives of the present book are to draw current and advanced pictures of different approaches to organic farming for organic food production and conserving the environment by preventing pollutant-generating conventional chemical-based farming practices. The present book comprises current advancements in basic theoretical,
practical, and application frameworks in organic farming by focusing latest empirical research findings on the following topics: basic concept, significance and future prospects of organic farming, organic agriculture, aquaculture, animal husbandry, environmental quality management, composting and vermicomposting, bioslurry and bio-fertilizers.

### Horticulture

**Ficus carica: Production, Cultivation and Uses**

Zeynel Dalkılıç, PhD (Professor, Aydın Adnan Menderes University, Faculty of Agriculture, Department of Horticulture, South Campus, Aydın, Turkey)

In series: Horticulture, Viticulture and Viniculture

Publication Date: 05/06/2022

258 pp.

Hardcover: 978-1-68507-765-5. $195.00

e-book: 978-1-68507-873-7. $195.00

*Ficus carica*, the fig, is one of the ancient crop plants originated from Anatolia. This is one of the most precious fruit crops beneficial to human health. It contains vitamins, minerals, protective compounds, and high carbohydrate content for human diet. On the one hand some people are starving in remote areas in the world, and on the other hand some people are getting obese. The more global climate change affects agricultural production and the food chain, the more the divide between the poor and the rich opens. While some experts draw attention to food security from farm to fork, some others advocate sustainable energy usage. When we are combating a global Covid-19 pandemic nowadays, remembering to help and back each other up has never been so important and striking in human history. Therefore, fig fruit can be considered as a functional food for human consumption. This noteworthy piece of work is composed of 10 chapters and covers the following subjects: Chapter 1, ancient history and cultural heritage; Chapter 2, production, trade, and marketing; Chapter 3, genetic diversity; Chapter 4, characteristics and caprification potentials; Chapter 5, gender identification using molecular markers; Chapter 6, effect of cordon pruning system; Chapter 7, virus diseases; Chapter 8, arthropod pests and nematodes; Chapter 9, postharvest handling and storage; and Chapter 10, modified atmosphere packaging and edible surface coating of fig plant.

### Pest Control

**Pest Management: Methods, Applications and Challenges**

Tarique Hassan Askary, PhD (Division of Entomology, Faculty of Agriculture, Wadura (SKUAST-K), Sopore, Jammu & Kashmir, India)

In series: Agriculture Issues and Policies

Publication Date: 12/01/2022

389 pp.

Hardcover: 979-8-88697-268-9. $230.00

e-book: 979-8-88697-393-8. $230.00

This book contains thirteen chapters focusing on pest management and control. The volume is broadly divided into two parts. Part I contains six chapters that deal with the role of chemicals in pest management. The opening chapter begins with the challenges and opportunities in the application of insecticides. The five additional chapters provide information on the pests of temperate fruits, pulses, spices and rice and the recent advances in their management. The concluding chapter of Part I deals with the utilization of chemicals in plant parasitic nematode management and the challenges faced thereof. In Part II, there are seven chapters devoted to microbes. The first chapter broadly explains the role of biopesticides in pest management, the new developments, challenges and future thrusts in this direction. The emphasis of the subsequent chapters shifts to different biocontrol agents viz., entomopathogenic nematodes, nematophagous fungi, bacteria and baculoviruses. One chapter deals exclusively with the integrated application of entomopathogenic nematodes and chemicals. The last chapter of the book deals extensively with the field application of biopesticides. An attempt has been made to present all important aspects and necessary guidelines for pest management in as simple and lucid a manner as possible with some essential data and nice photographs. This book will help agricultural scientists, research practitioners, extension workers, the farming community and especially those undergraduate and postgraduate students having entomology or nematology as their specialized subject.
Soil

Advantages and Disadvantages of Sandy Soils
Rashidi Bin Othman, PhD (Professor, Landscape Ecology, International Islamic University Malaysia (IUM), Malaysia), Farah Ayuni Mohd Hatta, PhD (Research Fellow, Plant Biotechnology, Institute of Islam Hadhari, National University of Malaysia, Bangi, Selangor, Malaysia), Wan Syibrah Hanisah Wan Sulaiman, PhD (Assistant Professor, Environmental Management and Sustainability, International Institute for Halal Research and Training (INHART), Malaysia), Nur Hanie Mohd Latiff, PhD (Assistant Professor, Environmental Science, International Institute for Halal Research and Training (INHART), Malaysia) and Razanah Ramya, PhD (Research Fellow, Ecology & Ethno Science, Institute of the Malay World and Civilization, National University of Malaysia, Bangi, Selangor, Malaysia)

In series: Air, Water and Soil Pollution Science and Technology
Publication Date: 01/12/2023
257 pp.
Hardcover: 979-8-88697-486-7. $195.00
e-book: 979-8-88697-532-1. $195.00

This book presents the significant values of sandy soil and its properties, which include biotic and abiotic components, soil protection, soil amelioration, ecological indicators, and, differing from other books, Forest Therapy concept implementation in the sandy soil forest areas. This book may benefit people from different fields, including ecologists, landscape architects, researchers, and students to understand in-depth the properties of sandy soil, its characteristics, and functional values.

Special Topics

Agricultural Research Updates. Volume 41
Prathamesh Gorawala and Srushti Mandhatri

In series: Agricultural Research Updates
Publication Date: 05/17/2022
223 pp.
Hardcover: 978-1-68507-861-4. $250.00
e-book: 978-1-68507-920-8. $250.00

This volume includes eight chapters that provide updates in agricultural research. Chapter One elucidates utilization of refined soybean oil and the by-products from the refinery process relating to food production. Chapter Two deals with the use of single 6-benzylaminopurine spray to increase biomass accumulation in cacti. Chapter Three examines the governance efficiency of agricultural farms in Bulgaria. Chapter Four highlights the contribution of organic matter in traditional soil fertility management practices. Chapter Five addresses the potential of saponins in mycorrhizal plants for enhancing biosynthesis. Chapter Six examines the influence of arbuscular mycorrhizal fungi on growth and secondary metabolites on herbs including oregano, sage, basil, and others. Chapter Seven explicates the different aspects of soil fertility and its importance in agriculture. Lastly, Chapter Eight evaluates the extraction of polyphenols of some agro-industrial co-products with soybean oil as solvent to enhance antioxidant properties.
Agricultural Research Updates. Volume 42
Prathamesh Gorawala and Srushti Mandhatri
In series: Agricultural Research Updates
Publication Date: 10/06/2022
226 pp.
Hardcover: 979-8-8697-261-0, $250.00
e-book: 979-8-8697-319-8, $250.00
This volume includes eight chapters that provide updates in agricultural research. Chapter One focuses on elaborating the rice straw characteristics and its sustenance as a valuable material for commercial, industrial and environmental applications. Chapter Two aims to provide a literature review that assesses the role of ruminants, particularly cattle, for smallholder farmers in an integrated farming system and its economic impacts. Chapter Three aims to analyze the effect of fermented silage diets using agroindustrial by-products on milk production and cheese characteristics. Chapter Four describes the application of different machine learning algorithms in banana production systems in Venezuela. Chapter Five shows an overview of published research studies about the features of nettle source, the extraction methodologies employed to obtain vegetable extracts, their bioactive chemical composition as well as some of their viable exploitation targets in order to summarize updated information for future development investigations on this plant. Chapter Six investigates the competency factors influencing agricultural programmes. Chapter Seven examines the repercussions of climate change on production systems in small ruminants. Finally, in Chapter Eight, the potential applications of drones for livestock management is discussed.

Agricultural Research Updates. Volume 43
Prathamesh Gorawala and Srushti Mandhatri
In series: Agricultural Research Updates
Expected Publication Date: 02/28/2023
294 pp.
Hardcover: 979-8-8697-550-5, $250.00
e-book: 979-8-8697-568-0, $250.00
This book contains seven selected articles on the topic of agricultural research. Chapter One is a resource and assessment and technological review of the production of biodiesel from spent coffee ground lipids. Chapter Two is a state of the art review of mango fruit aroma compounds. Chapter Three is a review of the Indian scenario and perspectives on non-edible oilseeds storage for biodiesel. Chapter Four examines new research on bioethanol production through agro-industrial wastewaters as feedstocks. Chapter Five explores Mentha piperita essential oil as an effective biopesticide against mosquitoes. Chapter Six reviews a simulation for controlling and predicting grain aeration effects. Finally, Chapter Seven is a comparison of genome-wide association studies in multi-environmental trials.

Principles of Digital Image Processing for Agricultural Applications
Suryaprabha Deenan, PhD (Assistant Professor, Department of Computer Applications, Nehru Arts and Science College, Coimbatore, Tamil Nadu, India), Satheeshkumar Janakiraman, PhD (Associate Professor, Department of Computer Applications, Bharathiar University, Coimbatore, Tamil Nadu, India) and Seenivasan Nagachandrabose, PhD (Associate Professor, Department of Nematology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India)
In series: Agriculture Issues and Policies
Publication Date: 12/29/2022
173 pp.
Softcover: 979-8-8697-428-7, $95.00
e-book: 979-8-8697-480-5, $95.00
This book is designed for undergraduate and post-graduate agricultural science students and agricultural engineering researchers to provide a comprehensive insight into the role of digital image processing in agriculture, and its basic principles to solve agriculture issues. This book is constructed with 11 different chapters comprising an introduction to digital image processing, various applications of digital image processing, the role of image processing in the agriculture sector, an overview of fundamental digital image processing procedures, image acquisition methods appropriate for various
agricultural situations, image enhancement tools for images acquired in different conditions, image segmentation methods concerned with plant and agriculture images, feature extraction techniques applicable for agricultural images, image classification or pattern recognition to solve agricultural problems, quality assessment metrics of reference and non-reference agriculturally important images and a case study on successful digital image processing application on the banana.

**Sustainable Agriculture**

**Strategies to Achieve Sustainable Development Goals (SDGs): A Road Map for Global Development**
Rajani Srivastava, M.Sc., PhD (Assistant Professor, Department of Environment & Sustainable Development, Rajiv Gandhi South Campus, Banaras Hindu University, India)

In series: Agriculture Issues and Policies
Publication Date: 08/10/2022
370 pp.
Hardcover: 978-1-68507-836-2. $230.00
e-book: 979-8-88697-027-2. $230.00

Sustainability entails addressing our demands without jeopardizing future generations’ ability to meet their own needs. In September 2015, 193 United Nations Member States adopted the 17 Sustainable Development Goals (SDGs), also known as the Global Goals, as a universal call to action for eradicating poverty, safeguarding the environment, and ensuring that all people experience peace and prosperity by 2030. These 17 interconnected global goals and 169 targets will be tracked and reviewed using a set of global indicators that will serve as a “blueprint for achieving a better and more sustainable future for everybody.”

**Chemometrics: Advances in Applications and Research**
Larry D. Crenshaw

In series: Analytical Chemistry and Microchemistry
Publication Date: 09/29/2022
280 pp.
Hardcover: 978-8-88697-274-0. $195.00
e-book: 978-8-88697-311-9. $195.00

Chemometrics is a discipline of chemistry that finds correlation between specific data using mathematical and statistical methods. During any thorough research, the scientists are handling vast amounts of data related to the samples which are being researched. In this type of research, finding the correlation (similarities or differences) between analyzed samples and data is of great importance. In the first chapter, commonly used chemometrics for spectral modeling transfer is examined. The second chapter provides an analytical tool to detect fraud when olive oil is illegally blended with VOIs or a ‘legal’ blend is falsely labelled with respect to the botanical nature of the oils mixed and/or the percentage of each oil in the declared mixture. H-NMR spectral data of olive and virgin olive oils and their mixtures with the VOIs most commonly used to make blends was analysed by pattern recognition techniques to develop multivariate classification and regression models, which were organised in a decision tree to afford a stepwise strategy for the aimed purposes. The next chapter focuses on a metabolomics approach based on H-NMR fingerprinting and multivariate data analysis for virgin olive oil stability assessments. In the fourth chapter, the authors review unsupervised methods using both principal component analysis (PCA) and hierarchical cluster analysis (HCA). Using these methods, they were able to spot the correlation between the samples and underlying data structures without the potential bias of scientists about the previous knowledge of data samples.
FTIR Spectroscopy: Advances in Research and Applications
Adriana S. França, PhD (Professora Titular, Departamento de Engenharia Mecânica, Universidade Federal de Minas Gerais, Brazil) and Leandro S. Oliveira, PhD (Universidade Federal de Minas Gerais, Brazil)

In series: Analytical Chemistry and Microchemistry
Publication Date: 05/26/2022
183 pp.
Softcover: 978-1-68507-571-2. $95.00
e-book: 978-1-68507-939-0. $95.00

Mid-infrared (MIR) or Fourier Transform Infrared (FTIR) spectroscopy is a vibrational spectroscopy technique that identifies chemicals based on the interaction of molecules with electromagnetic radiation in the mid-infrared region. The use of this technique has increased over the last decades due to its many advantages compared with the use of other methods, including non-destruction of the sample, minimal or no sample preparation, and the fact that it does not involve the use of any hazardous chemicals during the analysis. FTIR Spectroscopy: Advances in Research and Applications presents some of the most recent advances on the application of mid-infrared spectroscopy in biology, medicine and food science. It starts with an overview of chemometric methods that are needed for analysis and interpretation of infrared data (Chapter 1), followed by applications in the analysis of food and biological systems, including food provenance identification (Chapter 2) and structural aspects (Chapter 3), structural analysis of mollusk shells (Chapter 4), and applications in biomedical research (Chapter 5) and cancer diagnosis (Chapter 6). The book is written by an international panel of scientists with extensive expertise in the field of infrared spectroscopy, providing unique views and perspectives on both practical and theoretical applications.

Biochemistry

Biomolecules and Corrosion
Santosh Kumar Karn, PhD (Department of Biochemistry and Biotechnology, Sardar Bhagwan Singh University, Dehradun, India) and Anne Bhambri (Department of Biochemistry and Biotechnology, Sardar Bhagwan Singh University, Dehradun, India)

In series: Biochemistry Research Trends
Expected Publication Date: 01/31/2023
139 pp.
Softcover: 979-8-88697-458-4. $95.00
e-book: 979-8-88697-531-4. $95.00

Corrosion causes great losses to the economy every year. Microbial-influenced corrosion (MIC) is important for maritime, chemical engineering, and bioprocess engineering industries. Presently no environmentally friendly technology has been available to minimize the economic loss of biocorrosion. Currently available anti-biocorrosion technology depends heavily on chemical methods to regulate biofilm formation which has a negative impact on the environment. Therefore, it is essential to know the fundamentals of the roles of biomolecules within the whole process to develop detailed research capabilities and potential control and management strategies. This book targets the roles of EPS, proteins, lipids, DNA, and different metabolites currently known to be involved in the corrosion processes. The potential roles of EPS, proteins, lipids and enzymes are still poorly understood. There are still collective issues that need to be addressed, including the importance of the microbial role in MIC. More specifically, there exists a need to understand the impact of enzyme activities inside the biofilm matrix on the dynamics of corrosion reactions. Also, there is the involvement of metals or organometallic complexes in electron transfer and from chemically and morphologically diverse metallic surface films to ultimate electron acceptors.
**Laboratory Guide: Concepts and Protocols for Practical Courses in Biochemistry and Molecular Biology**  
*Shafat Ahmad Latoo, M.S., PhD (Lecturer, Biochemistry, Islamia College of Science and Commerce, Srinagar, J & K, India) and Mohammad Asif Shah, M.S., PhD (Lecturer, Biotechnology, Govt College for Women, Nawakadal, Srinagar, J & K, India)*  
In series: *Biochemistry and Molecular Biology in the Post Genomic Era*  
Publication Date: 09/01/2022  
286 pp.  
Hardcover: 978-1-68507-862-1. $195.00  
e-book: 978-8-8697-028-9. $195.00  
Laboratory Guide: Concepts and Protocols for Practical Courses in Biochemistry and Molecular Biology communicates science to novice and advanced learners and teaches students about basic concepts and their practical applications in the laboratory. By understanding and properly applying the protocols included in this book, students will be able to complete their laboratory-based courses with ease.

**The Biochemical Guide to Enzymes**  
*David Aebisher, PhD and Dorota Bartusik-Aebisher, PhD (Medical College of The University of Rzeszów, University of Rzeszów, Rzeszów, Poland)*  
In series: *Biochemistry Research Trends*  
Publication Date: 12/29/2022  
132 pp.  
Softcover: 979-8-8697-410-2. $82.00  
e-book: 979-8-8697-518-5. $82.00  
In this book, the authors seek to demonstrate the significant role of enzymes used in metabolomic processes. The mechanism of enzyme action is provided. This book presents the discovery, chemical structure and mechanism of action of 24 enzymes. The metabolomic functions of enzymes in treatment and diagnostics are also described.

**The Biochemical Guide to Proteins**  
*David Aebisher, PhD, DSc and Dorota Bartusik-Aebisher, PhD, DSc (Medical College of The University of Rzeszów, University of Rzeszów, Rzeszów, Poland)*  
In series: *Biochemistry Research Trends*  
Publication Date: 01/26/2023  
174 pp.  
Softcover: 979-8-8697-493-5. $95.00  
e-book: 979-8-8697-535-2. $95.00  
This book aims to provide scientific information about proteins. 30 chapters have been written that describe the characteristics of proteins and their influence on human physiology. The authors presented the structure of individual proteins and their role in particular diseases. Proteins are among the most important nutrients responsible for the proper functioning of the body. Protein is one of the basic building blocks of our tissues, plays a role in transport, regulating biochemical processes and in reactions initiated by the immune system.
Chemical Elements

Selected Topics in Germanium
Charles A. Smith
In series: Chemistry Research and Applications
Publication Date: 09/07/2022
206 pp.
Softcover: 979-8-88697-200-9. $95.00
e-book: 979-8-88697-216-0. $95.00
Germanium (Ge) is a lustrous, hard-brittle, grayish-white chemical element with applications in electronic devices and fluorescent lamps, among others. This volume includes four chapters that cover germanium from a variety of perspectives. Chapter One presents recent studies and developments in hydrometallurgical extraction of Ge from base metals production waste. Chapter Two reviews the current knowledge of high-k gate oxides based on Ge semiconductor substrate. Chapter Three focuses on the biocoordination chemistry of Ge and the role Ge plays in the human body. Lastly, Chapter Four presents a dual material Fin Field Effect Transistor structure using Ge as channel material.

Chemical Engineering

Properties and Uses of Calcium Silicate
Amanda G. Carlton
In series: Chemical Engineering Methods and Technology
Publication Date: 09/01/2022
208 pp.
Hardcover: 979-8-88697-128-6. $160.00
e-book: 979-8-88697-184-2. $160.00
Calcium silicate is a compound that can be derived from limestone and diatomaceous earth, and has applications as an anticaking agent in food preparation, as insulation, and more. The four chapters of this book explore the various characteristics and applications of calcium silicate. Chapter One examines the effectiveness of calcium-silicate cements in furcal perforation repair. Chapter Two investigates methods of producing cement with lower energy consumption by using calcium silicate. Chapter Three deals with the use of synthesized calcium silicates in compositions for the restoration of buildings. Lastly, Chapter Four evaluates and compares the effects of simulated tissue fluid on the Berkovich microhardness of four calcium silicate cements.

Food Science and Technology

Algal Biorefining: Resource Expenditure and Exergo-Environmental Sustainability
Cynthia Ofori-Boateng, PhD (Sustainable Biofuels and Coproducts. Eastern Regional Research Center, ARS, USDA, Wyndmoor PA, USA)
In series: Waste and Waste Management
Publication Date: 06/01/2022
296 pp.
Hardcover: 978-1-68507-706-8. $230.00
e-book: 978-1-68507-921-5. $230.00
This book details the attractive features of algae as a sustainable third-generation feedstock for biorefineries. The commonly explored algal biofuels technologies such as pyrolysis, fermentation, transesterification, gasification, and briquetting/pelleting are assessed in a biorefinery concept and discussed based on resource utilization and sustainability considering biorefinery concepts. Process improvement options for sustainable algal biorefineries are also discussed in this book. Finally, the thermo-environmental sustainability of algal biorefineries using exergy and life cycle assessment (LCA) tools are reviewed and assessed based on literature data.
Bioprospecting of Natural Compounds in Food, Pharmaceutical and Biomedical Science
Siddhartha Pati, PhD (Director, NatNov Bioscience Private Limited, Odisha, India), Tanmay Sarkar, PhD (Lecturer, Malda Polytechnic, West Bengal State Council of Technical Education, Government of West Bengal, Malda, India) and Dibyait Lahiri, PhD (Assistant Professor, Department of Biotechnology, University of Engineering and Management, West Bengal, India)

In series: Food Science and Technology
Publication Date: 12/08/2022
248 pp.
Hardcover: 979-8-88697-361-7. $195.00
e-book: 979-8-88697-431-7. $195.00

Bioprospecting of nature-based compounds is an important topic of biochemistry, owing to their structural variety and great application prospects. These chemicals, in particular, have been shown to have positive physiological and immunological benefits. Their use has been linked to the prevention of a variety of diseases as well as the promotion of good health. This book mainly intends to highlight high-quality original research and review papers that include innovative bioactive compounds and cutting-edge characterization techniques that contribute significantly to the area of diverse potential applications. The goal of this book is to emphasize the possibilities of utilizing nature-based compounds with favorable health effects in their entirety.

Flavonoids: Dietary Sources, Biological Properties and Therapeutic Potential
Nirmala Sehrawat, PhD (Assistant Professor, Department of Biotechnology, Maharishi Markandeshwar (Deemed to be University), Mullana-Ambala, India), Diwakar Aggarwal, PhD (Assistant Professor, Department of Biotechnology, Maharishi Markandeshwar (Deemed to be University), Mullana-Ambala, India), Sushil Kumar Upadhyay, PhD (Assistant Professor, Department of Biotechnology, Maharishi Markandeshwar (Deemed to be University), Mullana-Ambala, India) and Mukesh Yadav, PhD (Assistant Professor, Department of Biotechnology, Maharishi Markandeshwar (Deemed to be University), Mullana-Ambala, India)

In series: Food Science and Technology
Publication Date: 09/07/2022
199 pp.
Hardcover: 978-1-68507-953-6. $160.00
e-book: 979-8-88697-031-9. $160.00

This book focuses on dietary flavonoids and their biological activity along with their therapeutic potential. Dietary flavonoids have emerged as a safe and effective way of treating, controlling or managing various diseases. Various flavonoids have been investigated as natural, cost effective, alternate and combinatorial therapy for managing various diseases and have been found promising. Various functional foods have proven effective and beneficial for human health due to the presence of flavonoids. Flavonoids have antimicrobial, anti-inflammatory and antioxidant properties. The antioxidant and anti-inflammatory properties result in various health benefits to consumers. Various flavonoids have been found useful for management of diabetes, obesity, metabolic diseases, cancers, bone health, gut health, renal functions, liver diseases, neurological diseases, viral infections, overall immunity and other health improvements. Scientists throughout the world are studying the mechanisms of action of flavonoids against different diseases. Besides these mentioned complications, flavonoids provide overall health benefits.
Food Packaging: Safety, Management and Quality
Wing-Fu Lai, PhD (Principal Investigator, Ciechanover Institute of Precision and Regenerative Medicine, The Chinese University of Hong Kong (Shenzhen), China)
In series: Food Science and Technology
Publication Date: 10/20/2022
328 pp.
Hardcover: 979-8-88697-249-8. $230.00
e-book: 979-8-88697-314-3. $230.00
The objective of this book is to present a snapshot of the latest advances in the development, characterization and quality management of films for food packaging purposes. This book consists of three sections. The first section aims at presenting an introduction to materials selection and design for food packaging. Different types of materials, ranging from polysaccharides to graphene oxide nanocomposites, for film development will be discussed. The second section reviews the current status of engineering and optimization of food packaging films. Applications of the films for packaging foods such as green vegetables and mushrooms will also be presented. The last section is devoted to delineating practices useful for quality control and assurance in food packaging. Concepts and implementation of HACCP and other quality control measures will be discussed. Strategies to reduce human error in quality control of fresh produce labels will also be covered for food production purposes.

Polyacaprolactone: Applications, Synthesis and Characterization
Krishna Pramanik, PhD (Professor, Biotechnology & Medical Engineering, Head of the Center of Excellence in Tissue Engineering, National Institute of Technology Rourkela, India)
In series: Materials Science and Technologies
Publication Date: 09/21/2022
346 pp.
Hardcover: 978-1-68507-973-4. $230.00
e-book: 979-8-88697-119-4. $230.00
This book provides an overview of the advances in the synthesis of PCL, PCL-based biomaterials, and designing of appropriate PCL structures keeping in view of their applications in biomedical (orthopaedic implant), tissue engineering including bone, cartilage, skin, and cornea, protecting agent for material for medical devices and food packaging. The book shall be of special interest to material scientists, tissue engineers, medical scientists, mechanical engineers and biotechnologists with a better understanding of the physico-chemical and biological characteristics of PCL biomaterial to develop more appropriate and innovative, PCL-based composite materials for a wide field of applications. I hope the researchers, scientists, medical/healthcare professionals and industries shall find all these contributions interesting and will be inspired from reading to broaden their research towards the PCL-based material development and manufacturing of innovative products and devices from these materials.

Polyphenols and their Role in Health and Disease
Augustine Dion
In series: Food Science and Technology
Publication Date: 01/05/2023
165 pp.
Softcover: 979-8-88697-418-8. $95.00
e-book: 979-8-88697-472-0. $95.00
This book contains a selection of five chapters each discussing a different aspect of polyphenols and their roles in health and disease. Chapter One reviews the oral health benefits of polyphenols found in cocoa. Chapter Two is an overview of the effects of polyphenols on the microbiota of the gut and the consequent roles these play in health and disease. Chapter Three is a review of potential sources and health benefits of various polyphenols. Chapter Four examines different polyphenols from food and medicinal plants as well as their uses in Mexico. Chapter Five discusses the role of polyphenols in honey and their use as a natural therapeutic.
Proceedings of BIOSPECTRUM: The International Conference on Biotechnology and Biological Sciences: Biotechnological Intervention Towards Enhancing Food Value
Sanket Joshi, PhD (Deputy Director, Oil & Gas Research Center, Sultan Qaboos University, Muscat, Oman), Susmita Mukherjee (Professor and Head, Department of Biotechnology, Faculty Coordinator, Students’ Gymkhana, Faculty Coordinator Alumni Association, University of Engineering & Management, Kolkata, West Bengal, India) and Moupriya Nag, PhD (Assistant Professor, Department of Biotechnology, University of Engineering and Management, Kolkata, West Bengal, India)
In series: Food Science and Technology
Publication Date: 08/10/2022
240 pp.
Hardcover: 978-1-68507-985-7. $195.00
e-book: 979-8-88697-069-2. $195.00
This book deals with the theme of biotechnological intervention towards the food value chain. Chapters are based on papers submitted to "BIOSPECTRUM: The International Conference on Biotechnology & Biological Sciences." The majority of topics of concern for researchers, policy makers, and the scientific community are included. Subjects discussed include biotechnological intervention in food security and value chain, practices to improve high quality agricultural produce and improved food security, probiotics, antioxidant activity of edible oils, fermentation to improve protein and phenolic profiles of plant products, marker assisted breeding for genetic improvement of pest-insect resistance in cash crops, and more.

General Chemistry

Properties and Uses of Antimony
David J. Jenkins
In series: Chemistry Research and Applications
Publication Date: 07/22/2022
134 pp.
Softcover: 979-8-88697-081-4. $82.00
e-book: 979-8-88697-088-3. $82.00
Antimony (Sb) is a semimetallic chemical element which can exist in metallic form or non-metallic form. Antimony has a variety of applications and properties which are described in the five chapters of this book. Chapter One describes the structural and electrochemical properties of Sb and examines its application in rechargeable batteries. Chapter Two provides a complete picture of phase equilibria in the Cu-Sb-S system obtained experimentally by differential thermal analysis and powder X-ray technique. Chapter Three characterizes new layered high-entropy alloys based on antimony and bismuth chalcogenides with tetradymite structure. Chapter Four determines the phase equilibria in the PbTe-Bi2Te3-Sb2Te3 system using differential thermal analysis, X-ray diffraction, and scanning electron microscopy techniques. Lastly, Chapter Five determines the thermodynamic properties of the manganese-antimony tellurides using an electromotive force method.

Pyrimidines and their Importance
Roger G. Ward
In series: Chemistry Research and Applications
Expected Publication Date: 03/10/2023
134 pp.
Softcover: 979-8-88697-656-4. $95.00
This book contains four selected chapters on pyrimidines and their importance. The first chapter examines the synthesis, physico-chemical properties, and anti-fungal activity of new hybrids of thiazolo[4,5-D] pyrimidines with (1H-1,2, 4) triazole. The second chapter reviews pyrimidine ring containing natural products and their biological importance. The third chapter examines the regulation of the pyrimidine biosynthetic pathway in the bacterium Pseudomonas chlororaphis. The fourth and final chapter looks at pyrimidines as potential corrosion inhibitors.
The Chemistry of Calcium Carbonate
George R. Hood
In series: Chemistry Research and Applications
Publication Date: 12/01/2022
339 pp.
Hardcover: 979-8-8697-442-3. $230.00
e-book: 979-8-8697-448-5. $230.00
This book contains seven selected chapters on the chemistry of calcium carbonate. Chapter One is an overview of the production and unique properties of precipitated calcium carbonate (PCC). Chapter Two explores the potential for increasing the efficiency of doxorubicin delivery systems by means of transforming porous calcium carbonate vaterites into calcium phosphate structures. Chapters Three, Four, and Five each characterize calcium carbonate by different analytical methods. Chapter Three utilizes the X-ray fluorescence method, Chapter Four utilizes energy dispersive X-ray spectroscopy (EDS), and Chapter Five utilizes atomic force microscopy (AFM). Chapter Six is a mobile elements analysis of calcium carbonate by means of X-ray photoelectron spectroscopy (XPS) characterization. Finally, Chapter Seven is a characterization of calcium carbonate’s mineral crystal structure using X-ray diffraction (XRD).

The Future of Biorefineries
Waldemar Nyström
In series: Chemistry Research and Applications
Publication Date: 01/05/2023
259 pp.
Hardcover: 979-8-8697-524-6. $140.00
e-book: 979-8-8697-528-4. $140.00
This book is a collection of four chapters which review the future prospects of biorefineries. Chapter One is a review of the future of biorefineries from a circular economic perspective. Chapter Two is a prospective analysis of the challenges which biorefineries in Latin America face. Chapter Three reviews the advances and challenges to the process scale up for biorefineries in Latin America. Chapter Four is a spatially explicit assessment of a forestry biorefinery for the recovery of bio-based materials.

What to Know about Hydroxyapatite
Isaac Lavoie
In series: Biomaterials - Properties, Production and Devices
Publication Date: 01/19/2023
282 pp.
Hardcover: 979-8-8697-523-9. $140.00
e-book: 979-8-8697-529-1. $140.00
This book is a collection of eight chapters which provide an overview of what one should know about hydroxyapatite (Ha). Chapter One reviews the modification of hydroxyapatite coatings for implant applications. Chapter Two discusses the removal of pollutants by means of hydroxyapatite composites. Chapter Three reviews the synthesis and characterization of hydroxyapatite. Chapter four explores the potential use of functionalized hydroxyapatite in bone regeneration. Chapter Five reviews the applications of modified hydroxyapatite in catalysis. Chapter Six examines hydroxyapatite in terms of sustainable product development and waste valorization. Chapter Seven reviews the deposition of Ha-based coatings on bio-inert substrates by various deposition methods for improved bio-mechanical properties. Chapter Eight explores 3D printed Ha ceramics and its composite scaffolds for tissue engineering.
Organic Chemistry

The Essential Guide to Alkaloids
Deepak Kumar Semwal, PhD (Assistant Professor, Phytochemistry, Uttarakhand Ayurved University, Dehradun, India)
In series: Chemistry Research and Applications
Publication Date: 01/19/2023
240 pp.
Hardcover: 979-8-88697-456-0. $195.00
e-book: 979-8-88697-526-0. $195.00
This book is based on general information about alkaloids, their applications, and the chemistry of some natural and synthetic alkaloids. The contents are divided into a total of nine chapters contributed by different subject experts. The first chapter describes introductory knowledge and pharmaceutical perspectives of alkaloids. This section reports the different classification methods of alkaloids for better understanding. In addition, various extraction methods and pharmaceutical applications of alkaloids are also included in this chapter. The second chapter is based on chemical aspects and therapeutic uses of tropane alkaloids. This section covers structural variations, pharmaceutical uses and biosynthesis of tropane alkaloids. Different uses of alkaloids in traditional medicine are described in the third chapter, which is based on scientific and historical evidence. The fourth chapter discusses alkaloids of the genus Solanum such as solamargine, solasonine, tomatidine and kukoamines. Catharanthus roseus, a well-known alkaloid-rich herb is covered in the fifth chapter with its key alkaloids like vinblastine and vincristine. The sixth chapter examines a bromoppyrrole alkaloid namely stevensine which is naturally found in marine sponges. The seventh chapter focused on alkaloids derived from the Tinospora cordifolia, their structure and function and biosynthesis. Theophylline, a dimethylxanthine alkaloid with therapeutic properties is covered in the eighth chapter. This chapter also describes the applications of theophylline as a bronchodilator, immunomodulator and antiviral which make it an interesting candidate against coronaviruses. In addition to their medicinal properties, alkaloids are also useful as pesticides to protect plants from different pathogens and pests. These applications are included in the ninth chapter with the main emphasis on their unique properties such as being safer for the environment, easily degradable and low toxicity as compared to synthetic pesticides.

Waterborne Polyurethanes (WBPs): Production, Chemistry and Applications
Dr. Abbas Mohammadi, PhD
In series: Polymer Science and Technology
Expected Publication Date: 03/20/2023
Hardcover: 979-8-88697-528-4. $230.00
e-book: 979-8-88697-628-1. $230.00
Over the course of fifteen selected chapters, this book explores the production, chemistry, and applications of waterborne polyurethanes (WBPs). The first chapter is a conceptual introduction to WBPs, and the following eight chapters cover different kinds of waterborne polyurethanes, such as those made with natural and synthetic polymers, polyurethane/acrylic hybrids, waterborne polyurethane nanocomposites, and even light stimuli responsive and conductive WBPs. The remaining six chapters cover various applications of WBPs ranging from textile treatment and food packing to biomedical applications such as drug delivery.

Physical Chemistry

A Closer Look at Chemical Kinetics
Dr. Victor Martinez-Luaces, PhD
In series: Chemistry Research and Applications
Expected Publication Date: 03/15/2023
Hardcover: 979-8-88697-484-3. $195.00
e-book: 979-8-88697-581-9. $195.00
This book proposes a closer look at chemical kinetics, which in this specific case, should be understood as a more detailed study of the connections of this discipline with other branches of chemistry and, even more, with other areas of science and technology. The first part—which includes two chapters—explores theoretical developments where the connections of chemical kinetics with mathematical modeling of scientific and industrial problems are clearly illustrated. The second part of the volume is devoted to experimental chemical kinetics, where specific reactions are studied in Chapters Three to Six. In all these chapters, kinetic studies allow the authors to propose mechanisms consistent with the experimental results obtained. In the third part of the book—which includes the following two chapters—different types of catalytic processes are studied, particularly those related to electrocatalysis, photocatalysis, and surface phenomena. The fourth part of this volume presents a work related to nanotechnology and its catalytic applications. The fifth and last part of this volume exemplifies the link between chemical kinetics and industrial processes, particularly in metallurgy.
2D Metallic Transition Metal Dichalcogenides: Fundamentals and Applications

Chandra Sekhar Rout, PhD (Associate Professor, Functional Materials & Devices Laboratory, Centre for Nano and Material Sciences (CNMS), Jain University, Ramanagaram, Bangalore, India) and Brahmananda Chakraborty (Scientist, High Pressure and Synchrotron Radiation Physics Division, Bhabha Atomic Research Centre, Mumbai, India)

In series: Physics Research and Technology
Publication Date: 07/27/2022
308 pp.
Harcover: 978-1-68507-965-9. $230.00
e-book: 978-8-88697-067-8. $230.00

Owing to possession of idiosyncratic physical attributes together with inherent magnetism, superconductivity and charge-density-wave order leads to potential usage over diverse domains, e.g., high-end microelectronic strategies, energy conversion and storage, catalysis, etc. 2D metallic TMDs have clutched extensive contemplation in the current time. Upon a thorough revisitation of a great deal of relevant literature, a visible dearth of a comprehensive compendium regarding such substances has been deeply realized. This edited book is aimed at filling such a gap via the presentation of eight different chapters devoted to systematically discussing fundamentals and applications of 2D metallic TMDs, so as to enable the readers to attain an inclusive concept and adequate knowledge regarding such materials.

Advances in Chemistry Research. Volume 73
James C. Taylor

In series: Advances in Chemistry Research
Publication Date: 09/07/2022
316 pp.
Harcover: 978-8-88697-097-5. $250.00
e-book: 978-8-88697-117-0. $250.00

This volume includes eight chapters that detail recent advances in chemistry research. Chapter One focuses on the kinetic-energy/information probes of chemical processes. Chapter Two reviews the chemistry and application of acrylamide and polyacrylamide as well as associated health risks. Chapter Three discusses inter- and intra-molecular force processes and absorption/luminescence energies in inorganic supramolecular systems in complexes and clusters based on gold. Chapter Four provides various applications, significant advancements, and future opportunities of the Chemical Reactor Network method. Chapter Five includes an overview of nanocellulose and discusses various factors that affect its surface morphology. Chapter Six presents a chemical product design methodology applied to complex fluids such as Pickering emulsions. Chapter Seven summarizes recent developments for H2O2-based green oxidation reactions using different transition metal salt catalysts. Finally, Chapter Eight provides a green perspective on the use of Oxone in organic synthesis.

Advances in Chemistry Research. Volume 74
James C. Taylor

In series: Advances in Chemistry Research
Publication Date: 10/20/2022
284 pp.
Harcover: 978-8-88697-212-2. $250.00
e-book: 978-8-88697-320-4. $250.00

This book consists of 7 chapters on recent advances in chemistry research. Chapter 1 connects quantitatively among 3D molecular and electronic structures; energetics; thermodynamics and diffusion parameters of observable soft-ionization mass spectrometric molecular ions and their fragmentation products. Chapter 2 focuses on the modification approaches of various natural polysaccharides, especially cellulose, chitosan, starch and alginate, via uncontrolled radical polymerization (UCRP) and controlled radical polymerization (CFP). Chapter 3 examines the excess physical and thermodynamic properties as a means for predicting molecular interactions in binary liquid mixtures. The goal of Chapter 4 was related to the productivity analysis of a
continuous chemical reactors, considering the closed-loop performance of the reactor under a Proportional-Integral (PI) controller. Chapter 5 is a comprehensive review on the new ferrocene functionalized copper complexes which are explored in different organic transformations. Chapter 6 examines the luminescence quenching method for dissolved oxygen (DO). Finally, the authors of Chapter 7 discuss single-walled carbon nanotubes based sensors for biomedical analysis, the latter of which requires fast and reliable screening methods for the fast assessment and diagnosis of different diseases.

**Advances in Chemistry Research. Volume 75**

*James C. Taylor*

In series: *Advances in Chemistry Research*

Publication Date: 10/13/2022

246 pp.

Hardcover: 979-8-88697-259-7. $250.00
e-book: 979-8-88697-321-1. $250.00

This book consists of 8 chapters on the latest advances in chemistry research. Chapter 1 is devoted to the state-of-the-art catalysts for pyrolysis to obtain biofuels and chemicals from biomass, plastics and other residues. The studies catalysts are critically revised, focusing on the most promising solids and their improvements using bifunctional catalysts. In addition, guidance on their future perspectives is discussed. Chapter Two focuses on a general approach to the various sulfides on the occurrence of sulfites and the methods usually used to monitor and warn about possible adverse reactions resulting from their use in food products. A case study of sulfites in meat preparations is also presented. In Chapter 3, the authors considered the methods available in literature on the synthesis of apatite-structured compounds. Chapter 4 focuses on the magnetic torque inside the superoxide radical as the driving force for oxygen activation by cofactor-free dioxygenases. In Chapter 5, the developments in covalent organic frameworks membranes over the past few years are reviewed. The fabrication methods of COF membranes, including bottom-up strategy and top-down strategy are discussed and the applications of COF membranes in liquid separation are highlighted. Finally, the existing challenges and outlook in this field are analyzed. Chapter 6 reviews various eco-friendly green and one-pot synthetic approaches useful in preparing 1,2,4-thiadiazole containing derivatives. Chapter 7 gives brief details on the chemistry, physicochemical properties, clinical uses, and chemical and photodegradation of 5-fluorouracil (5-FU), an anticancerous agent which is widely used in the treatment of different malignancies including stomach cancer, head and neck cancer, and breast cancer. The last chapter of this volume collectively describes the recent important catalytic roles of manganese Schiff base catalysts. The role of Mn-Schiff base complexes in biological activities is also examined.

**Advances in Chemistry Research. Volume 76**

*James C. Taylor*

In series: *Advances in Chemistry Research*

Publication Date: 11/24/2022

319 pp.

Hardcover: 979-8-88697-378-5. $250.00
e-book: 979-8-88697-413-3. $250.00

This book is a collection of eleven chapters discussing various topics on recent advances in chemistry research. Chapter One discusses the potential use of hydrogels in engineering applications. Chapter Two reviews multifunctional supramolecular gels. Chapter Three discusses the various processes used to dry aromatic plants and their effects on final product quality. Chapter Four is an analysis of Single Crystal X-ray structures and anticancer activity studies on substances derived from thiazolidine. Chapter Five examines the design and function of low molecular mass gelators based on derivatives of thiazolidine. Chapter Six is a review of the properties of bismuth niobate-based materials via impedance spectroscopy, a powerful and non-destructive technique. Chapter Seven examines the use of nitrogen containing conjugated building blocks for use in organic electronics. Chapter Eight is a study of transition metal dichalcogenides through an ab-initio approach. Chapter Nine reviews the synthesis process as well as antioxidant and antibacterial properties of substances derived from thiazolidine-4-carboxylic acid. Chapter Ten examines the potential to remove beryllium from aqueous solutions by means of chelating resins. The final chapter discusses the removal of beryllium from aqueous solutions, but presents the possibility of doing so by means of biopolymer-enhanced ultrafiltration.
Advances in Chemistry Research. Volume 77
James C. Taylor
In series: Advances in Chemistry Research
Expected Publication Date: 03/10/2023
270 pp.
Hardcover: 979-8-88697-574-1. $250.00
e-book: 979-8-88697-625-0. $250.00
This volume presents nine selected chapters discussing recent advances in chemistry research. Chapter One examines the synthesis and various properties of chromophores with aminostyryl quinoxaline moiety for photonic and optoelectronic applications. Chapter Two reviews the importance of the chemiluminescent system of marine chromophore coelenterazine. Chapter Three is a literature review of computational alanine scanning mutagenesis for probing protein stability and protein-protein interactions. Chapter Four is an investigation of various studies of L-alanine in an aqueous medium. Chapter Five reviews the synthesis of indole containing chromophores. Chapter Six reviews the interaction of bis[N-(2,6-dimethylphenyl)aminophenylglyoximato-κ2N,N′]nickel(II) dimethyl sulfoxide solvate with some biomolecules by computational chemistry methods. Chapter Seven examines the interaction between DNA bases with the molecular structure of 1,4-Bis[(z)-2-(3-mesityl-3-methylcyclobutyl)-2-(thiosemicarbazono)ethyl]piperazine dimethyl sulfoxide.
Chapter Eight reviews the acetoxylation of camphene over activated carbons with sulfonic acid groups. Chapter Nine demonstrates the behavior of short oligomeric molecules as being that of bistable machines.

Functional Analytical Techniques in Pharmaceutical Chemistry
Malik Saadullah (Government College University Faisalabad, Faisalabad Punjab, Pakistan)
In series: Analytical Chemistry and Microchemistry
Publication Date: 09/29/2022
299 pp.
Hardcover: 979-8-88697-059-3. $230.00
e-book: 979-8-88697-288-7. $230.00
Pharmaceutical Chemistry is a scientific discipline in the chemical and pharmaceutical field involved in the design and development of pharmaceutical drugs and their analytical techniques. Analytical chemistry is a branch of pharmaceutical chemistry that specializes in the analysis of various substances. It involves the separation, identification, and the quantification of matter by using classical and modern methods involving the use of scientific instruments. This book is an attempt to expose the analytical techniques used in pharmaceutical chemistry, so that one can possess command in analytical techniques.

Introduction to Multidisciplinary Science in an Artificial-Intelligence Age: Properties of Matter: Elasticity, Permeability, Porosity, Viscosity, and Wettability
Luc Ikelle
In series: Chemistry Research and Applications
Expected Publication Date: 03/15/2023
Hardcover: 979-8-88697-522-2. $310.00
e-book: 979-8-88697-578-9. $310.00
Higher science education is about preparing people to address the scientific and technological challenges of our times. The list of these challenges includes, but is not limited to, feeding the world's growing population, improving the length and quality of lives on Earth, improving short- and long-distance communication and transportation, predicting of, adapting to, and mitigating of natural hazards, and exploring space to improve our lives on Earth and for the survival of our civilization. This book series prepares students to understand and contribute, to address these challenges. Because these challenges, even in most of their narrow focuses, transcend the current college curriculums or programs. The Earth's climate change is an example of the narrow focus of the large topic of natural hazards. It spans almost all aspects of modern sciences, including biology, chemistry, and physics. Moreover, the span of these challenges may also be telling us that we have to rethink higher sciences education because the current splintering of science education into endless disciplines may not be the best or a unique way to prepare minds to address these challenges. We may be locking talented young minds to a certain viewpoint forever, an unintended indoctrination. At least some universities and colleges must start moving away from the monolithic way of delivering higher science education or to create a multidisciplinary science as a separate program and hopefully unleash a new generation of super engineers and scientists who are speaking scientific language. Moreover, this approach may optimize the higher education time for some people.
The Chemistry of Coumarin
Scott R. Sheley

In series: Chemistry Research and Applications
Expected Publication Date: 03/20/2023
Softcover: 979-8-88697-560-4. $82.00
e-book: 979-8-88697-597-0. $82.00

This book reviews and examines the chemistry of coumarin from different perspectives in six chapters. Chapter One reviews the one-pot synthesis of bromocoumarins via consecutive Pechmann condensation and bromination catalyzed by cellulose sulfuric acid. Chapter Two examines recent advances in heterocyclic compounds. Chapter Three looks at the chemical constituents and synthetic methods of bioactive coumarins. Chapter Four provides insights into the structure-activity relationship of alkynyl-coumarinyl ethers as selective mao-B inhibitors using molecular docking. Chapter Five reviews the phytochemistry and pharmacological actions of coumarin. Chapter Six is an overview of coumarins from different perspectives.

The Science of Carbamates
Dr. Gülü Kaymak (Kütahya Health Sciences University, Evliya Çelebi, Kütahya, Turkey)

In series: Chemistry Research and Applications
Publication Date: 05/03/2022
134 pp.
Softcover: 978-1-68507-708-2. $95.00
e-book: 978-1-68507-872-0. $95.00

This scientific book is about the toxic effects of carbamates, which have a functional carbonyl group, and how these effects can be eliminated. It is aimed to provide knowledge to all scientists related to this field. Although carbamates are generally considered to be pesticides, significant amounts of carbamates are used as medicine. This book contains eight chapters that examine carbamates from a variety of perspectives, including the latest research in this field. Chapter One comprehensively studies the chemical structure of carbamates used as drugs and the poisoning of carbamates. Chapter Two discusses how to develop cheap and efficient modes of remediation from the environment. Chapter Three highlights the important role of microorganisms in the degradation of carbamates. Chapter Four focuses on especially biodeterioration of carbamates by fungi. Chapter Five examines the probiotic microorganisms as detoxification tools in the degradation and transformation of carbamates. Chapter Six reviews the genetic risk that may occur as a result of exposure to carbamate pesticides in living things. Chapter Seven explains the genetic biomarkers that help determine the management of chronic pesticide toxicity by determining different gene polymorphisms in agricultural workers as a result of long-term contact with carbamates. Chapter Eight thoroughly studies the clinical information about intoxication that may arise as a result of carbamate group exposure.

What to Know about Lanthanum
Catherine C. Bradley

In series: Chemistry Research and Applications
Publication Date: 01/26/2023
115 pp.
Softcover: 979-8-88697-615-1. $82.00
e-book: 979-8-88697-623-6. $82.00

This book contains four chapters discussing essential facts about lanthanum. Chapter One describes lanthanum complexes with variable coordination and versatile applications. Chapter Two reviews the effects of lanthanum on aquatic organisms. Chapter Three discusses the synthesis and properties of nanodispersed luminescent structures based on lanthanum fluoride and phosphate for optopharmacology and photodynamic therapy of tumor diseases localized in cranial organs and bone tissues. Chapter Four discusses the removal and recovery of lanthanum from aqueous solutions by biosorption.
## Artificial Intelligence

**AI-Enabled IoT for Smart Health Care Systems**

*Tawseef Ayoub Shaikh, PhD (Senior Assistant Professor, Pandit Deendayal Energy University, Gandhinagar, Gujrat, India), Tabasum Rasool, PhD (Research Associate, Division of Interdisciplinary Sciences, Indian Institute of Science (IISc) Bangalore, India) and Mohammed Wasid, PhD (Assistant Professor, Interdisciplinary Centre for Artificial Intelligence, Aligarh Muslim University, Uttar Pradesh, India)*

In series: *Internet of Things and Machine Learning*

Publication Date: 08/10/2022

269 pp.

Hardcover: 978-1-68507-977-2. $195.00
e-book: 979-8-88697-073-9. $195.00

The book focuses on intelligent computer-aided tools and techniques for early and precise disease diagnosis. Trending topics like deep learning and the internet of things have immense opportunities in healthcare data analytics. So, the contents of the book are targeted mainly at the automated CAD tools for healthcare data analytics. A major portion of the book emphasizes the recent state-of-the-art methodologies, tools, and datasets that are used in healthcare diagnosis, patient monitoring, healthcare recommendation systems, etc.

**Applications of Artificial Intelligence in the Healthcare Sector**

*Jyoti Prakash Patra, PhD (Professor, Department of Computer Science and Engineering, Shri Shankaracharya Institute of Professional Management and Technology, Mujgahan, Raipur (CG), India) and Yogesh Kumar Rathore (Assistant Professor, Department of Computer Science and Engineering, Shri Shankaracharya Institute of Professional Management and Technology, Mujgahan, Raipur (CG), India)*

In series: *Computer Science, Technology and Applications*

Expected Publication Date: 02/15/2023

184 pp.

Hardcover: 979-8-88697-502-4. $160.00
e-book: 979-8-88697-541-3. $160.00

This book was constructed with the syllabus of many countries’ universities in mind, so that undergraduate students, postgraduate students, and university researchers can utilize it for their studies. Chapter 1 of the book mainly focuses on the background of Artificial Intelligence and its applications in various fields. Chapter 2 presents the applications of Artificial Intelligence to save lives in rural areas. In Chapter 3, applications of Artificial Intelligence in pharmacies are explored. Chapter 4 is about the use of machine learning algorithms to extract and optimize features from the imaging of a diseased patient. Chapter 5 provides details about the machine learning techniques used to detect lung cancer and pneumonia. Chapter 6 examines applications of deep learning techniques to fight the COVID-19 Pandemic. In Chapter 7, the use of deep autoencoders in the fields of bio-medicine is described with its implementation, and Chapter 8 covers chronic disease diagnosis using Artificial Intelligence and the Internet of Things. The last two chapters, Chapters 9 and 10 give focus to currently available health monitoring devices and possible improvements of their design along with the applications of IoRT (Internet of Robotics Things) in healthcare.
Applied Artificial Intelligence (AI) to Green Power Technology
Yogesh Kumar Chauhan, PhD (Associate Professor, EED, KNIT, Uttar Pradesh, India), Ranjan Kumar Behera, PhD (Department of Electrical Engineering, Indian Institute of Technology, Patna Bihta, Bihar, India) and Asheesh K. Singh, PhD (Professor, M. N. National Institute of Technology Allahabad, Prayagraj, India)
In series: Computer Science, Technology and Applications
Publication Date: 11/17/2022
257 pp.
Hardcover: 979-8-88697-131-6. $195.00
e-book: 979-8-88697-317-4. $195.00
The aim of this book is to explore the feasible solutions of various issues related to performance of green power technologies with the help of proven artificial intelligence techniques. Issues related to performance, wind energy conversion systems, micro/pico hydropower generation systems, fuel cell systems, and other emerging green power technologies are covered. Also, challenges in distributed energy generating systems and other relevant issues are covered.

Artificial Intelligence and Digital Diversity Inclusiveness in Corporate Restructuring
Richa Goel, PhD (Assistant Professor, Department of International Business, Amity University, Uttar Pradesh, Noida, India), S. K. Baral, PhD (Professor, Department of Commerce, Faculty of Commerce & Management, Indira Gandhi National Tribal University (A Central University) Amarkantak, Madhya Pradesh, India) and Ramamurthy Venkatesh, PhD (Head of Business & Technology, Regional System Integrator, NETS International Communications, Dubai)
In series: Internet of Things and Machine Learning
Publication Date: 07/27/2022
335 pp.
Hardcover: 978-1-68507-786-0. $230.00
e-book: 979-8-88697-074-6. $230.00
In this era of globalization, diversity in the business environment is about more than gender, race and ethnicity. It now includes employees with diverse religious and political beliefs, education, socioeconomic backgrounds, sexual orientation, cultures and even disabilities. Companies are discovering that, by supporting and promoting a diverse and inclusive workplace, they are gaining benefits that go beyond the optics. There is no industry left where artificial intelligence is not used in some capacity. Considering the pace at which AI, machine learning and deep learning have been developing in recent years, it is expected that AI will profoundly modify the way we live and work. One of the areas in which this paradigm may stand out in the future is related to diversity and inclusion within companies. AI can detect potential bias and prejudice in decision-making by simulating intelligent behaviour, potentially reducing trends and prejudices that could hinder organizations’ ability to recruit diversely and inclusively.

Blockchain Technology: Advances in Research and Applications
Eva R. Porras, PhD (Managing Director and Lead Researcher at SmartLedger Blockchain Solutions and Honorary Research Collaborator of the Department of Business Economics, Rey Juan Carlos University, Spain)
In series: Economic Issues, Problems and Perspectives
Publication Date: 10/06/2022
261 pp.
Hardcover: 979-8-88697-162-0. $195.00
e-book: 979-8-88697-263-4. $195.00
Nakamoto's 2008 publication of the Bitcoin protocol started a technological and economic revolution. Now, more than 10,000 digital payment brands in the markets claim to be backed up by distributed ledger technologies (DLTs) or blockchains. This volume compares the characteristics of these technologies while it brings clarity to the different aspects of the ecosystem.
Machine Learning Algorithms for Engineering Applications: Future Trends and Research Directions
Prasenjit Chatterjee, PhD (Department of Mechanical Engineering, MCKV Institute of Engineering, West Bengal, India), Parmanand Astya, PhD (Dean, Faculty of Engineering & Technology, Sharda University, Uzbekistan), Sudeshna Chakraborty, PhD (Associate Professor, Sharda University, Greater Noida, Uttar Pradesh, India) and Dr. Pooja (Associate Professor, Faculty of Engineering & Technology, Sharda University, Uzbekistan)

In series: Advances in Data Science and Computing Technologies
Publication Date: 06/24/2022
214 pp.
Hardcover: 978-1-68507-449-4. $160.00
e-book: 978-8-88697-086-9. $160.00

Machine learning is a vital part of numerous academic and financial applications, in areas ranging from health care and treatment to finding relevant information in social networks. Large organizations thoughtfully apply machine learning algorithms with extensive research teams. The purpose of this book is to provide an intellectual introduction to statistical or machine learning (ML) techniques for those that would not normally be exposed to such approaches during their typical required statistical exercise. Statistical analysis is an integral part of machine learning and can be described as a form of it, often even utilizing well-known and familiar techniques, that has a different focus than traditional analytical practice in applied disciplines. The key notion is that flexible, automatic approaches are used to detect patterns within the data, with a primary focus on making predictions on future data.

Novel Developments in Computational Intelligence Systems and Their Applications in Multidisciplinary Areas
Manoj Sahni, PhD (Associate Professor and Head, Mathematics, Pandit Deendayal Energy University, Gandhinagar, Gujarat, India), José Maria Merigó, PhD (Professor, School of Systems, Management and Leadership at the Faculty of Engineering and Information Technology, University of Technology Sydney, Australia), Ernesto León Castro, PhD (Professor, Universidad Católica de la Santísima Concepcion, Chile) and Ritu Sahni, PhD (Visiting Faculty, Pandit Deendayal Energy University, Gandhinagar, Gujarat, India)

In series: Computer Science, Technology and Applications
Publication Date: 2/9/2023
192 pp.
Hardcover: 978-8-88697-547-5. $160.00
e-book: 978-8-88697-585-7. $160.00

This book covers novel research based on various computational intelligence topics, including deep learning, artificial intelligence, machine learning, neural networks, healthcare, solutions to various problems using fuzzy systems and their applications in cryptography, assignment problems, transportation problems, cloud computing, etc. The goal of writing this book is to promote advances in the field of computational intelligence systems and to aid in the dissemination of results concerning recent applications in the areas of computational intelligence system-based applications, its allied branches like artificial intelligence, deep learning, cloud computing, fuzzy system, etc… among working professionals, researchers, and educators. This book will be useful for Data Scientists, web developers, cryptographers, medical researchers, engineers, researchers, and graduate level students in computer science, data science, operations research, and mathematics. It provides novel applications as well as new theoretical developments required to understand current computational intelligence topics such as deep learning, machine learning, fuzzy based systems, and various other relevant fields. Graduate and postgraduate Computer Science, Engineering, Information Technology and Mathematics students, as well as teachers, can use it as a reference book because they can find applications that can be used to clarify specific concepts.
Revolutionary Applications of Intelligent Drones
Mohit Angurala, PhD (Head of the Department (Computer Science and Engineering), Khalsa College of Engineering and Technology, Amritsar, India) and Vikas Khullar, PhD (Associate Professor, Department of Computer Science and Engineering, Chitkara University Institute of Engineering and Technology, Chitkara University, Punjab, India)

In series: Computer Science, Technology and Applications
Publication Date: 08/29/2022
155 pp.
Softcover: 978-1-68507-991-8, $95.00
e-book: 978-8-88697-123-1, $95.00

This work includes details starting from the basics of drone technology and discusses diverse aspects related to drone designing and implementation. Further chapters detail the impact of drone technology on society in terms of development, challenges, and security concerns. Then, implementations of artificial intelligence techniques such as machine learning, deep learning, etc., are discussed to translate drone technology into intelligent drone technology. There are diverse applications in the area of intelligent drone technologies such as agriculture, disaster management, security, military, etc. Hence, in this book, some of the drone-specific applications are discussed.

Understanding Pattern Analysis
Mangesh M. Ghonge, PhD (Associate Professor, Department of Computer Engineering, Sandip Foundation’s Sandip Institute of Technology and Research Centre, Nashik, India), Pradeep Nijalingappa, PhD (Professor, Computer Science and Engineering, Bapuji Institute of Engineering and Technology, Davangere, Karnataka, India) and Ahmed J. Obaid, PhD (Assistant Professor, Department of Computer Science, Faculty of Computer Science and Mathematics, University of Kufa, Iraq)

In series: Computer Science, Technology and Applications
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159 pp.
Softcover: 978-1-68507-951-2, $95.00
e-book: 978-1-68507-777-8, $95.00

Understanding Pattern Analysis provides an overview of the most recent research on the creation and application of synergistic approaches to pattern analysis in real-world contexts. This book discusses a variety of hybrid intelligence strategies, including application of pattern analysis to astrobiology, pattern analysis for predictive systems of modern agriculture practices, cognitive pattern recognition, cognition of 5G network toward digital healthcare for smart cities and object detection for autonomous vehicles.

Computer Science

A Guide to Design and Analysis of Algorithms
Soubhik Chakraborty (Professor, Department of Mathematics, Birla Institute of Technology, Mesra, Jharkhand, India), Prashant Pranav (Assistant Professor, Department of Computer Science and Engineering, Birla Institute of Technology, Mesra, Jharkhand, India), Naghma Khatoon (Assistant Professor, Faculty of Computing and Information Technology, Usha Martin University, Jharkhand, India) and Sandip Dutta (Professor, Department of Computer Science and Engineering, Birla Institute of Technology, Mesra, Jharkhand, India)

In series: Computer Science, Technology and Applications
Publication Date: 12/15/2022
114 pp.
As there can be more than one algorithm for the same problem, designing and analyzing an algorithm becomes important in order to make it as efficient and robust as possible. This book will serve as a guide to design and analysis of computer algorithms. Chapter One provides an overview of different algorithm design techniques and the various applications of such techniques. Chapter Two reviews the divide and conquer strategy and the algorithm types that employ it. Chapter Three explores greedy algorithms and some problems that can be solved with this approach. Chapter Four discusses in depth the dynamic programming approach. Chapter Five provides a solution to the N-Queens problem utilizing a backtracking approach. Chapter Six elucidates the reader to branch and bound techniques and provides three solutions to problems implementing them. Part II of this book begins with Chapter Seven, where two different approaches to the analysis of algorithms are discussed. Chapter Eight reviews randomized algorithms through an empirical lens. Chapter Nine discusses Master Theorem and the many kinds of problems this Theorem can solve. Chapter Ten, the final chapter, provides notes on the empirical complexity analysis of algorithms.

Applying an Advanced Information Search and Retrieval Model in Organisations: Research and Opportunities
Maria del Carmen Cruz Gil (Professor, Zaragoza University, Facultad de Filosofía y Letras, Spain)
In series: Computer Science, Technology and Applications
Publication Date: 05/26/2022
99 pp.
Softcover: 978-1-68507-560-6. $82.00
e-book: 978-1-68507-914-7. $82.00
In our lives, we need information continuously to carry out tasks of any kind (personal, academic, and professional). Depending on the context in which we find ourselves and the time available to carry out the task, emotions such as uncertainty and stress can present in the search process. But the important thing is that when we know the search process, the uncertainty and stress are minimized. In this context, the author investigates existing studies on the search and retrieval of information from the user's perspective. The study turned out to be very complex for two reasons: 1. Scientific literature is widely dispersed in different articles and academic books, even if it was the same search and information retrieval model. 2. Sources are not accessible to all people. As a consequence, the author plans to disseminate the results of this research with the aim of facilitating knowledge and understanding of anyone interested in entering the information search and retrieval process. With the collaboration of Nova Science Publishers, we find ourselves before an affordable, simple, and manageable book. Chapters 1 to 7 outline the search and information retrieval models of the following authors: Belkin, Ingwersen, Ellis, Kuhlthau, Wilson, Dervin, and Byström. In Chapter 8, the author presents her own model for searching and retrieving information. This model is formed by some elements previously seen from the other authors, but also by other novel ones such as the organisation. This is due to the fact that some of the tasks carried out with greater frequency and complexity are those that intervene in our professional tasks, in which scientific studies confirm that an effective organisation cannot be conceived without efficient information management.

Internet of Everything: Smart Sensing Technologies
T. Kavitha (Professor, Department of Electronics and Communication Engineering, AMC Engineering College, Visvesvaraya Technological University (VTU), Bengaluru, India), V. Ajantha Devi (Research Head, AP3 Solutions, Chennai, Tamil Nadu, India), S. Neelavathy Pari (Assistant Professor, Department of Computer Technology, Anna University, MIT Campus, Chennai, India) and Sakkaravarthi Ramanathan (Professor, Computer Science Department, Vanier College, Saint Laurent, Quebec, Canada)
In series: Internet of Things and Machine Learning
Publication Date: 06/17/2022
353 pp.
Hardcover: 978-1-68507-865-2. $230.00
e-book: 978-1-68507-943-7. $230.00
The Internet of Things (IoT) refers to a system of interconnected computing devices with sensors, processing ability, and software, which connect and communicate with other devices and systems over the internet or other networks. IoT technology enables applications that perform tasks without human-to-human or human-to-computer interaction, improving efficiency and generating new opportunities. IoT digitalizes industries to improve product quality and cost and creates the potential for a fully networked, human-centered society with healthy economic growth. The concept of Internet of Everything (IoE) goes beyond IoT to include the connections between people, things, data, and processes combined into a
common interrelated system, leveraging human and artificial intelligence to improve decisions and experience, and represents the future of IoT technology. Internet of Everything: Smart Sensing Technologies addresses the forefront of study of IoE by presenting state-of-the-art research along with current and future challenges in building new, smart applications. Specific topics covered include sensing, connectivity and communication, knowledge extraction by discovering resources for modeling information, and security and privacy. The sixteen chapters of this book will benefit students, researchers, and others who are interested in the future of this exciting technology.

Machine Learning Analysis of qPCR Data Using R
Luigi Marongiu, PhD (Research Associate, Viral Oncolytic Group, University of Tübingen, Germany)
In series: Research Methodology and Data Analysis
Publication Date: 11/17/2022
135 pp.
Softcover: 979-8-88697-339-6. $82.00
e-book: 979-8-88697-380-8. $82.00
The quantitative polymerase chain reaction (qPCR) is a versatile and popular assay for quantifying nucleic acids. With the recent expansion of the number of reactions per assay, there is a need for an accurate method to report the data suitable for automation. This book will describe such a method, based on machine learning analysis, and implement it with publicly available tools. This book is intended for researchers and will provide a detailed introduction to the programming language R, including references for the most common functions. This book will provide an advanced strategy for the objective analysis of qPCR data suitable for experts in the field and an introduction to qPCR and computational analysis for students.

Speech Recognition Technology and Applications
Vasile-Florian Păiș (Research Institute for Artificial Intelligence "Mihai Drăgănescu", Romanian Academy, Bucharest, Romania)
In series: Computer Science, Technology and Applications
Publication Date: 09/07/2022
226 pp.
Hardcover: 978-1-68507-929-1. $160.00
e-book: 979-8-88697-179-8. $160.00
Speech represents the most natural means of communication between humans. By using Automatic Speech Recognition (ASR) and Text-to-Speech (TTS) systems, machines also become able to interact with humans using speech. This is of particular importance for building interactive robots or speech-enabled chatbots. This book starts by exploring state-of-the-art ASR and TTS approaches, making use of artificial neural networks, relevant also to low-resource scenarios. Then, it explores the application of speech technology to specific domains, such as the medical domain, human-robot interaction, and even interlinking of speech and text resources using linguistic linked open data (LLOD) principles. The book also provides punctuation restoration techniques, enabling the production of high-quality text transcripts. Included algorithms have low latency and can be parallelized, thus enabling their use in interactive systems. Chapter authors are professors and scientific researchers with experience in building and using natural language processing algorithms and speech applications.

The Future of Data Mining
Cem Ufuk Baytar, PhD (University Lecturer, Management Information Systems, Istanbul Topkapı University, Istanbul, Turkey)
In series: Research Methodology and Data Analysis
Publication Date: 10/20/2022
152 pp.
Softcover: 979-8-88697-250-4. $95.00
e-book: 979-8-88697-315-0. $95.00
The purpose of this book is to discuss data mining, which is a subset of data science, from a variety of perspectives. With the technological advances of recent years, new software and hardware-based systems are available in most business environments. With these systems, data production continues to increase in personal, corporate, commercial and many other areas. Information systems convert raw data, which alone are not so meaningful, into information after the processes are applied. Database systems are necessary for the storage and management of the information generated. Revealing meaningful relationships hidden in a stack of high-volume data shows the function of
data mining. Processing big data has become important to produce information that will support business decisions and be a strategic tool in today’s competitive environment. In this context, the effectiveness of data mining applications is increasing day by day as a decision support system to develop marketing strategies in every sector by identifying customer behavior and target groups.

### Programming and Software Development

**Neural Network Control of Vehicles: Modeling and Simulation**

*Igor Astrov (Tallinn University of Technology, Harjumaa, Estonia)*

In series: *Computer Science, Technology and Applications*

Publication Date: 06/01/2022

220 pp.

Hardcover: 978-1-68507-757-0. $160.00

e-book: 978-1-68507-916-1. $160.00

In the past few years, considerable interest has been shown and relevant resources have been devoted to the design, development and operation of autonomous aerial, underwater, and sea surface vehicles. The possibility of removing human pilots from danger and the size and cost advantages of autonomous vehicles are indeed attractive, but often have to be compared with the performance that can be attained by human-piloted vehicles, in terms of mission capabilities, efficiency and flexibility. The operation of an autonomous vehicle in an unknown, dynamic and potentially hostile environment is a very complex problem, especially when the autonomous vehicle is required to use its full maneuvering capabilities and to react in real time to changes in the operational environment. A common way of dealing with highly complex systems is via a hierarchical decomposition of the activities to be performed by the autonomous vehicles. However, only limited results can be obtained with this method. Another method is to design a hybrid control system that offers safety and performance guarantees by use of neural control technique. Neural networks appear to offer a new, promising direction toward better understanding of the most difficult control problems that have previously been very difficult or impossible to solve. This book provides basic approaches for the modeling and simulation of neural control systems using the MATLAB/Simulink environment for various types of vehicles, emphasizing realistic dynamics with numerous examples. These types of vehicles include experimental aircraft, self-guided missiles, unmanned miniature helicopters, autonomous underwater vehicles, and more.

### Special Topics

**A Beginner’s Guide to Virtual Reality (VR) Modeling in Healthcare Applications with Blender**

*Yuk Ming Tang, PhD (Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University, Hong Kong), Ho Lun Ho (Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University, Hong Kong), Ka Yin Chau (Faculty of Business, City University of Macau, Macao) and Yan Wan (Faculty of Business, City University of Macau, Macao)*

In series: *Computer Science, Technology and Applications*

Publication Date: 07/27/2022

166 pp.

Softcover: 978-1-68507-811-9. $95.00

e-book: 978-1-68507-945-1. $95.00

This book aims to guide using 3D modeling techniques, texturing, and assigning material by using healthcare as the core application for demonstration. Blender is a free and open-source digital content creation (DCC) tool that provides the freedom to users of different backgrounds to get started quickly. The demonstrating of healthcare application enables related expertise to be equipped with modeling and rendering techniques through understanding background knowledge in character modeling, dressing and animation in healthcare application. The target audience includes professionals and researchers working in virtual reality, computer graphics, computer simulation, design, visual arts in various disciplines, e.g., computer science, design, art, healthcare, rehabilitation, education, and information technology.
A Closer Look at Online Deception and Disinformation

Suzanne M. Williams

In series: Internet Policies and Issues
Publication Date: 11/17/2022
250 pp.
Hardcover: 979-8-88697-310-5. $150.00
e-book: 979-8-88697-377-8. $150.00

In the two-plus decades since the creation of the internet, we have seen life for Americans and their families transformed in many positive ways. The internet provides new opportunities for commerce, education, information, and connecting people. However, along with these many new opportunities, we have seen new challenges as well. Bad actors are stocking the online marketplace, using deceptive techniques to influence consumers, deceptive designs to fool them into giving away personal information, stealing their money, and engaging in other unfair practices.

Blockchain Technology Based Big Data for Healthcare: Concept and Paradigm

Basetty Mallikarjuna, PhD (Associate Professor, School of Computing Science & Engineering, Galgotias University, Greater Noida, India), Niranjanamurthy M, PhD (Assistant Professor, Department of Computer Applications, M S Ramaiah Institute of Technology, Bangalore, India), Sheng-Lung Peng, PhD (Professor, Department of Computer Science and Information Engineering, National Dong Hwa University, Hualien, Taiwan) and Amulya MP (Assistant Professor, Department of Computer Science and Engineering, BGSIT / Adichunchanagiri University (ACU), Karnataka, India)

In series: Advances in Distributed Computing and Intelligent Data Analytics
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224 pp.
Hardcover: 978-1-68507-968-0. $160.00
e-book: 979-8-88697-204-7. $160.00

Blockchain is an open-source technology that offers an alternative to the traditional intermediary for transfers of cryptocurrency, among other applications. This book discusses existing research on blockchain and big data and provides its readers with the state-of-the-art in blockchain based on big data for healthcare.

Frontiers in Quantum Computing: New Research

R. Anandan, PhD (Professor, Head of the Department of Computer Science and Engineering, Vels Institute of Science, Technology and Advanced Studies, Tamil Nadu, India)

In series: Computer Science, Technology and Applications
Publication Date: 05/13/2022
265 pp.
Hardcover: 978-1-68507-816-4. $195.00
e-book: 978-1-68507-900-0. $195.00

The objective of this book is to communicate advancements of knowledge and help disseminate results concerning recent applications and case studies in the area of quantum computing among working professionals and professionals in education and research, covering a broad cross-section of technical disciplines. This book will allow students to explore knowledge in quantum computing to produce serviceable and innocuous systems as well as purposeful systems with cutting-edge technology. To yield computer systems with decent usability, developers must attempt to understand the factors that determine how people use technology. This book will cater to an extensive cross-sectional and multi-disciplinary readership ranging from academics, business delegates, CEOs, communication designers, computer scientists, digital customers, e-learning environment designers, industrial leaders, industry consultants, key workers, law enforcement agencies, managers, practitioners, professionals, professors, profit/non-profit e-organizations, programmers, R&D/professional
research communities, security architects, stakeholders, students, support staff and university researchers/scholars of various communities, such as artificial intelligence, cyber-physical systems, ethics, robotics, safety engineering, safety-critical systems, standardization and certification digital forensics and application domain communities such as aerospace, agriculture, automotive, critical infrastructures, healthcare, manufacturing, retail, smart transports, smart cities and smart healthcare, using real case studies and projecting outcomes, showing the intricate details of quantum computing in these real-life scenarios. As a final point, this book will provide up-to-date, premeditated, and creative information to those engrossed in the field of quantum computing.

**Horizons in Computer Science Research. Volume 22**

*Thomas S. Clary*

In series: *Horizons in Computer Science*

Publication Date: 09/01/2022

290 pp.

Hardcover: 979-8-88697-101-9. $250.00
e-book: 979-8-88697-234-4. $250.00

This volume includes eight chapters that describe recent advances in computer science research. Chapter One reviews the taxonomy of phishing attacks and focuses on the soft computing-based anti-phishing techniques proposed for identifying phishing websites. Chapter Two gives the basic theory and applications of quantum hypercomputation. Chapter Three presents a method using soft sets for a qualitative assessment of human-machine performance under fuzzy conditions and describes how topological spaces can be extended to fuzzy structures. Chapter Four considers forensic computing, collection of relevant data, and metrology and measurements in the cybernetic system. Chapter Five explores the features of phase change memory and proposes a series of strategies to improve its lifetime. Chapter Six proposes a new method for developing Quality of Service routing applications in Software Defined Networks. Chapter Seven discusses the recent trends of machine learning applications in cosmology and gravitational wave astronomy. Finally, Chapter Eight introduces a write-aware data allocation approach to address the data assignment problem and a bucket-based wear-leveling algorithm for phase-change memory data management.

**Horizons in Computer Science Research. Volume 23**

*Thomas S. Clary*

In series: *Horizons in Computer Science*

Publication Date: 10/27/2022

250 pp.

Hardcover: 979-8-88697-337-2. $250.00
e-book: 979-8-88697-399-0. $250.00

This volume contains ten chapters which present recent and future research concepts in computer science research. Chapter One presents new theorems for analysing digital logic gates. The second chapter reviews current work to postulate the future of intrusion detection systems in cloud computing. Chapter Three analyzes the storage structure and management of distributed ledger technologies in blockchain systems. Chapter Four reviews an experiment testing the bouncing phenomenon of sand particles on a membrane and how their random walk forms Chladni patterns. The fifth chapter discusses a robust model for the foraging of microorganisms by random walk patterns. Chapter Six presents research into the use of printed circuit board from a recycling based point of view. The seventh chapter is an introduction to sparse distributed representations in text data curation in the context of natural language processing (NLP). The eighth chapter reviews a wide ranging survey of research into intrusion detection systems in the Internet of Things (IoT) model of the world. Chapter Nine provides a far reaching review of modern issues in digital forensic processes in the environment of cloud computing. The tenth and final chapter uses a schema of hegemonic praxis to analyze issues of cyber warfare in the modern world.
Kennedy Njenga (University of Johannesburg, Johannesburg, South Africa)
In series: Cybercrime and Cybersecurity Research
Publication Date: 11/24/2022
102 pp.
Softcover: 979-8-88697-390-7, $82.00
e-book: 979-8-88697-450-8, $82.00
This book is the outcome of a review of literature on the possible concerns and issues Small and Medium-Sized Enterprises (SMEs) would face when adopting the fourth industrial revolution (4IR) technologies. From a review of the current and past literature, this book disseminates insightful ideas and developments in the field of information and cybersecurity. It is intended that these ideas will shape how SMEs now and in the immediate future address information and cyber security risks. This book is also of particular interest to information security administrators managing SME information security, who may gather additional insights on the emergent information security threats facing SMEs that are discussed. A key consideration for this book is the innovative ways that SMEs have adopted 4IR technologies but, in doing so, have attracted unknown information and cyber security risks.

Earth Sciences

Geology

Neogene Deep Water Benthic Foraminifera from the Indian Ocean – A Monograph
Anil Kumar Gupta (Professor, Department of Geology and Geophysics, Indian Institute of Technology Kharagpur, Kharagpur, WB, India)
In series: Earth Sciences in the 21st Century
Publication Date: 12/01/2022
337 pp.
Hardcover: 979-8-88697-385-3, $230.00
e-book: 979-8-88697-412-6, $230.00
This book pertains to the broader discipline of micropaleontology, presenting detailed taxonomic descriptions of deep water benthic foraminifera from the three Deep Sea Drilling Project (DSDP) sites. Brief notes on microhabitats of benthic foraminifera, biostratigraphy and their importance in understanding history of oxygen minimum zone and deep–sea circulation in the Indian Ocean during the Neogene have also been provided. The purpose of this volume is to cater to the greater needs of graduate students, researchers and professionals working on Foraminifera – their systematic descriptions and use in paleoceanography from the marine realms with special interests on the Indian Ocean microfauna. This book is expected to serve as both a reference and textbook to students and experts. This book will reduce the ambiguities in taxonomic status of deep-water benthic foraminifera to a great extent since there is disagreement about the application of names to certain benthic foraminiferal taxa. For students of geology, this book will be relevant to the study of subjects of micropaleontology, paleoceanography and paleoclimatology, and marine geosciences. It will be useful for both teaching and research to graduate, doctoral and post-doctoral students.
Radium in the Hydrosphere of Brazilian Alkaline Areas
Luis Henrique Mancini, PhD (Researcher, Departamento de Geologia, UFPR- Universidade Federal do Paraná, Curitiba (PR), Brazil) and Daniel Marcos Bonotto (Full Professor of Geochemistry, UNESP-Universidade Estadual Paulista “Júlio de Mesquita Filho”, Rio Claro (SP), Brazil)

In series: Environmental Remediation Technologies, Regulations and Safety
Publication Date: 07/08/2022
224 pp.
Hardcover: 978-1-68507-889-8. $160.00
e-book: 979-8-88697-009-8. $160.00

Radium is a radioactive element and the heaviest in the group of alkaline earth metals, with geochemical characteristics that are very similar to those of barium and calcium. In the environment, its chemical properties are controlled by ion exchange and adsorption processes, mechanisms that control the rate of radium transport in surface waters, groundwaters and soil systems. There are four natural isotopes of radium: $^{226}$Ra (half-life = 1,622 years, alpha particle emitter, member of the $^{238}$U decay series); $^{223}$Ra (half-life = 11.4 days, alpha particle emitter, member of the $^{235}$U decay series); $^{228}$Ra (half-life = 6.7 years, beta particle emitter, member of the $^{232}$Th decay series); $^{224}$Ra (half-life = 3.6 days, alpha particle emitter, member of the $^{232}$Th decay series). The dominant mineralogical characteristics of the rocks in the drainage basins and aquifers strata considerably influence the presence of these radium isotopes in the waters. Thus, the geological characteristics of the drainage basins and aquifers, physico-chemical properties and hydrological conditions are factors affecting the radiological quality of the surface waters and groundwaters. The radium isotopes usually monitored in waters for the purpose of assessing their radiological quality are $^{226}$Ra and $^{228}$Ra due to their longer half-life. The limits recommended by the Brazilian and World Health Organization legislations for the intake of $^{226}$Ra and $^{228}$Ra in drinking water are 1 Bq/L (=1000 mBq/L) and 0.1 Bq/L (=100 mBq/L), respectively. Analyses of most natural waters have shown that $^{226}$Ra and $^{228}$Ra are present at very low activities, usually lower than the guideline reference values. However, some rock types in fractured aquifers contain relatively high concentrations of uranium and thorium, such as granites and alkaline rocks that can contribute to the release of enhanced radium levels into the waters. Additionally to these geogenic factors, anthropogenic activities such as ores mining, fertilizer production and electricity generation by nuclear power plants may also increase the presence of radium in the water resources. This book reports a relevant $^{226}$Ra and $^{228}$Ra dataset in waters and bottom sediments occurring at two alkaline geological domains of Minas Gerais State, southeast Brazil.

Hydrology

Water Scarcity: Global Perspectives, Issues and Challenges
Saeid Eslamian, PhD (Professor, Center of Excellence in Risk Management and Natural Hazards, Isfahan University of Technology, Isfahan, Iran), Prabal Barua, PhD (Program Manager, Young Power in Social Action, Bangladesh) and Faezeh Eslamian, PhD (Department of Bioresources Engineering, Faculty of Agricultural and Environmental Sciences, McGill University, Montreal, Canada)

In series: Water Resource Planning, Development and Management
Publication Date: 07/27/2022
249 pp.
Hardcover: 978-1-68507-812-6. $195.00
e-book: 979-8-88697-085-2. $195.00

This book includes diverse perspectives on the water scarcity problem for global communities. The agriculture sector is one of the most affected sectors in the world. The authors in this book explore the adaptation techniques used by agriculture farmers to mitigate the water crisis and increase food production. This book aims to depict the main global problems and challenges that have a negative impact on water insecurity, human health, and food security, with the underlying objective of highlighting the need for reinforcing its full application in all contexts and countries.
Meteorology and Climatology

Handbook of Uncertainty in Eurasian Forecasting (HEF)
Saeid Eslamian, PhD (Professor, Water Engineering, Isfahan University of Technology, Iran), Mir Bintul Huda, PhD (Consultant, Water Resources Management Centre, National Institute of Technology, Jammu & Kashmir, India) and Faezeh Eslamian, PhD (Department of Bioresource Engineering, McGill University, Montreal, Quebec, Canada)

In series: Meteorology and Climatology
Publication Date: 09/07/2022
277 pp.
Hardcover: 978-1-68507-966-6. $195.00
e-book: 979-8-88697-158-3. $195.00

Forecasting is a technique that uses historical data as inputs to make informed estimates that are predictive in determining the direction of future trends. Eurasia comprises about 36% of the world’s total area and about 70% of the world population. Eurasia comprises Asia and Europe, although, geographically, it is a single continent with arbitrary geological borders. Eurasia has been a home to the world’s oldest civilizations and plays an important part in the mainstream history of the world. Eurasian countries have many common characteristics and forecasting of this region can prove to be of major help in integrated resources management, leading to sustainable development, optimum decision making of international world organizations and achieving goals of world peace. This book deals with the various aspects of social and environmental importance in this region, especially climate change and hydrological modelling and flood forecasting.

Observing Micrometeorology: A Personal Tour through an Evolving Science
Bruce B. Hicks (Metcorps, Norris, TN USA; Adjunct Professor, Agriculture, University of Tennessee, Knoxville, TN USA)

In series: Earth Sciences in the 21st Century
Publication Date: 12/01/2022
328 pp.
Hardcover: 979-8-88697-369-3. $230.00
e-book: 979-8-88697-426-3. $230.00

In early 1962, at the age of 21, Bruce Hicks found himself temporarily in charge of a micrometeorological experimental program conducted at Kerang, in Victoria (Australia). He had no schooling in the atmospheric sciences, and so started a self-education program based on (a) what he saw with his own eyes, (b) what his mentors told him and (c) textbook lore. He quickly discovered that others in that group of researchers at CSIRO in Australia (under the leadership of C. H. B. Priestley) shared his misgivings about some of the science that was then rapidly becoming disciplinary dogma. A career in experimental meteorology followed, accompanied by bursts of unrestrained iconoclasm. After migrating to the USA in 1973 and serving as Director of the Air Resources Laboratory of the National Oceanic and Atmospheric Administration, he returned to his favorite science with new vigor in 2006. He quickly found that new instrumentation and new researchers were yielding mountains of reasons to reconsider what textbooks often teach. His book reveals the bases for his revised understanding of air-surface exchange, the surface boundary layer, and the atmospheric and terrestrial features that influence them. This is not a textbook. Rather, it is a summary of how the teachings of textbooks might be interpreted in the light of information more recently available. This is an update of the basics that underpinned an evolving science before it was kidnapped by computers and modeling. He is not trying to change the science. Oh, heck. Yes, he is.
**Mineralogy**

**Geopolymers: Structure, Properties and Applications**  
*Joseph E. Glenn*  
In series: *Geology and Mineralogy Research Developments*  
Publication Date: 09/21/2022  
223 pp.  
Hardcover: 979-8-88697-197-2. $160.00  
e-book: 979-8-88697-224-5. $160.00  

Geopolymers are networks of mineral molecules linked with covalent bonds. Geopolymers have a number of commercial applications and are used in medicine, high-temperature ceramics, and more. This volume includes four chapters discussing various aspects of geopolymers. Chapter One reviews some of the modifications, applications, and challenges of waste-derived geopolymer catalysts. Chapter Two investigates the adsorption of Cu(II), Mn(II), Pb(II), and Zn(II) ions to geopolymers obtained from biomass combustion ash. Chapter Three presents a summary of the literature on geopolymer concrete's foundations and disadvantages compared to portland cement concrete, mix proportions that give the best strength, management of fiber additives, performance analysis against burst rate, and resistance to attack. Lastly, Chapter Four deals with the development and application of sulfated geopolymer catalyst in the oxidation of dibenzothiophene.

**Gypsum: Sources, Uses and Properties**  
*Matthew N. Ippolito*  
In series: *Geology and Mineralogy Research Developments*  
Publication Date: 05/20/2022  
96 pp.  
Softcover: 978-1-68507-932-1. $82.00  
e-book: 979-8-88697-016-6. $82.00  

Gypsum is a soft sulfate mineral made up of calcium sulfate dihydrate and has various applications, such as fertilizer, chalk, and plaster. This book includes five chapters that provide further details on this material. Chapter One focuses on some recently reported gypsum composite plasterboards as well as the functions and properties of various other composite plasterboards. Chapter Two deals with the methods of preparation and utilization of gypsum-based lightweight materials. Chapter Three shows the possibilities of multiple strengthening of gypsum products by surface treatment and impregnation with water-acrylic and epoxy compound. Chapter Four deals with the effect of waste plastic fiber inclusion on the mechanical and some durability properties of foamed gypsum. Lastly, Chapter Five captures the current state of art of gypsum utilization in geotechnical applications.

**Pyrite and Pyrrhotite: Managing the Risks in Construction Materials and New Applications**  
*Michael L.J. Maher, PhD, P.Eng. (Principal and Construction Materials Specialist, WSP Golder, Whitby, Ontario, Canada)*  
In series: *Construction Materials and Engineering*  
Publication Date: 12/22/2022  
383 pp.  
Hardcover: 979-8-88697-329-7. $230.00  
e-book: 979-8-88697-395-2. $230.00  

This book has been divided into three sections. The first section contains one chapter setting out the geological origins of sedimentary pyrite. Section two contains five chapters that provide detailed insights into the behavior of reactive pyrite and pyrrhotite when present in construction aggregates. Most recently, the consequences for property owners in Québec, Ireland and Connecticut, from iron sulfides in unbound aggregates and in aggregates in concrete have been devastating both financially and emotionally to building owners. When, through no fault of their own, their house loses some or all of its value, the impact on homeowners’ lives can be shattering. The third section deals with the more positive aspects of pyrite and how emerging research is showing its value as a low-cost material for such diverse applications as coatings for solar panels and as a growth enhancer for agricultural crops.
Non-Euclidean Geometry in Materials of Living and Non-Living Matter in the Space of the Highest Dimension
Gennadiy Zhizhin (Professor, Academician of Russian Academy of Natural Sciences, Associate Editor of Int. J. of Applied Research in Bioinformatics (IGI Global), Member of the Editorial Board of the Journal Biosphere (Russia), Member of the Scientific Council of the Russian Academy of Sciences on Combustion and Explosion, St. Petersburg, Russia)

In series: Mathematics Research Developments
Publication Date: 07/27/2022
281 pp.
Hardcover: 978-1-68507-885-0. $195.00
e-book: 978-8-88697-064-7. $195.00

This monograph briefly describes the properties of Euclidean geometry and Riemannian geometry. The significance of the genetic code in connection with the established laws of transmission of hereditary information in the polytope of hereditary information and their sequence in the chain of nucleotides is discussed. Information processes in living matter play a significant role in ensuring the sustainable existence of living organisms. In this regard, the monograph pays great attention to the study of information flows in polytopes of the highest dimension, which are biomolecules. It is shown that the higher the dimensionality of the polytope, the more powerful the information flow it has. This allows living organisms to create reliable protection against harmful external influences (for example, from viruses). In general, the monograph represents a new worldview of nature and life on Earth, which is based on the highest dimension of the molecules of chemical compounds.

Environmental Sciences

Atmospheric Aerosols: Properties, Sources and Detection
Binoy K. Saikia, PhD (Coal & Energy Division, CSIR-North East Institute of Science & Technology, Jorhat, Assam, India)

In series: Environmental Science, Engineering and Technology
Publication Date: 10/13/2022
149 pp.
Softcover: 979-8-88697-211-5. $95.00
e-book: 979-8-88697-341-9. $95.00

This book explores different aspects of atmospheric aerosols such as rare earth elements, trace elements, organic compounds, bioaerosols and microplastics emphasizing their types, properties, sources, and analytical and source apportionment methods. All the chapters are authored by experts in their relevant fields and contain up-to-date reference materials.

Indoor Air Quality: Control, Health Implications and Challenges
Robert M. Ridgway

In series: Air, Water and Soil Pollution Science and Technology
Publication Date: 08/10/2022
116 pp.
Softcover: 979-8-88697-134-7. $82.00
e-book: 979-8-88697-181-1. $82.00

This book includes five chapters that explore the topic of indoor air quality from several perspectives. Chapter One investigates the efficiency of a solar air heater system. Chapter Two examines the effect of indoor air pollution in child populations in educational settings. Chapter Three studies the impact of numerical parameters on heat ventilation in a box prototype. Chapter Four includes simulations of airflow related to a room
containing a sitting person and a computer to determine ventilation system performance. Lastly, Chapter Five analyzes airflow in spaces equipped with a vertical confluent jets ventilation system.

**Ecology**

**Vultures of India: Ecological Developments, Problems, and Prospects**

*Kaushalendra Kumar Jha, PhD (Former PCCF and Professor, Indian Institute of Forest Management, India) and Michael O’Neal Campbell, PhD (Lecturer, Simon Fraser University, Canada)*

In series: *Birds - Evolution, Behavior and Ecology*

Publication Date: 12/22/2022

529 pp.

Hardcover: 979-8-88697-441-6. $310.00

e-book: 979-8-88697-461-4. $310.00

This book covers selected topics about Indian vultures, focusing on their ecology, interactions with people and future, based on related political, social, economic, biological, and technological issues. This is a complex and vast area, complicated by the recent catastrophic decline in the populations of South Asian vulture species on the heels of the introduction of the veterinary drug diclofenac, and the consequent global media and research attention. Related issues have also emerged, such as human induced landscape change, and successes and failures of the ameliorative actions that followed. The book shows that while diclofenac dominated the attention to vulture ecologies and their futures in South Asia, other comparatively neglected issues such as socio-economic policies and technological developments were and are still vital. In the study of vultures and their rapidly changing ecologies, the main clusters of research methods have included laboratory studies and field techniques, the latter both biological and human socio-cultural and economic/technological. The chapters of this book consequently include work on computer software and associated technology, ecological research methods, the behavioral patterns of the studied vulture species and related animals, chemical analyses, related to animal dietary patterns and environmental degradation, avian intrusions into human life spaces etc. The book introduces the ecology of the vulture species residing or wintering in India. This is followed by natural ecological processes of habitat selection, population status and impact of diclofenac which was believed to bring some of the Indian vultures close to local or regional extinction.

**Environmental Conservation**

**Understanding Kashmir Lakes: Water Quality, Biodiversity, Deterioration, Encroachment, and Vision for Their Protection and Restoration**

*Waseem A. Wani, PhD (Chemistry, PDF (UTM, Malaysia), PDF (INST, India), PDF (UMN, USA), Assistant Professor of Chemistry at Govt. Degree College Tral, Kashmir, J&K, India), Javaid Ahmad Tali, PhD (Assistant Professor of Geography, Government Degree College Tral, Kashmir, Jammu and Kashmir, India) and Mohammad Farooq Mir, PhD (Zoology, Associate Professor of Zoology, Principal of Govt. Degree College Bomai, Kashmir, J&K, India)*

In series: *Environmental Remediation Technologies, Regulations and Safety*

Publication Date: 11/24/2022

118 pp.

Softcover: 979-8-88697-391-4. $82.00

e-book: 979-8-88697-452-2. $82.00

The last three decades have witnessed serious deterioration of major Kashmir lakes (Wular, Dal, Nigeen, Anchar and Manasbal) due to the pollution of their water and large-scale encroachment into their surroundings. Quite an extensive amount of research work has been carried out on the growing state of deterioration of the above named five indispensable lakes of the Kashmir valley. This book gives a glimpse of the overview of these lakes along with a discussion of their water quality, diversity of flora and fauna, deterioration, state of encroachment, and the vision for their protection and restoration. This book will raise awareness about the plight of the important Kashmir lakes and the measures for their protection and restoration. Interestingly, this book compiles the most recent information on the water quality, biodiversity and the state of
deterioration of the five major indispensable lakes of Kashmir valley. The discussion of the scientific vision for the protection and restoration of Kashmir lakes will greatly help this book to become a standout choice for readers.

Wildfires: Assistance Programs and Management
Joel M. Nelson
In series: Natural Disaster Research, Prediction and Mitigation
Publication Date: 12/22/2022
275 pp.
Hardcover: 979-8-88697-445-4. $150.00
e-book: 979-8-88697-495-9. $150.00

Wildfires in the western United States are burning hotter, more frequently, and causing an increasing and unprecedented amount of damage and destruction to the natural and built environment. Chapter 1 looks at existing federal assistance programs—including several at the Federal Emergency Management Agency (FEMA)—for state, local, tribal, and territorial governments and individual survivors impacted by wildfire. Chapter 2 examines wildfire management in the midst of the COVID–19 pandemic.

Global Warming and Climate Change
Urban Heat Islands Reexamined
Satyaprakash, PhD (Professor, Department of Civil Engineering, Sharda University, Greater Noida, UP, India) and Anne W. M. Ng, PhD (Senior Lecturer, Charles Darwin University, Darwin, Australia)
In series: Climate Change and its Causes, Effects and Prediction
Publication Date: 09/29/2022
223 pp.
Hardcover: 979-8-88697-215-3. $160.00
e-book: 979-8-88697-287-0. $160.00

“Urban heat island” refers to the phenomenon of increased temperatures in urban areas due to dense high-rise buildings and entrapped heat. The effects of urban heat islands are compounded by climate change, which drives temperatures up even further. This book will provide readers with an overview of the current understanding of urban heat islands and will give them an understanding of ways to mitigate the effects of urban heat islands.

Natural Disasters
The Challenges of Disaster Planning, Management, and Resilience
Michail Chalaris (Assistant Professor, Department of Chemistry Research, International Hellenic University, School of Science, Director on Risk, Hazards, Crises, and Safety, Hephaestus Advanced Research Laboratory, Rtd Major General (HFCs), East Macedonia and Thrace, Greece)
In series: Natural Disaster Research, Prediction and Mitigation
Expected Publication Date: 02/2/2023
605 pp.
Hardcover: 979-8-88697-229-0. $275.00
e-book: 979-8-88697-533-8. $275.00

Major disasters, both natural and man-made, have led to an increased need to improve the effectiveness of existing prevention, mitigation, and response capabilities. The types of disasters that many countries face depend to some extent on their geography and climate, and as a result, they have built different response strategies. There is evidence of a growing vulnerability to disasters as the worsening conditions of climate change may increase the destruction of human life, ecosystems, and infrastructures. This book aims to explore and analyze different approaches and practices in dealing
with both traditional and novel forms of resilience and crisis and suggest a way forward for science based on correct decision-making at different levels.

**Tsunamis: Detection Technologies, Response Efforts and Harmful Effects**

*Wei Chek Moon, PhD (Lecturer, Department of Civil Engineering, Faculty of Engineering & Built Environment, MAHSA University, Malaysia) and Tze Liang Lau, PhD (School of Civil Engineering, Universiti Sains Malaysia, Penang, Malaysia)*

In series: *Natural Disaster Research, Prediction and Mitigation*

Publication Date: 12/29/2022

86 pp.

Softcover: 979-8-88697-483-6. $82.00

e-book: 979-8-88697-514-7. $82.00

Tsunamis, the most deadly natural disaster, have been part of the world’s history for thousands of years. Much of the world witnessed historical tsunamis that devastated the coast with great losses of life and property. Over the latter decade of the 20th century, the development of tsunami sciences has seen rapid growth as an interdisciplinary field that brings together scientists, engineers and researchers from all over the world. As a sequel to the first two editions - Tsunamis: Economic Impact, Disaster Management and Future Challenges in 2013 and Tsunamis: Detection, Risk Assessment and Crisis Management in 2018, the current edition of Tsunamis: Detection Technologies, Response Efforts and Harmful Effects serves as a collection of tsunami research that showcases on how the evolving technologies and innovative efforts in foreseeing the harmful effects of tsunamis. This current edition consists of five chapters authored by tsunami experts in their respective fields, from Malaysia, Indonesia, India, and Germany. These chapters are written with hopes of contributing towards continued progress in the future.

**Wildfire Crisis: Management, Strategies, and Impacts**

*William W. Reed*

In series: *Natural Disaster Research, Prediction and Mitigation*

Publication Date: 12/01/2022

223 pp.

Hardcover: 979-8-88697-444-7. $150.00

e-book: 979-8-88697-496-6. $150.00

Wildfires have been growing in size, duration, and destructivity over the past 20 years. Growing wildfire risk is due to accumulating fuels, a warming climate, and expanding development in the wildland-urban interface. The risk has reached crisis proportions in the West, calling for decisive action to protect people and communities and improve forest health and resiliency. In addition, devastating wildfires and related electricity blackouts have drawn national attention to the challenge of maintaining grid resiliency in the face of extreme conditions.

**Wildfires: Response, Recovery and Mitigation**

*Edward R. Robbins*

In series: *Natural Disaster Research, Prediction and Mitigation*

Publication Date: 12/15/2022

322 pp.

Hardcover: 979-8-88697-446-1. $230.00

e-book: 979-8-88697-494-2. $230.00

The United States is experiencing an ongoing wildfire crisis. Fires, including some of the largest wildfires in the history of the United States, have engulfed millions of acres of wildlands over the past decade causing extensive property damage and resulting in loss of life. Wildfires are expected to continue growing in size and destructive potential in the foreseeable future. FEMA is required to respond to a rapidly increasing number of wildfires that are affecting communities, and government auditors have found deficiencies in FEMA’s responses. This book reviews wildland fire prevention, mitigation, suppression, management, and rehabilitation policies.
This volume includes eight chapters that provide updates in the field of environmental research. Chapter One deals with the subject of applied bioethics, providing historical and contemporary environmental examples. Chapter Two presents different field and experimental studies based on fluorescence spectroscopy addressing the spatio-temporal dynamics of dissolved organic matter in headwaters of North Patagonia. Chapter Three reviews the recent advancements in the field of small RNA delivery in plants and discusses the advantages, limitations and successes of various delivery methods along with their applications in crop improvement. Chapter Four describes the factors that pose threats to floodplain fisheries in Bangladesh and strategies to overcome these threats. Chapter Five explores the preparation and properties of natural fiber-reinforced castor oil-derived polyurethane foams and their applications. Chapter Six discusses the role and long-lasting effect of seasonal flooding in phytoplankton ecology of floodplain lakes along the Middle Daugava River at Daugavpils, South-East Latvia. Chapter Seven evaluates the surface water quality of Küçük Menderes River Basin, located in Turkey, using factor analysis and water quality index methods. Finally, Chapter Eight investigates the effect of nanomagnetite, hydroxyapatite, and nanocomposite particles on wheat.

This book includes nine chapters that detail recent advancements in environmental research. Chapter One studies the deposition of chemical elements in the territory of Kosovo using the technique of mosses as biomonitors. Chapter Two investigates how exposure time affects the moss uptake of polycyclic aromatic hydrocarbons (PAHs), compares different techniques for the determination of PAHs in moss samples, and provides an overview of advantages of moss over other biomonitors. Chapter Three provides an overview of rare earth element distribution in moss and soil samples collected from 67 sites in North Macedonia. Chapter Four explains the occurrence and remediation of acid mine drainage. Chapter Five includes a literature review concerning public-private partnerships in connection with environmental sustainability. Chapter Six quantifies pollutant emissions during commutes in Querétaro, Mexico. Chapter Seven investigates spatiotemporal drought monitoring using soil water in arid rangelands. Chapter Eight discusses the main factors controlling acid mine drainage generation and the various technologies applied for removal of toxic metals from acidic drainages. Finally, Chapter Nine proposes that hydroponics and environmental control using plant factories are effective methods for enhancing the functionality and utilization of prickly pear.

This volume includes eight chapters that present recent advances in environmental research. Chapter One gives a detailed explanation of humic substances. Chapter Two explores the impact of built environment variables on air quality and transport choices. Chapter Three focuses on genetic engineering improvement for bioremediation and the feasibility of low-cost technology for algal biomass utilization. Chapter Four reviews the biodegradation of pollutants and removal of metals in constructed wetlands and microbial fuel cells. Chapter Five concerns the recycling of lithium-ion batteries from electric
vehicles. Chapter Six deals with the impact of chlorides on drinking water safety. Chapter Seven explores the food security context under the constraints of climate change on rural farmers in Hadejia River Basin, northwestern Nigeria. Finally, Chapter Eight provides a review on the application of Dimethylether for enhanced oil recovery.

**Advances in Environmental Research. Volume 92**

*Justin A. Daniels*

In series: Advances in Environmental Research

Publication Date: 11/10/2022

208 pp.

Hardcover: 979-8-88697-362-4. $250.00
e-book: 979-8-88697-400-3. $250.00

This volume presents eight chapters reviewing advances in environmental research. The first chapter provides an overview of effects of microplastic pollution in the environment. Chapter two analyzes the population dynamics and community structure of aquatic organisms in freshwater ecosystems, looking at multiple important variables. The third chapter discusses the sources, properties, and ecological applications of calcium sulfates. Chapter four reviews the bounce back of nature during the COVID-19 pandemic. The fifth chapter looks into issues of soil water repellency and moisture dynamics in eucalyptus tree populations. Chapter six examines rheological properties and antioxidant activity of polysaccharides extracted from five cystoseira algae. Chapter seven reviews research on the synergistic effects of calcium sulfate and silica on arsenic mobility and accumulation by cultivated plants. The final chapter discusses a study of novel fibrousion-exchange sorbents for pretreatment processes in the nanofiltration for water treatment.

**Advances in Environmental Research. Volume 93**

*Justin A. Daniels*

In series: Advances in Environmental Research

Publication Date: 12/15/2022

239 pp.

Hardcover: 979-8-88697-417-1. $250.00
e-book: 979-8-88697-474-4. $250.00

This book is a selection of nine chapters focused on advances in environmental research. Chapter One is an update on a study of plant responses to environmental stresses. Chapter Two is a review on the management of a hunting population using wild reindeer in the Taymir. Chapter Three examines ecosystems which have been impacted by antibiotics and pesticides, specifically exploring the emergence of resistances and their implication for human health. Chapter Four reviews biogas production from brewer's spent grain. Chapter Five examines the effects of turbulent environments on laser beams. Chapter Six provides a snapshot of the biodiversity of macroalgae in the Red Sea. Chapter Seven discusses a restructuring of regional approaches to manage the biodiversity of the Red Sea and Gulf of Aden. Chapter Eight is a review on pollution prevention and sustainability. Chapter Nine provides a viewpoint on the evolution of environmental stresses by examining the impact of environmental stress on photodetectors and human eyes.

**Advances in Environmental Research. Volume 94**

*Justin A. Daniels*

In series: Advances in Environmental Research

Expected Publication Date: 03/20/2023

263 pp.

Hardcover: 979-8-88697-586-4. $250.00
e-book: 979-8-88697-665-6. $250.00

This book contains eight selected chapters covering advances in environmental research. Chapter One examines recent advances in soil remediation using nano zero-valent iron (nZVI) activated peroxydisulfate (PDS) and peroxymonosulfate (PMS). Chapter Two reviews the current knowledge and future trends of bioplastics. Chapter Three is a comprehensive review of the various aspects of inhalable ambient particulate matter. Chapter Four is an overview of bioethanol production from agricultural wastes. Chapter Five examines the environmental occurrence and toxicological effects of benzo(a)pyrene. Chapter Six reviews how the impact of carbon dioxide emissions worsen perceptions of climate-friendly material selection, with a focus on the Ghanaian perspective. Chapter Seven is a conceptual framework for a multi-criteria optimization model for office building development through climate-friendly material selection. Chapter Eight is a kinetic study of dry flue gas desulfurization by various sorbents using a random pore model.
Sustainable and Healthy Building Environments
Ro<1.25>berto Alonso González Lezcano, PhD (Professor, Department of Architecture and Design, Universidad CEU San Pablo, Madrid, Spain)
In series: Green Research, Developments, and Programs
Publication Date: 01/26/2023
341 pp.
Hardcover: 979-8-88697-401-0. $230.00
e-book: 979-8-88697-497-3. $230.00
This book addresses a topic of great relevance today, considering that in developed countries, most of the time is spent indoors; therefore, indoor residential environments have a direct influence on human health. Furthermore, in developing countries, significant levels of indoor pollution make housing unsafe, which has an impact on the health of its inhabitants; thus, housing is a key factor in the health of people around the world. In this book we look at a range of innovative research and evidence-based policy ideas that demonstrate the importance of housing research and policy for health and well-being.

Wind Turbines: Technology, Applications and Efficiency
David Borge-Diez, PhD (professor, Department of Electrical, Systems and Automation Engineering, University of León, Spain) and Daniel Orlando Icaza (Professor, Catholic University of Cuenca, Ecuador. Center for research, innovation and technology transfer CIITT. Lighting technology research laboratory CIITT, GIRVyp Group, Ecuador)
In series: Environmental Remediation Technologies, Regulations and Safety
Publication Date: 09/07/2022
237 pp.
Hardcover: 978-1-68507-974-1. $195.00
e-book: 979-8-88697-159-0. $195.00
This book performs a multidisciplinary approach of wind energy and analyzes existing wind technologies to propose novel modeling techniques and control systems and explore novel applications. The authors discuss whether wind energy is a valid alternative from the point of view of feasibility to be integrated in buildings or desalination plants, among others. The results support that wind energy is a profitable alternative that can also be used in several different applications different from large-scale plants. Finally, in this book, a chapter is included to evaluate the feasibility and economic, social and environmental implications of large-scale wind plants in locations where no previous development exists and where specific complex characteristics must be considered and a case study for the largest wind plant in Ecuador is presented. As a result, readers can access a detailed approach to wind energy from a technical point of view and consider novel applications and related implications of this renewable energy.

Toxic and Hazardous Substances
Pesticide Residues: Chemistry, Toxicology and Environmental Impact
David J. Goode
In series: Environmental Science, Engineering and Technology
Expected Publication Date: 03/20/2023
Softcover: 979-8-88697-557-4. $95.00
e-book: 979-8-88697-594-9. $95.00
This book contains three chapters focusing on the chemistry, toxicology, and environmental impact of pesticide residues. Chapter One reviews recent advances in the formulation of pesticides and their relationship to their efficacy and toxicity. Chapter Two is an overview of soil phytoremediation technologies. Chapter Three examines corbicular pollen as a potential source of information in agroecosystems.
Phthalates: Environmental and Health Effects
Müfide Aydoğan Ahbab, PhD (Associate Professor, Hamidiye Vocational School of Health Services, University of Health Sciences, İstanbul, Turkey) and Nurhayat Barlas, PhD (Professor, Science Faculty, Hacettepe University, Ankara, Turkey)
In series: Environmental Remediation Technologies, Regulations and Safety
Publication Date: 07/27/2022
289 pp.
Hardcover: 978-1-68507-970-3. $230.00
e-book: 978-8-88697-038-8. $230.00
Phthalates are esters of phthalic acid that are groups of chemicals used mainly in the production of plastics. Phthalates are also called plasticizers and they make solid plastics flexible and soft. Besides plastics, phthalates are also used as raw materials and/or auxiliary chemicals in many industrial activities. Because of their widespread use, phthalates are very common in nature and are classified as non-persistent pollutants. Their harmful effects have started to be shown by studies conducted in the last 20-30 years which revealed that phthalates have endocrine disrupting effects, among other health consequences. This book deals with the various health and environmental effects of phthalates.

Waste

Waste Management

Recycling of Discarded Carpets for Structural Polymer Composites
Dr. Rajesh Kumar Verma, Dr. Jogendra Kumar and Mr. Shivi Kesarwani
In series: Materials Science and Technologies
Publication Date: 02/09/2023
128 pp.
Softcover: 978-8-88697-538-3. $82.00
e-book: 978-8-88697-588-8. $82.00
In the 21st century, waste has become the primary concern for manufacturing processes and industries. Waste management is critical for controlling many types of waste, including solid, liquid, and gaseous forms. The manufacturing of carpets and their uses is a substantial source of waste. The generation of waste leads to an imbalance of the environmental conditions and has hazardous effects on the ecology. The principle of “waste to wealth” could be helpful for manufacturing industries and human beings. This book is comprised of four parts. Part One begins with an overview of the subject, focusing on general issues and technologies relevant to carpet waste. Part Two demonstrates the potential of methodology for developing materials made from discarded carpet polymer composites. Part Three discusses the use of novel nanomaterials to recycle discarded materials. Finally, the last section of the book discusses possible uses for recycled carpet composite structures that may act as a noise barrier in the sound insulating wall tiles, and in many more applications like floor tiles, road barriers, tooling, and fire-retardant instrumentation.

What is Biodegradation and Why it Matters
Robert T. Howard
In series: Waste and Waste Management
Publication Date: 06/24/2022
347 pp.
Hardcover: 978-1-68507-933-8. $230.00
e-book: 978-1-68507-959-8. $230.00
Biodegradation refers to the breakdown of organic matter by microorganisms, such as bacteria and fungi, and constitutes an important part of waste management, environmental protection, and more. This book includes four chapters that provide different perspectives on the importance of biodegradation using new research. Chapter One presents a comprehensive discussion of biodegradable implants, emphasizing the important features of biodegradable Mg-based and Fe-based systems and their recent developments. Chapter Two explores case studies on the reutilization of fishery waste to
gain a better understanding of biodegradation in the production of biofertilizer and bioactive compounds. Chapter Three reviews information about studies performed in order to develop bioremediation strategies using fungi or microbial consortia to diminish chemical herbicides residues in soil. Lastly, Chapter Four describes green synthesized and biologically synthesized nanoparticles and their role in remediation and gives insight into a recently emerged, novel method that makes use of nano-bio composite in dye remediation.

**LIFE SCIENCES**

**Biology**

**Advances in Biology. Volume 1**

*Charles D. Grant*

In series: *Advances in Biology*

Publication Date: 09/21/2022

218 pp.

Hardcover: 979-8-88697-201-6. $250.00
e-book: 979-8-88697-218-4. $250.00

This volume includes seven chapters that describe recent advances in biology. Chapter One reviews and discusses the enzymes and methods for bioproduction of the rare sugars of D-allulose, D-allose, allitol, L-xylulose, L-xylose, and L-ribose. Chapter Two analyzes the properties of mKATP channels and functional and bioenergetic effects of ATP-sensitive K+ transport. Chapter Three describes interactions of bilirubin with several proteins and the effects of these interactions on the protein’s structure and function. Chapter Four provides an overview of Panton Valentine Leukocidin-producing Staphylococcus Aureus pneumonia and its therapeutic strategy. Chapter Five discusses the reunification of chemical and biochemical thermodynamics. Chapter Six includes a study of the in-vitro activity of eflozoane/tazobactam against pseudomonas aeruginosa and enterobacterales isolates from Taiwan. Finally, Chapter Seven examines elevated levels of caspase-3 in cerebrospinal fluid of newborns with perinatal asphyxia as a biomarker of failing mitochondrial bioenergetics.

**Advances in Biology. Volume 2**

*Charles D. Grant*

In series: *Advances in Biology*

Publication Date: 11/24/2022

281 pp.

Hardcover: 979-8-88697-422-5. $250.00
e-book: 979-8-88697-435-5. $250.00

This volume contains eight selected chapters on recent advances in the science of biology. Chapter One explores a combined DFT and electrostatics approach to coupling biological electron and proton transfer reactions in Cytochrome c oxidase. Chapter Two reviews a new process for the detection of amyloid fibrils in the brain using unsymmetric cationic cyanine dyes. Chapter Three discusses the membrane effects of amyloid fibrils in the body via fluorescence study and computer modeling. Chapter Four updates the model of the curvature of graphitic materials through an analysis of molecular modeling studies on the spiral structure of graphene and eumelanin models. Chapter Five reviews the generation of antigen specific CD8+ T-cells by B-cells and Dendritic cells. Chapter Six provides a categorization of prophage genes in Bacillus subtilis 168 and assesses their relative impotence through RNA-seq gene expression analysis. Chapter Seven reviews the optimization of naturally occurring compounds through the click chemistry approach, giving researchers a new powerful synthetic toolbox. Chapter Eight is an overview of studying asafoetida phytoconstituents as biological inhibitors.
Advances in Medicine and Biology. Volume 197
Leon V. Berhardt
In series: Advances in Medicine and Biology
Publication Date: 09/07/2022
229 pp.
Hardcover: 979-8-88697-151-4. $250.00
e-book: 979-8-88697-173-6. $250.00
This volume includes nine chapters that detail recent advancements in medicine and biology. Chapter One describes how to sequence the genomes of medicinal plants using the genetic engineering toolkit developed during the sequencing of human genome. Chapter Two gives brief details about the biochemical and therapeutic importance and the developed methods for the determination of riboflavin in bulk and pharmaceutical preparations. Chapter Three encompasses the current state-of-art successful computational drug design strategies that include curated databases, virtual high-throughput screening, pharmacophore modelling and biomolecular interaction network analysis tools. Chapter Four focuses on recent advancements in high temperature effects on plants, from heat perception to its manifestations in growth, development and defense, with a special emphasis on jasmonates, which play an important role in responding to developmental and environmental cues. Chapter Five describes the symptoms, diagnosis, and treatment of granulomatosis with polyangiitis. Chapter Six examines progressive multifocal leukencephalopathy reactivation in Anti-CD 20 antibodies. Chapter Seven explores the therapeutic potential of eugenol, an allyl-substituted guaiacolphenol. Chapter Eight summarizes the development of genome manipulation techniques for next-generation lactic acid bacteria. Finally, Chapter Nine discusses methods for overcoming molecular processes that cause violations of the regularity of fibrin structure and their functional complications.

HMGB1: Functions, Inhibitors and Clinical Significance
Eylem Taskin, PhD (Professor, Physiology, Adiyaman University, Adiyaman, Turkey), Celal Guven, PhD (Associate Professor, Biophysics, Adiyaman University, Adiyaman, Turkey) and Salih Tunc Kaya, PhD (Assistant Dr., Biology, Duzce University, Duzce, Turkey)
In series: Life Sciences Research and Development
Publication Date: 12/08/2022
280 pp.
Hardcover: $160.00
e-book: 979-8-88697-466-9. $979-8-88697-408-9. $160.00
Damage-associated molecular patterns (DAMPs), a term also known as alarmins coined by Walter G. Land, Seong, and Matzinger, are endogenous danger molecules that are released from damaged or dying cells and activate the innate immune system by interacting with pattern recognition receptors (PRRs). One of the most well-known DAMPs is high mobility group box-1 (HMGB1), the name being such due to its very fast movement in gel electrophoresis. Importantly, HMGB1 has been shown to contribute to the pathogenesis of various diseases including myocardial ischemia/reperfusion injury, epilepsy, diabetes, multiple sclerosis, cancer, as well as hepatic steatosis, and fatty liver disease. There are three sections in the book. The first section is named HMGB1 and Cancer, including two chapters. One of the chapters in the first section is focused on HMGB1 in cancer therapy and managing COVID-19 infection, as well as multiple sclerosis. The second section in the first section is the crosstalk between cancer and myocardial ischemia/reperfusion injury (MIR) through HMGB1 via ferroptotic cell death. The second section is HMGB1 and metabolic interactions, consisting of two chapters. The first chapter in the second section is about HMGB1 and inflammation in adipose tissue, resulting in insulin resistance and type 2 diabetes. The second chapter in the second section sums up recent data related to HMGB1 and liver injury, e.g., drug-induced liver injury, alcoholic liver disease, non-alcoholic fatty liver disease, viral hepatitis, sepsis, and acute chronic liver failure, hepatocellular death through oxidative stress, inflammatory signaling, and autophagy in hepatocytes. The third section is about HMGB1 and neurodegenerative diseases. The section contains four chapters. The first chapter in the section evaluates HMGB1 and its antagonist in brain disorders, including epilepsy, headache, neuroimmunological disorders, neurodegenerative disorders, and stroke. The second chapter in the third section is about the role of HMGB1 on post-brain injury, including potential mechanisms and therapeutic opportunities as well. The third chapter in the third section evaluates the interaction of HMGB1 and Multiple sclerosis via TLR4/NF-κB signaling pathway, leading to the release of proinflammatory cytokines causing an inflammatory response. The last chapter in the third chapter aims to explain the effects of HMGB1 on Epilepsy.
Structure and Function of Cytochromes
Elaine J. Mathis
In series: Biochemistry and Molecular Biology in the Post Genomic Era
Publication Date: 10/13/2022
281 pp.
Hardcover: 978-8-88697-102-6. $230.00
E-book: 978-8-88697-122-4. $230.00
This book contains five chapters exploring the structure and function of cytochromes, which are redox-active proteins that contain a heme with a central Fe atom at its core as a cofactor. Chapter One explores the functional relevance of cytochrome c-oxidase subunit IV expression for cellular energy sensing, ATP production, and oxidative stress levels and its role in neurodegeneration. Chapter Two deals with the factors determining the orientation of ligated histadines in hemoproteins, cytochromes, and model systems. Chapters Three and Four include comparative studies of native and synthetic cytochrome b. Lastly, Chapter Five discusses some examples of synthetic and native cytochromes used as central components of biosensors in bioelectronic/biocatalytic applications.

Bacteriology

Cyanobacteria: Life History, Ecology and Impact on Humans
Rajeshwar P. Sinha, Ph.D., FSAB (Professor, Centre of Advanced Study in Botany, Banaras Hindu University, Varanasi, India)
In series: Bacteriology Research Developments
Publication Date: 10/20/2022
289 pp.
Hardcover: 978-8-88697-169-9. $230.00
E-book: 978-8-88697-206-1. $230.00
Cyanobacteria are a rich source of several novel metabolites having the potential for drug development. They are a promising bioresource for application in sustainable agriculture, medicine, and green nanotechnology. Certain natural compounds of cyanobacteria such as mycosporine-like amino acids (MAAs) and scytonemin, having UV-absorbing/screening and antioxidative properties, could be biotechnologically exploited by the pharmaceutical industries for the development of natural sunscreens as well as antiaging medicines. This book encompasses the most recent knowledge and modern trends in the field of cyanobacterial research and their impact on humans. It provides a guide for beginners as well as advanced researchers in the field of cyanobacterial study.

Biotechnology

Cyanobacteria and Their Importance
Rajeshwar P. Sinha, PhD (Director and CEO, InnoResTech Foundation, Coordinator (Applied Microbiology), Former Coordinator (Industrial Microbiology), DAAD Fellowship Awardee, Centre of Advanced Study in Botany, Banaras Hindu University, Varanasi, India)
In series: Life Sciences Research and Development
Publication Date: 08/10/2022
399 pp.
Hardcover: 978-1-68507-934-5. $230.00
E-book: 978-8-88697-071-5. $230.00
Cyanobacteria form a prominent component of microbial populations in almost all ecosystems, especially in rice fields where they contribute significantly to fertility as a natural biofertilizer. Also, cyanobacteria are a rich source of several novel metabolites having biotechnological and industrial significance. This book discusses the most recent knowledge and modern trends in the field of cyanobacterial research and its importance in the scientific and industrial world.
Botany

Coriandrum sativum: Origin, Uses and Nutrition
Mamta Pujari, PhD (Assistant Professor, Department of Botany, Lovely Professional University, Phagwara, Punjab, India), Bharat Kapoor, PhD (Assistant Professor, Department of Hotel management and Tourism, Guru Nanak Dev University, Amritsar, Punjab, India), Neeta Pande, PhD (Professor, Department of Botany, Govt. College Kumaon University Nainital, Uttarakhand, India) and Anju Joshi, PhD (Professor, Department of Botany, Govt. Degree College, Sitarganj Udham Singh Nagar, Uttarakhand, India)

In series: Botanical Research and Practices
Publication Date: 06/02/2022
146 pp.
Softcover: 978-1-68507-842-3. $95.00
e-book: 978-1-68507-955-0. $95.00

This book describes the origin, cultivation, botanical characteristics, phytochemical composition, and biological properties of Coriandrum sativum, also known as coriander. The book also discusses management strategies to prevent various diseases by using this herb. Chapter One emphasizes coriander's nutritional and functional properties. Chapter Two covers the traditional medicinal properties of coriander and argues for its potential for improving quality of life, especially related to aging and lifestyle-associated illnesses. Chapter Three describes the pharmacological activities of all parts of the plant and its use as a functional food and nutraceutical. Chapter Four summarizes the cultivation and processing of coriander and provides further details on its medicinal properties. Chapter Five discusses coriander's role in the food industry as a flavoring agent and preservative, among other applications. Chapter Six assesses coriander's effectiveness as a medicinal agent. Lastly, Chapter Seven gives an overview of the origin, taxonomic status, distribution, botanical description, and cultivation of coriander, as well as the diseases that affect it.

Ferns: Growth, Diversity and Ecological Importance
Dr. Shobhit Kumar Srivastava, PhD and Mr. Gyan Prakash Srivastava

In series: Life Sciences Research and Development
Expected Publication Date: 03/15/2023
Hardcover: 979-8-88697-554-3. $160.00
e-book: 979-8-88697-582-6. $160.00

The study of organism evolution and diversity has long drawn the attention of scientists, particularly those working in the various branches of botany. As a result, there are numerous textbooks on the topic. Pteridophytes (Ferns) take up different percentages of the extant texts, and some textbooks even focus on only one subgroup, like the ferns. Currently, no book that comprehensively addresses every crucial aspect related to the development, diversity, and ecological significance of pteridophytes to the best of our knowledge. The authors are confident that the readers of this book will be fascinated by pteridophytes and the range of products they provides, including food, fibers, and ornaments etc. The chapters on the evolution of different plant parts will give the readers new insights into how to investigate more relationships that link the evolution's lingering. All aspects of biodiversity in pteridophytes are covered in the current book, including spore morphology, climate and ecological relationships, ethnobotanical significance, and nematode activity. The remaining two chapters focused on the discourse of these magnificent plants and the cultural relevance of pteridophytes in diverse agro-climatic zones worldwide.
Indian Medicinal Plants of Ladakh Himalaya Used in Sowa Rigpa
Mayaram Uniyal (Former Director, CCRAS, Ministry of AYUSH, Government of India, India), Deepak Kumar Semwal – Assistant Professor, Uttarakhand Ayurved University, Harrawala, Dehradun, India, Ruchi Badoni Semwal (Assistant Professor, Pt. L.M.S. Govt. PG College, Rishikesh, Uttarakhand, India) and Ankit Kumar (Senior Research Fellow, Uttarakhand Ayurved University, Harrawala, Dehradun, India)

In series: Herbs and Herbalism
Publication Date: 11/10/2022
148 pp.
Softcover: 979-8-88697-210-8. $95.00
e-book: 979-8-88697-427-0. $95.00

This book is based on the medicinal plants of Ladakh used in the traditional system of medicine in the Northern part of India, which consists of the Leh and Kargil districts. The medicinal plants described in this book are based on the survey work conducted with the financial support of the Ministry of AYUSH Government of India. Interestingly, there are several species described in this book that are for the first time identified by the author. Although there are many floras used as medicinal plants including some regional floras of India including Indian Medicinal Plants, the flora of indigenous plants of India and some Medicinal plants of Jammu and Kashmir, the present book mainly focuses on the medicinal plants of the Ladakh region used in their traditional medicinal system called Sowa Rigpa or Amchi.

Cell Biology

Endothelial Progenitor Cells in Health and Disease
Amankeldi A. Salybekov, MD, PhD (Senior Clinical Researcher, PI at Clinical Research Center, Shonan Kamakura General Hospital, Kanagawa, Japan), Shuzo Kobayashi, MD, PhD (Kidney Diseases and Transplant Center, Shonan Kamakura General Hospital, Kamakura, Japan) and Takayuki Asahara, MD, PhD (Shonan Research Institute of Innovative Medicine, Fujisawa, Japan)

In series: Cell Biology Research Progress
Publication Date: 07/08/2022
191 pp.
Hardcover: 978-1-68507-794-5. $160.00
e-book: 978-1-68507-948-2. $160.00

We are delighted to offer this textbook to the scientific community, entitled Endothelial Progenitor Cells in Health and Disease, which covers a timely topic in the rapidly evolving discipline of vascular biology. Written primarily for a life science audience and clinicians, the fundamentals of EPCs biology and the latest characterization and definition in health and diseases are introduced, followed by explanations of the most cutting-edge cell therapy methods to cure ischemic diseases. In Section One, endothelial cell progenitor isolation methods and biological characterization were reported. The discovery of this novel endothelial progenitor cells (EPC) concept has overturned the previous dogma which suggested that vasculogenesis could only occur during embryogenesis. In fact, both vasculogenesis and angiogenesis may potentially have a synergistic role in postnatal revascularization. Also, this chapter summarized recent advances in EPC biology such as biological function, origin, definition, and classification. Each EPC culture and isolation method is clearly defined to prevent confusion in EPC biology. Section Two focuses on EPC biological function alteration in cardiovascular diseases (CVD). Several large clinical trials have reported that the number and biological function are strongly associated with major adverse cardiovascular events. The diagnostic and prognostic potential of EPC is crucial in terms of CVD. In Section Three, biological dysfunction mechanisms of EPC and their scarcity in diabetic patients’ peripheral blood were clearly described. Preclinical studies have shown that EPC-based therapy is feasible, safe, and efficacious in multiple disease states. Subsequently, this has led to several clinical trials demonstrating the feasibility and safety profile of EPC therapy against cardiovascular ischemic diseases. In Section Four, regenerative medicine pioneers discussed EPCs translation to the clinic and cell transplantation challenges along with their solutions. Personalized stem cell-based therapy approaches employing several clinical biomarkers, disease-related genetic-trait evaluation methods, and advanced analyses with state-of-the-art computational methods such as machine learning-based prediction can increase cell therapies’ efficacy and decrease treatment costs. The last chapter in the book describes a therapeutic application of EPC-derived extracellular vesicles to cure CVD.
Transcriptomics and their Importance
Sarah Naiyer, PhD (Research Scientist, Department of Microbiology and Immunology, University of Illinois at Chicago, USA) and Khalid Hussain Bhat, PhD (Assistant professor, Division of Basic Sciences and Humanities, FOA, Wadura, Sopore, SKUAST-Kashmir, India)

In series: Cell Biology Research Progress
Publication Date: 10/06/2022
229 pp.
Hardcover: 979-8-88697-044-9. $195.00
e-book: 979-8-88697-203-0. $195.00

Transcriptomics refers to the study of the transcriptome, which is the complete set of RNA transcripts produced by the genome of a specific cell. This book provides an overview of the information that the transcriptome provides and how developments in transcriptomics has transformed our understanding of cell biology. This book is comprised of three parts. Part I serves as an introduction to describe the development of transcriptomics as a technique and the way by which it has enhanced our knowledge and provided a better understanding of the basic biology of cellular function. Part II of the book is written to understand the milestones and contributions of transcriptomics in understanding the dynamics of cancer biology. Part III provides an insight on how transcriptomics is helping us to understand microbes and host-pathogen interaction including bioremediation.

Ecology

Dynamics and Interrelations between Nature, Science, and Society
Kaushalendra Kumar Jha, PhD (Former PCCF and Professor, Technical Forestry, Indian Institute of Forest Management, Bhopal, India) and Michael Campbell, PhD (Lecturer, Simon Fraser University, Canada)

In series: Life Sciences Research and Development
Publication Date: 09/21/2022
481 pp.
Hardcover: 979-8-88697-053-1. $230.00
e-book: 979-8-88697-130-9. $230.00

This book covers cutting edge topics on the interactions between scientific advancements and societal developments, and the applications of these developments to nature and environmental measurements and change. In this endeavor, there are four main clusters, namely technological developments such as geomatics applications to the measurement and analysis of socio-environmental change, ecological modifications and environmental damage, comparative ecologies, and management methods. These issues have emerged as the key topical clusters during the 21st century and may be researched effectively only by using wide-ranging examples. India stands as one of the best examples for case studies, due to its extremely variable landcover, dense human population and topflight cohorts of researchers on environmental management. The current book acknowledges the need for comparative studies, hence international comparisons are also included, using integrated ecological studies covering animal behavior, landcover, habitat and plant ecological change and human/animal relations, with the international case studies along these lines. Crucially, from a technological perspective, developments include more accurate positioning and tracking systems, detailed ecological studies, and analyses of the research results to support more sophisticated research tools. In the current book, each chapter is written by leading, international scholars, each taking a vital topic for current research.

Terminal Philosophy Syndrome - Ecology and the Imponderable
Michael Charles Tobias, PhD (President, Dancing Star Foundation, Tesuque, New Mexico, USA) and Jane Gray Morrison (Senior Vice President, Dancing Star Foundation, Tesuque, New Mexico, USA)

In series: Human Evolution, Biological and Cultural Domains
Publication Date: 12/29/2022
290 pp.
Hardcover: 979-8-88697-415-7. $125.00
e-book: 979-8-88697-478-2. $125.00

This treatise is focused on biology and the imponderable; ecosystems lost and found. The problem of human consciousness in the Anthropocene, which is a very different crisis for
the planet than ever posed before by our thinking, and the reactive thoughts and feelings of all Others (a word we use to
guide one’s image and interior sense of every individual of every other taxonomic rank on earth). We cannot offer
something otherwise, that would connotate a validation of philosophical speculation. To do so is to live in a falsity, where
the authentic, integral and protracted Consciousness that aspires to a facet of biology (and for some, physics) imports every
buttress that can attempt to stave off, or at least delay reality, involving itself in everybody’s business, believing fiercely
that its very Being matters. When -though who can say – by all evidence it does so only in negative numbers and
exponents. In square roots whose expressions are largely disastrous, save for the moments of kindness, the unstinting
gestures, first responders, museums, those who have sworn to a Hippocratic Oath in whatever honest and virtuous form, all
those cherished byproducts of this unlikely species. Recognition that our species’ capacity to venerate nature in all her
quirks and ellipses, stochastic incalculables and steadfast patterns, her graces and unimagined diversity, is our only chance
of at least partial survival into an unknown future. Not that it matters in the least, whether we survive as a species, that is.
Although, given the currents of our collective behavior – not to be entirely foregone in our conclusions – the one fact that
appears to stand out in biological history is that the quicker we are gone, the better it will be. That is not a mean-spirited
approach to a text, but a necessarily sobering one.

Genetics and Genomics

Genetic Instability and Some Unusual Radiobiological Effects
Ekaterina S. Evstratova (Head of Laboratory, National Medical Research Radiological Center of the Ministry of Health of the Russian Federation, Kaluga Region, Russia), Vladislav G. Petin (Head of Laboratory, A. Tsyb Medical Radiological Research Center, Kaluga Region, Russia), Andrey D. Kaprin (CEO, National Medical Research Radiological Center of the Ministry of Health of the Russian Federation, Kaluga Region, Russia) and Petr V. Shegai (Deputy CEO for Sciences, National Medical Research Radiological Center of the Ministry of Health of the Russian Federation, Kaluga Region, Russia)

In series: Genetics - Research and Issues
Publication Date: 07/15/2022
294 pp.
Hardcover: 978-1-68507-886-7, $230.00
e-book: 979-8-88697-007-4, $230.00

Genetic instability leads to the accumulation of many changes necessary to transform the stable genome of a normal cell into an unstable genome. Such a transformation can be the cause of radiation mutagenesis, carcinogenesis and aging – the main long-term effects of ionizing radiation, UV light, and other harmful environmental factors. A new quantitative assessment of the genetic instability was suggested, taking into account the delay in the formation of colonies by cells surviving after exposure to harmful agents. It was demonstrated that the genetic instability of yeast cells is mainly determined by cell ploidy, but not by the sigmoid shape of the survival curve or the cell’s ability of post-irradiation recovery. New experimental data confirm the participation of recovery processes in the manifestation of the relative biological effectiveness of densely ionizing radiation both for cell inactivation and for radiation-induced genetic instability. A number of universal patterns of synergic interactions are demonstrated, which did not depend on the used biological test and objects nor the interacting physical and chemical factors. Potential significance of synergy at low intensities of physical and chemical environmental factors is proved. Original data on the influence of cyclic heating and cooling on cell survival are obtained. It is concluded that osmotic homeostasis of cells, along with DNA, is an important target responsible for cell viability under the damaging action of various agents. Data on the favorable effect of the increased natural background of ionizing radiation are discussed. The manifestations of radiation hormesis were revealed for various radiation accidents, professional and medical exposure. The results obtained demonstrate that the action of high-energy ionizing radiation is accompanied by irradiation with UV light that occurs when charged particles move at a speed exceeding the speed of light in a given medium.
**Marine Biology**

**Properties and Applications of Alginate**  
*Michael Y. Wilkerson*  
In series: *Life Sciences Research and Development*  
Publication Date: 11/10/2022  
181 pp.  
Softcover: 979-8-86697-371-6. $95.00  
e-book: 979-8-86697-381-5. $95.00  
This book includes seven chapters, each focusing on modern research into properties and applications of alginate. The first chapter elucidates the reader to the structural properties and applications of alginate, and additionally discusses future development targets in various fields. The second chapter gives an overview into fabrication of ALG- and S-ALG-based submicron- and nano-sized gel particles with a focus on protein encapsulation. The third chapter returns to analyzing the unique physical properties of alginate and its current and potential uses. The fourth chapter reviews the development of alginate hydrogel beads by the process of microencapsulation, enabling the preservation of the entrapped material. The fifth chapter reviews new uses of alginate in the probiotic food industry as a carrier for probiotic immobilization, and summarizes the extrusion and spray dry techniques used to implement them. The sixth chapter gives a brief knowledge of the structure-property relationships, film formation, biocompatibility, and toxicity study of alginate and its different biomedical applications. The seventh and final chapter, after reviewing how alginate is discovered, describes the main properties of alginate, discusses the sources and chemical structure of alginate, and its various applications, especially in drug release and tissue engineering.

**Microbiology**

**Bacteriophages: Interaction, Diversity and Applications**  
*Prasanth Manohar, PhD*  
In series: *Microbiology Research Advances*  
Publication Date: 07/15/2022  
322 pp.  
Hardcover: 978-1-68507-860-7. $230.00  
e-book: 978-1-68507-958-1. $230.00  
The impact of viruses on the human population is inevitable. But not all viruses are deadly. There are good viruses that occupy our body and the environment. These bacteria-eating viruses are called bacteriophages. From birth to adulthood, bacteriophages have a consequential impact on human health by stabilizing the beneficial bacteria. Bacteriophages can arrest the bacterial machinery and kill them, which finds direct use in curing bacterial infections, known as phage therapy. In the future, phages, instead of antibiotics, will be used to treat bacterial diseases.

**Catalase and its Applications**  
*Kaley Rutherford*  
In series: *Microbiology Research Advances*  
Publication Date: 10/27/2022  
119 pp.  
Softcover: 979-8-86697-421-8. $82.00  
e-book: 979-8-86697-433-1. $82.00  
This book is a collection of five chapters discussing catalase and its various applications in different fields. Chapter One discusses the cardiovascular effects of a catalase blockade of H2O2 in normotensive and hypertensive rats. Chapter Two reviews daily and seasonal changes in activity of catalase in littoral macroalga on the Barents Sea, as well as the influence of abiotic factors in the aforementioned. Chapter Three is an overview of plant catalases under abiotic stress. Chapter Four analyses aspects of the blood catalase in the human body, and finally, Chapter Five discusses the inhibitory effect of drugs on catalase activity.
Endophytes: Types, Potential Uses and Mechanism(s) of Action  
Pragya Tiwari, PhD (Research Professor, Department of Biotechnology, Yeungnam University, Gyeongsan, Gyeongbuk, Republic of Korea)

In series: Microbiology Research Advances  
Publication Date: 10/06/2022  
351 pp.  
Hardcover: 979-8-88697-045-6. $230.00  
e-book: 979-8-88697-205-4. $230.00

Endophytes are organisms that live between living plant cells and do not cause disease. Endophytes are ubiquitously present in diverse plant species, demonstrating a co-evolution with the plant host. Furthermore, different classes of microbial species, including bacteria, fungi, and actinomycetes colonize the internal plant tissues, leading to a wide range of implications. The medicinal plants associated with endophytes have been extensively studied as a potential source of bioactive compounds, with pharmacological attributes and biotechnological applications. Scientific breakthroughs in whole genome sequencing and annotation of endophyte-associated gene/metabolic pathways provided key insights into functional mechanisms and their dynamics within plants. Studies have highlighted the socio-economic implications of fungal endophytes in the environment, agriculture, and medicine with considerable success. Although extensively studied as a “production platform” of novel pharmacological metabolites, the molecular mechanisms of plant-endophyte dynamics remain less understood/explored for their efficient utilization in drug discovery and other biotechnological applications. This book aims to provide comprehensive knowledge about the multifaceted applications of endophytes.

Endotoxins and their Importance  
Arif Pandit, PhD (Assistant Director Research, Directorate of Research, Sher e Kashmir University of Agricultural Sciences and Technology of Kashmir, Shalimar, Srinagar, Jammu and Kashmir, India) and R. S. Sethi, PhD (Professor and Head, Department of Animal Biotechnology, College of Animal Biotechnology, Guru Angad Dev Vety and Animal Sciences University, Ludhiana, Punjab, India)

In series: Microbiology Research Advances  
Publication Date: 06/07/2022  
120 pp.  
Softcover: 978-1-68507-839-3. $82.00  
e-book: 978-1-68507-913-0. $82.00

This book is divided into six chapters that cover a wide range of endotoxin biology topics. The first chapter provides a general overview of endotoxins, as well as a timeline of their use and discovery. In Chapter Two, we’ll look at how to extract and characterize these compounds. In Chapter Three, the genetics and biochemical pathways involved in endotoxin biosynthesis are discussed in depth. In Chapter Four, endotoxin virulence is discussed, as well as the mechanisms of host-pathogen interactions. In Chapter Five, the use of endotoxins as vaccine adjuvants is discussed as a futuristic way to improve vaccine efficacy. At the end, Chapter Six discusses potential areas of endotoxin exposure in the environment, as well as measures to combat the ecological threat.

Listeria monocytogenes: Microbiology, Sites of Infection and Treatment  
Raghu Vishweswaraiah, PhD (Scientist, Dairy Microbiology Division, ICAR-NDRI, Karnal, Haryana, India) and Faizan Ahmed, PhD (Postdoctoral Scientist, Cedars-Sinai Medical Center, Los Angeles USA)

In series: Microbiology Research Advances  
Publication Date: 08/24/2022  
354 pp.  
Hardcover: 978-1-68507-883-6. $230.00  
e-book: 979-8-88697-087-6. $230.00

Listeria monocytogenes is a Gram-positive soil bacterium that is ubiquitous. Consumption of ready-to-eat, frozen, raw, or little processed meals has recently increased its rise, causing alarm among scientists. It is a pathogenic bacterium with a dual lifestyle: it develops as a full normal bacterium in the environment, but when it enters the human body, it grows as an intracellular invasive pathogen that causes listeriosis. In this new
book, the authors present current research in the study of Listeria monocytogenes causing food-borne illnesses through various food sources, pathogenicity caused by Listeria monocytogenes, antimicrobial resistance in Listeria monocytogenes, risk assessment of Listeria monocytogenes in foods, control and prevention of infection, and treatment of listeriosis in humans. This book also covers bacteriophages-based control of Listeria monocytogenes in foods and its diagnosis in foods through conventional and novel rapid techniques.

New Research on Mycorrhizal Fungus
Professor Qiang-Sheng Wu, Professor Ying-Ning Zou, Professor Yue-Jun He, and Professor Nong Zhou
In series: Microbiology Research Advances
Expected Publication Date: 03/20/2023
Hardcover: 979-8-88697-637-3. $160.00
e-book: 979-8-88697-662-5. $160.00
This book focuses on an overview of new advances in mycorrhizal fungi, especially arbuscular mycorrhizal fungi. The book contains chapters on mycorrhizal fungi populations in mangroves, the growth of arbuscular mycorrhizal fungi, mycorrhization of pears in in vitro culture conditions, mycorrhizal mineralization of nutrients, mycorrhizal roles in improving soil health, the benefits of synergistic application of biochar and arbuscular mycorrhizal fungi, and the ecological functions of arbuscular mycorrhizal fungi (invasive plant control, mycorrhizal remediation of soil pollution, and mycorrhizal farm management systems). This book can provide theoretical as well as technical support for researchers working on mycorrhizal fungi, and also provide ideas for new research on mycorrhizal fungi in the future.

The Book of Fungal Pathogens
André Luis Souza dos Santos, PhD (Laboratory of Advanced Studies of Emerging and Resistant Microorganisms, General Microbiology Department, Microbiology Institute Paulo de Góes (IMPG), Health Center Science, Federal University of Rio de Janeiro, Brazil), Marta Helena Branquinha (Universidade Federal do Rio de Janeiro (UFRJ), Brazil), Lucimar Ferreira Kneipp (Fundação Oswaldo Cruz (FIOCRUZ), Brazil) and Maryam Roudbary (Iran University of Medical Sciences, Iran)
In series: Infectious Diseases and Microbiology
Publication Date: 12/22/2022
505 pp.
Hardcover: 979-8-88697-454-6. $250.00
e-book: 979-8-88697-470-6. $250.00
Fungi can be harmful to global health, biodiversity and agriculture and they are responsible for life-threatening diseases, especially in individuals with a weakened immune system. Over the last decades, the number of invasive infections, mainly caused by fungi belonging to Candida, Cryptococcus, Aspergillus and Pneumocystis genera has increased and negatively affected the clinical outcomes of the patients. With regard to all these issues, this book focuses on the processes associated with fungal pathogenesis. The authors believe that this book will serve as a useful reference for consultations with specialists in the Mycology field since it contemplates the most important issues in the proposed area. The chapters are written by experts who actively contribute to international scientific literature. The editors also believe that the theme is a very attractive proposal and the compilation of interesting data will benefit readers in terms of identification, epidemiology, pathogenesis, and treatment of predominant fungal infections around the world. “The Book of Fungal Pathogens” contains 18 chapters, several pictures, diagrams, and tables that can be used in both undergraduate and postgraduate teaching as well as scientific lectures.

Understanding Antibiofilm Activity
Iram Liaqat, PhD (Associate Professor, Department of Zoology, Government College University, Lahore, Pakistan)
In series: Microbiology Research Advances
Publication Date: 07/08/2022
206 pp.
Hardcover: 978-1-68507-927-7. $160.00
e-book: 979-8-88697-005-0. $160.00
Biofilms have grown into a major issue that poses hazards to all life forms. This book reviews strategies which can be employed to combat biofilms. Chapter 1 demonstrates that microbial biofilms are generated when a polymeric matrix surrounds a collection of
Science and Technology

single or heterogeneous microbial organisms. Chapter 2 discusses how biofilm resistance to antimicrobial drugs has become a global problem for medical researchers. Chapter 3 discusses how even though antibiofilm tactics are helpful, they are still worth investigating because each strategy is limited by physiological parameters such as composition, osmolarity, and bacterial species. Chapter 4 reveals that biofilms are diverse microbial societies dwelling in diverse environments. Chapter 5 confers emerging biofilm eradication tendencies and tactics, as well as the treatment of biofilm-related medical problems. Chapter 6 examines how biofilm's pervasiveness makes its removal extremely challenging. Chapter 7 looks at a variety of recently discovered nano-established biomaterials as well as the approaches that are being used to create antibiofilm surfaces. Finally, Chapter 8 discusses how microbial biofilms, which are generated by the aggregation of single or varied microbial species encased in a polymeric matrix, are a frequent way for bacteria to shield themselves against environmental challenges and antibacterial treatments.

Zoology

A Closer Look at Silkworms
Pratheep Thangaraj, PhD (Department of Biotechnology, PRIST Deemed to be University, Tanjavur, Tamil Nadu, India)

In series: Insects and Other Terrestrial Arthropods: Biology, Chemistry and Behavior
Publication Date: 02/2/2023
129 pp.
Softcover: 979-8-8697-501-7. $82.00
e-book: 979-8-8697-563-5. $82.00

The first section of this book covers recent research developments on the silkworm, B. mori. Chapter One describes the recent advancements in utilization, product diversification and value addition of ericulture resources for the sustainability of farmers. Chapter Two compares the efficacy of silk production and how it is achieved through the growth and development of silkworms supplemented with antioxidants and exposed to low dose radiation from the gamma source. B. mori viral disease and lipid compositional changes during the spinning stage is the focus in the next two chapters. In Chapter Three, Tanmaya et al. review the characteristics of B. mori viruses, the classification of viral infections, mode of infectivity, transmission, symptomatology of viral diseases, detection of pathogenic viruses, the molecular mechanism of pathogenicity of viral diseases and insect antiviral defense mechanisms. Management practices can be carried out both at pre-rearing and rearing conditions for obtaining and improving qualitative and quantitative silk production. Chapter Four analyzes the neutral lipids changes in silk glands during fifth instar larvae and spinning stages of B. mori. Chapter Five, by Geeta Pandey, is an outline of the historical perception of silk, its structure, general characteristics, current clinical trials and emerging biomedical applications of silk fibroin along with future prospects and challenges in this field. The authors of Chapter Six discuss the recent advancements in B. mori lipid metabolism, transportation, and lipid carrier proteins. This book ends with Chapter Seven – a review of silk proteins such as sericin and fibroin and their medical applications.

Advances in Animal Science and Zoology. Volume 20
Owen P. Jenkins

In series: Advances in Animal Science and Zoology
Publication Date: 09/21/2022
222 pp.
Hardcover: 979-8-8697-199-6. $250.00
e-book: 979-8-8697-217-7. $250.00

This volume includes six chapters that present updates in animal science and zoology. Chapter One examines the use of zebrafish model system to investigate the pathophysiology of schizophrenia. Chapter Two consolidates facts about melatonin and its involvement in the regulation of fish populations. Chapter Three explores the interaction between the native aquatic gastropod, Valvata humeralis, and invasive aquatic gastropod, Potamopyrgus antipodarum, along a biotic gradient of density in a system where it was suspected that an interaction shift was occurring. Chapter Four explores competition and facilitation between these two gastropods. Chapter Five analyzes the role of superoxide dismutase in reptiles under toxicity contexts. Lastly, Chapter Six analyzes and assesses the corpses of three English Bulldog puppies that had anasarca, a fetal malformation that presents generalized edema.
Christopher I. Argyros (Professor, Department of Mathematical Sciences, Cameron University, Lawton, Oklahoma, USA), Samundra Regmi (Researcher, Learning Commons, University of North Texas at Dallas, Dallas, TX, USA), Ioannis K. Argyros, PhD (Researcher, Department of Computing and Technology, Cameron University, Lawton, Oklahoma, USA) and Santhosh George, PhD (Department of Mathematical and Computational Sciences, National Institute of Technology, Karnataka, India)
In series: Mathematics Research Developments
Publication Date: 12/01/2022
447 pp.
Hardcover: 978-1-68507-994-9. $230.00
e-book: 978-8-88697-425-6. $230.00
This book provides different avenues to study algorithms. It also brings new techniques and methodologies to problem solving in computational sciences, engineering, scientific computing and medicine (imaging, radiation therapy) to mention a few. A plethora of algorithms which are universally applicable are presented in a sound, analytical way. The chapters are written independently of each other, so they can be understood without reading earlier chapters. But some knowledge of analysis, linear algebra, and some computing experience is required. The organization and content of this book cater to senior undergraduate, graduate students, researchers, practitioners, professionals, and academicians in the aforementioned disciplines. It can also be used as a reference book and includes numerous references and open problems.

Contemporary Algorithms: Theory and Applications Volume II
Christopher I. Argyros (Researcher, Department of Computing and Mathematical Sciences, Cameron University, Lawton, Oklahoma, USA), Samundra Regmi (Researcher, Learning Commons, University of North Texas at Dallas, Dallas, TX, USA), Ioannis K. Argyros, PhD (Professor, Department of Computing and Mathematical Sciences, Cameron University, Lawton, Oklahoma, USA) and Santhosh George, PhD (Department of Mathematical and Computational Sciences, National Institute of Technology, Karnataka, India)
In series: Mathematics Research Developments
Publication Date: 12/15/2022
401 pp.
Hardcover: 978-8-88697-109-5. $230.00
e-book: 978-8-88697-479-9. $230.00
The book is a continuation of Volume I with the same title. It provides different avenues to study algorithms. It also brings new techniques and methodologies to problem solving in computational sciences, engineering, scientific computing and medicine (imaging, radiation therapy) to mention a few. A plethora of algorithms are presented in a sound analytical way. The chapters are written independently of each other, so they can be understood without reading earlier chapters. But some knowledge of analysis, linear algebra, and some computing experience are required. The organization and content of the book cater to senior undergraduate, graduate students, researchers, practitioners, professionals, and academicians in the aforementioned disciplines. It can also be used as a reference book and includes numerous references and open problems.
Game Theory

Balancing Economic, Legal, and Social Macrosystems Based on Modelling Decision Processes
Lidiya V. Zhukovskaya, Dr. Sci. (Econ.), Cand. Sci. (Phys.-Math.)
(Chief Researcher, Central Economics and Mathematics Institute, the Russian Academy of Sciences, Moscow, Russia)

In series: Economic Issues, Problems and Perspectives
Publication Date: 09/29/2022
214 pp.
Hardcover: 979-8-88697-093-7. $160.00
e-book: 979-8-88697-141-5. $160.00

The author considers the interaction of three national macrosystems (economic, legal, and social) within a national public metasystem, justifying and solving the problem of their balancedness using the concept of Berge equilibrium. This equilibrium mathematically expresses the Golden Rule of ethics (GR), one of the most ancient, specific, and widespread moral generalizations that appear in Christianity, Islam, Judaism, Buddhism, and Confucianism. It instructs: “Do to others as you would like them to do to you.” The author studies the influence of morality (in the sense of Kant's imperative or the GR) on strategic decision-making in the national public metasystem. The Nash equilibrium of the three macrosystems reflects the neoliberal economic doctrine widespread currently. An alternative moral-philosophical economic doctrine based on the GR is substantiated using systems theory and game theory.

Probability and Mathematical Statistics

Frontiers in Mathematical Modelling Research
M. Haider Ali Biswas, PhD (Professor, Mathematics, Science Engineering and Technology School, Khulna University, Khulna, Bangladesh) and M. Humayun Kabir, PhD (Associate Professor, Department of Mathematics, Jahangirnagar University, Savar, Bangladesh)

In series: Mathematics Research Developments
Publication Date: 05/06/2022
379 pp.
Hardcover: 978-1-68507-430-2. $230.00
e-book: 978-1-68507-845-4. $230.00

Mathematical modeling is the process of trying to precisely define a nonmathematical situation, real-life phenomena of changing world and the relationships between the situations in the language of mathematics, and finding out mathematical formulations or patterns within these situations and phenomena. Mathematical modeling in terms of nonlinear dynamic equations is described as a conversion activity of real problems in a mathematical form. The interactions between the mathematical and biological sciences have been increasing rapidly in recent years. Both traditional topics, such as population and disease modeling, and new ones, such as those in genomics arising from the accumulation of DNA sequence data, have made mathematical modeling in biomathematics an exciting field. The best predictions of numerous individuals and scientific communities have suggested that this growing area will continue to be one of the most dominating and fascinating driving factors to capture the global change phenomena and design a sustainable management for a better world. Frontiers in Mathematical Modelling Research provides the most recent and up-to-date developments in the mathematical analysis of real world problems arising in engineering, biology, economics, geography, planning, sociology, psychology, medicine and epidemiology of infectious diseases. Mathematical modeling and analysis are important, not only to understand disease progression, but also to provide predictions about the evolution of the disease and insights about the dynamics of the transmission rate and the effectiveness of control measures. One of the main focuses of the book is the transmission dynamics of emerging and re-emerging infectious diseases and the implementation of intervention strategies. It also discusses optimal control strategies like pharmaceutical and non-pharmaceutical interventions and their potential effectiveness on the control of infections with the help of compartmental mathematical models in epidemiology. This book also covers a wide variety of topics like dynamic models in robotics, chemical process, biodynamic hypothesis and its application for the mathematical modeling of biological growth and the analysis of diagnosis rate effects and prediction of zoonotic viruses, data-driven dynamic simulation and scenario analysis of the spread of diseases. Frontiers in Mathematical Modelling Research will play a pivotal role as helpful resource for mathematical biologists and ecologists, epidemiologists, epidemic modelers, virologists, researchers, mathematical modelers, robotic scientists and control engineers and others engaged in the analysis of the transmission, prevention, and
control of infectious diseases and their impact on human health. It is expected that this self-contained edited book can also serve undergraduate and graduate students, young scholars and early career researchers as the basis for meaningful directives of current trends of research in mathematical biology.

Record Values and Their Applications for Exponential and Rayleigh Distributions - A Handbook
Mohammad Ahsanullah (Professor Emeritus, Rider University, Lawrenceville, New Jersey, USA) and Mohammad Shakil (Professor of Mathematics, Miami Dade College, Hialeah, Florida, USA)

In series: Mathematics Research Developments
Publication Date: 12/29/2022
139 pp.
Softcover: 979-8-8697-245-0. $95.00
e-book: 979-8-8697-508-6. $95.00

Records arise naturally in many fields of study such as climatology, sports, science, engineering, medicine, traffic, and industry, among others. An observation is called a record if its value is greater than (or analogously, less than) all the preceding observations. The exponential and Rayleigh distribution play pivotal roles in the study of records because of their wide applicability in the modeling and analysis of lifetime data. In this handbook, various properties of record values of univariate exponential and Rayleigh distributions, including most of the recent works, are reviewed. Some new results on mean residual life based on records and the minimum variance linear unbiased estimators of past records from univariate exponential distribution are presented.

Stochastic Processes: Fundamentals and Emerging Applications
Mikhail Moklyachuk, D.Sci.(Professor, Department of Probability Theory, Statistics and Actuarial Mathematics, Taras Shevchenko National University of Kyiv, Ukraine)

In series: Mathematics Research Developments
Publication Date: 12/15/2022
530 pp.
Hardcover: 978-1-68507-982-6. $260.00
e-book: 979-8-8697-475-1. $260.00

Stochastic processes involving random variables are associated with the concepts of uncertainty or chance. Significant research areas in mathematical and applied sciences are devoted to their study. The growing interest of researchers interested in this field is caused by a variety of different applications in many areas like mechanics, acoustics, economics, medicine, biology etc. Thus, understanding the needs of practitioners and simultaneously presenting the new theoretical results is the aim of the book. This book consists of 12 chapters, which describe the basic concepts and properties of random processes.

Special Topics

Advances in Mathematics Research. Volume 31
Albert R. Baswell

In series: Advances in Mathematics Research
Publication Date: 06/01/2022
205 pp.
Hardcover: 978-1-68507-892-8. $250.00
e-book: 978-1-68507-903-1. $250.00

This volume includes six chapters that detail recent advancements in mathematics research. Chapter One presents various capabilities of the Maple computer algebra system. Chapter Two uses data from the Children of Immigrants Longitudinal Study to demonstrate how to perform multilevel structural equation modeling to investigate if academic aspiration of immigrant youths in late adolescence mediates both the effects of family socioeconomic status and school location at individual and school levels in early adolescence on their later successful college graduation in young adulthood. Chapter Three proves the existence and regularity of solutions in α-norm for some partial functional integrodifferential equations in Banach spaces. Chapter Four discusses a
method for obtaining exact solutions of nonlinear partial differential equations. Chapter Five analyzes the linear and nonlinear stability of modons and We-Verkley waves, which are weak solutions of the barotropic vorticity equation. Lastly, Chapter Six provides an explicit representation of the maps interconnecting the sets of solutions to the special double confluent Heun equation and the equation of the RSJ model of overdamped Josephson junction in case of shifted sinusoidal bias.

Advances in Mathematics Research. Volume 32

Albert R. Baswell

Chapter 1 is an introduction to meta-regression analysis. The authors demonstrate that meta-regression analysis is a methodological framework that allows modeling and correcting problems of publication bias while explaining the variability of results usually found in social sciences literature. In Chapter 2, a new model order reduction technique for the simplification of the complex large-scale stable linear dynamic systems is presented. Chapter 3 discusses the importance of identifying variables, scales, and methods for the sensory analysis of novel food products. Chapter 4 focuses on structural stability and dynamic quantum models. Chapter 5 is an introduction to linear difference equations. Chapter 6 includes a survey of various measures used in cohort analysis with alternative multifaceted indices used in theory and often by practitioners. The chapter is intended to offer a concise description of these measures and elaborate where and how they may be used in different cohort analysis. In Chapter 7, two mixed initial-boundary value problems describing motions of incompressible Maxwell fluids with power-law dependence of viscosity on the pressure are analytically investigated. In Chapter 8, new permanent solutions for Stokes' second problem of incompressible burgers fluids and their applications is explored. Next, for the first time, the authors propose the definitions of the fractional sum and fractional difference on non-uniform lattices in two different ways. Chapter 10 focuses on the Carleman linearization method for boundary value problems. In the last chapter, Chapter 11, the authors review some of the recent work on pattern packing, superpatterns, and pattern avoidance when colored or circular patterns/permutations are considered.

Physics and Astronomy

Cosmology

A Guide to Black Holes

Kenath Arun, PhD (Assistant Professor, Department of Physics & Electronics, CHRIST (Deemed to be University), Bengaluru, India)

The idea of a black hole goes back to Laplace or maybe even earlier to Englishman John Michell, referring to these bodies as 'dark stars', way back in 1783. Laplace argued that the largest objects in the universe must become invisible and would hence be dark. When Einstein proposed his general theory of relativity in the early 1900s, Schwarzschild solved the equation (1916) for a spherical star and the solution implied that below a radius (referred to as the Schwarzschild radius), all light and other radiation are trapped inside the star, and it becomes what is called a black hole. With better detection mechanisms, such as the images from the Event Horizon Telescope, the universe of black holes is opening up for astronomical observations and discoveries over all wavelengths. This book covers a wide range of topics related to black holes and their dynamics.
Conceptual Features of Einstein’s Theory of General Relativity
Based on the Philosophy of Science
Jun-Young Oh (Emeritus Professor, Hanyang University at Seoul Campus, Republic of Korea, Visiting Research Professor, Seoul National University, Republic of Korea, Seoul, South Korea)

Publication Date: 09/15/2022
139 pp.
Softcover: 979-8-88697-107-1. $95.00
e-book: 979-8-88697-140-8. $95.00
The main objective of this book is to present the theory of general relativity in a direction that will be intelligible, informative, and interesting to the individual reader. Many of the texts about general relativity are either too thin on detail or too narrow in scope; this book was written with the aim of rectifying these shortcomings.

Mathematical and Computational Physics

Second Harmonic Generation: Pathways of Nonlinear Photonics
Abdel-Baset M. A. Ibrahim, PhD (School of Physics and Material Studies, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia) and Pankaj Kumar Choudhury, PhD (Institute of Microengineering and Nanoelectronics, Universiti Kebangsaan Malaysia)

Publication Date: 07/08/2022
229 pp.
Hardcover: 978-1-68507-888-1. $160.00
e-book: 979-8-88697-002-9. $160.00
Second harmonic generation (SHG) has a wide range of applications in today's technological era, including nonlinear optics, quantum optics, lasers, material science, medical science, biological imaging, and high-resolution optical microscopy. In the laser industry, for example, SHG is prudent to create wavelength-specific high-energy lasers. It is also used to measure ultra-short pulse width with autocorrelators. SHG is now indispensable as a spectroscopic imaging tool in applications, such as biophysical characterization of the plasma membrane, biological sensing, disease diagnostics, and investigations of biomolecular interactions at interfaces. Because of its non-destructive detection, ultrafast response, and polarization sensitivity, SHG is exploited to describe crystal structures and materials. The use of SHG to characterize two-dimensional (2D) material structures gives crucial insights into their physical properties, thereby promoting the development of the relevant basic research, leading to the investigation of the potential applications of those materials. Developments in SHG research hold promising potentials of a large class of materials, such as magnetic- and nonmagnetic layered materials, perovskites, antiferromagnetic oxides, II-VI and III-V semiconductors, and nanotubes, for a variety of technological applications. This book focuses on the process of modelling and simulations of the SHG phenomenon in the area of nonlinear and quantum optics. The first chapter provides a visualization of the scientific landscape of research in SHG using scientometric analysis from 1962 to 2020 based on Scopus database. This chapter gives new postgraduate students in the subject useful information on hot themes in SHG research and how they are related to one another. There is also a brief mention of multinational collaborative networks. The following four research chapters look at the SHG from a classical standpoint, using Maxwell's equations to describe the nonlinear optical interaction between the electromagnetic wave and the medium. Such interaction is treated quantum mechanically in the second section of the book, with the SHG process described using a propagating Hamiltonian. As such, the volume adequately describes the SHG from both the classical and quantum mechanical standpoints. This allows the postgraduate researchers, focusing on the nonlinear phenomena, resulting from light-matter interaction, to find the content useful. In the second part of this volume, readers are introduced to a full theoretical analysis of the quantum features generated in certain optical devices, such as a two-waveguide device working under the SHG and coupled waveguide arrays with the combined second- and third-order nonlinear effects. To be more specific, this part discusses how SHG-enabled devices might be a useful source of nonclassical light. This section remains relevant for postgraduate students commencing their studies in quantum optics, where the nonclassical phenomena, such as squeezing and entanglement, require a solid understanding of the underlying techniques, namely the phase space and the analytical perturbative methods.
Particle Physics

Scalar Strong Interaction Hadron Theory III
Fang Chao Hoh (Retired, Uppsala, Sweden)
In series: Physics Research and Technology
Publication Date: 09/21/2022
349 pp.
Hardcover: 979-8-88697-110-1. $230.00
e-book: 979-8-88697-142-2. $230.00
The purpose of this book is to present the scalar strong interaction hadron theory in a coherent and systematic manner. This is not a finished research monograph, but gives an account of the present state of a theory supposedly still at its early stage of development. The chapters herein have been revised and updated many times over the years. This work will hopefully facilitate researchers interested in entering into this field and serve as a basis for future development of this theory. The new feature of this third edition is mainly Chapters 16 and 17 in which gravitation is included in the scalar strong interaction hadron theory.

Polymer Physics

Natural/Inorganic Fillers Reinforced Kevlar Fabric Based Polymer Composites
Mohit Hemanth Kumar, Ph.D. (Department of Mechanical Engineering, Alliance College of Engineering and Design, Alliance University, Bangalore, Karnataka, India), Nivedha B (Department of Physics, National Institute of Technology, Tiruchirappalli, India) and M. Ashok, Ph.D. (Department of Physics, National Institute of Technology, Tiruchirappalli, India)
In series: Polymer Science and Technology
Publication Date: 06/10/2022
186 pp.
Hardcover: 978-1-68507-864-5. $160.00
e-book: 978-1-68507-923-9. $160.00
In recent years, composite materials have garnered attention, as various combinations of reinforcements can be incorporated to create lightweight materials with diverse properties. Composite materials can be tailored for particular applications and made suitable for adverse atmospheric conditions. A new, challenging research area involves the formulation of innovative materials with less weight, higher stiffness, lower costs, and higher biocompatibility. Examples of applications for such materials include electric vehicles, defense vehicles, aircraft parts and industrial machine structures. The incorporation of natural and inorganic filler to Kevlar epoxy composite shows improved behavioral properties compared to either natural or inorganic filler alone. These properties include tensile, flexural and interlaminar shear strength as well as thermal performance. This book aims to describe the advantages of using bi-filler reinforcement over single filler reinforcement to enable the development of innovative composite materials with tunable properties.

Quantum Theory

Radiation and Matter
Marian Apostol, PhD (Professor, Institute for Physics and Nuclear Engineering, Magurele, Romania)
In series: Physics Research and Technology
Publication Date: 10/06/2022
315 pp.
Hardcover: 979-8-88697-246-7. $230.00
e-book: 979-8-88697-267-2. $230.00
The book describes the quantum-mechanical motion in the context of the quantum field theory. A relativistic particle requires time and length thresholds in order to move
quantum-mechanically, as a consequence of its relativistic rest energy and momentum. The subject is discussed mainly in relation to the Dirac equation for the electron and the electromagnetic interaction. Electromagnetic quantum-mechanical effects are computed. Also, the book presents the theory of the electromagnetic field, the relativistic motion, especially the motion of a charge in the electromagnetic field, as well as the electromagnetic field in matter and the surface electromagnetism.

### Special Topics

**An Introduction to Permittivity**

*Parveen Saini, PhD (Conjugated Polymers and Graphene Technology Group, Solar Hutmert, Polymeric and Soft Materials Section, Materials Physics and Engineering Division, CSIR-National Physical Laboratory, New Delhi, India)*

In series: *Physics Research and Technology*

Publication Date: 11/24/2022

288 pp.

Hardcover: 979-8-88697-042-5. $230.00
e-book: 979-8-88697-375-4. $230.00

Permittivity is a very important quantity often used to quantify the behavior of a system under a given electric field distribution in space. The dielectric polarization and associated losses are two main associated effects that are connected through the complex permittivity via its real and imaginary parts respectively. Therefore, the quantitative measure of permittivity is essential for predicting the response of a system, e.g. charge storage characteristics of capacitor/supercapacitor, flux through a charge carrying closed surface, exciton binding energy in soar cells/LEDs, properties of liquid crystals and LCDs, relaxation of dielectrics, microwave absorption effectiveness of shielding materials, response of antenna systems, governing phase velocity of electromagnetic radiation through given medium, designing of metamaterials etc. Permittivity has special relevance in energy storage, energy harvesting, energy conversion, energy transmission, energy dissipation, and even stealth technology; therefore, its thorough understanding is required especially in the context of practical applications. This edited book is the first of its kind that provides a single-source solution to specifically address the fundamentals and applications of permittivity through a comprehensive literature account.

**Beyond Special Relativity: Looking for the Intrinsic Properties of Space-Time**

*Riccardo Zancan (Energy Engineering Student, University of Pisa (UNIP), Via Angiolo Tommasi, Livorno (LI), Italy) and Raul Tozzi (State Scientific High School “Federigo Enriques”, Regional School Office for Tuscany, Piazza Giacomo Matteotti, Livorno (LI), Italy)*

In series: *Physics Research and Technology*

Publication Date: 10/06/2022

249 pp.

Hardcover: 979-8-88697-108-8. $195.00
e-book: 979-8-88697-219-1. $195.00

What is time? And space? How are these two apparently opposed elements indissolubly linked? This book starts from man's intrinsic need to ask himself questions and elaborate answers, and tries to analyze, through a simple and intuitive physical-mathematical language, some aspects of Einstein's Special and General Relativity, accompanied by equally clear and immediately understandable images. An interesting discussion of simultaneity and causality is presented together with the relativistic accelerated version of the original twin paradox.
Electromagnetic Waves: Advances in Applications and Research
Manuel B. Hutchinson
In series: Physics Research and Technology
Publication Date: 09/15/2022
168 pp.
Softcover: 979-8-88697-254-2. $95.00
e-book: 979-8-88697-265-8. $95.00
Electromagnetic waves are waves that are formed due to vibrations between an electric field and a magnetic field. This book includes four chapters that present new applications and research on electromagnetic waves. Chapter One reviews the microwave absorption properties of CoFe2O4-based materials. Chapter Two examines strong resonance effects in ordered layered photonic structures for filtering, collimation, metrology and spectroscopy. Chapter Three describes an antenna array of upgraded quadruple sector emitters for wireless 4G networks. Lastly, Chapter Four explores the possibility of numerical solving scattering problems of electromagnetic waves by bodies with non-coordinate boundaries by reducing to infinite sets of linear algebraic equations relative to the coefficients of expansion of the unknown field in terms of eigen waves of coordinate domains in different coordinate systems.

Future Relativity, Gravitation, Cosmology
Valeriy V. Dvoeglazov, PhD, M. de G. Caldera Cabral, J. A. Cázares Montes, and J. L. Quintanar González (Unidad Académica de Física, Universidad Autónoma de Zacatecas, Mexico)
In series: Physics Research and Technology
Publication Date: 01/26/2023
379 pp.
Hardcover: 979-8-88697-455-3. $230.00
e-book: 979-8-88697-527-7. $230.00
This book contains fifteen selected articles which each relate to the emergent problems in modern physics. Each article has been peer-reviewed, as this volume is a continuation of the work published by the editors in the past. This book shall be of interest to professors, researchers, engineers, theoretical physicists, postgraduate students, and anyone with an interest in theoretical physics and astrophysics.

Horizons in World Physics. Volume 308
Albert Reimer
In series: Horizons in World Physics
Expected Publication Date: 03/20/2023
Hardcover: 979-8-88697-226-9. $250.00
e-book: 979-8-88697-593-2. $250.00
This volume includes ten chapters that describe recent advancements in physics research. Chapter One analyzes the molecular interaction of various types of radiation on biological matter. Chapter Two deals with supercontinuum generation using noise-like pulses from erbium-doped fiber lasers. Chapter Three examines new thermodynamic approaches to ferroelectric phase transitions. Chapter Four studies the gravitational noise from model helical structures in gelatin and chromosomes. Chapter Five describes the influence of nuclear DNA on mitochondrial DNA. Chapter Six presents the results obtained in two different problems in quantum information theory. Chapter Seven reviews hybrid quantum systems built with neutral atoms. Chapters Eight and Nine assesses the potential of successors and upgrades to the Large Hadron Collider. Finally, Chapter Ten provides measurement techniques for determining thermal conductivity on bulk samples and thin films.

Physics and Mechanics of New Materials and Their Applications, 2021 – 2022
Ivan A. Parinov, DrSc, Shun-Hsyung Chang, PhD and Arkady N. Soloviev, DrSc
In series: Materials Science and Technologies
Expected Publication Date: 02/28/2023
e-book: 979-8-88697-542-0. $210.00
The developing modern methods and approaches for studying advanced materials define the main vectors and topics for modern science and its applications. These investigations
are based on strict mathematical and numerical methods, including modern approaches of mathematical modeling and physical experiments. They allow for direct improvement of material properties and characteristics of designed devices. These PHENMA 2021 – 2022 Proceedings are devoted to Research and Development of various actual problems divided into a framework of five scientific directions: (i) processing techniques; (ii) physics and mathematics; (iii) mechanics; (iv) applications and (v) industry and management of prospective materials. This collection presents selected reports of the 10th Anniversary International Conference on "Physics and Mechanics of New Materials and Their Applications" (PHENMA 2021 – 2022), which took place in Divnomorsk, Russia, May 23 – 27, 2022.

Quantum Field Theory and Applications
Natale Palerma
In series: Physics Research and Technology
Publication Date: 07/08/2022
257 pp.
Hardcover: 978-1-68507-930-7. $160.00
e-book: 978-1-68507-957-4. $160.00
Quantum field theory (QFT) is a theoretical framework that combines classical field theory, special relativity and quantum mechanics, and represents the forefront of theoretical physics. The four chapters of this book include new research on quantum field theory and present different perspectives on the subject. Chapter One applies the notion of clothing particles in QFT to the theory of nuclear forces and quantum electrodynamics. Chapter Two is based on results from black hole thermodynamics at all energy scales and demonstrates that there is a natural ultraviolet applicable boundary distant from the Planck scales in QFT. Chapter Three presents a version of quantum field theory based on discrete energy-momentum and illustrates this theory using examples of fermion and boson fields. Lastly, Chapter Four discusses in detail whether or not perturbative expansion series in quantum electrodynamics are convergent and points out that the disagreement between the experimental value of the muon g-2 and the theoretical one predicted in the standard model might be due either to the larger hadronic vacuum polarization contributions or to an unexpectedly large sum of the perturbative expansion series.

The World of Circulating Light Where Ball Lightnings Live
Vladimir Torchigin, PhD (Professor, Chief Researcher, Russian Academy of Sciences, Federal Research Center “Computer Science and Control”, Moscow, Russia)
In series: Physics Research and Technology
Publication Date: 10/06/2022
218 pp.
Hardcover: 979-8-88697-222-1. $160.00
e-book: 979-8-88697-352-5. $160.00
The book describes a completely new world, the existence of which no one had even suspected before. Therefore, this world could not be studied either theoretically or experimentally. The study of the nature of ball lightning made it possible to discover this world. Pyotr Kapitsa, a Russian scientist, Nobel Prize winner, studying the phenomenon of ball lightning, was forced to admit at the end of his life that this bright nut was too strong for his teeth. At the same time, he suggested that ball lightning is a phenomenon from another world unknown to him. Indeed, he was partly right. He was wrong that ball lightning was related to plasma, but he was right that ball lightning belonged to another world unknown to him. The book describes the features of this world and the properties of its inhabitants. The most known among them is ball lightning. This world we called the world of circulating light. This book is not science fiction. The book is based on over eight dozen articles published since 2003 in leading international physics and optics journals. Although scientists have not been able to unravel the nature of ball lightning for many centuries, it turned out that the explanation is so simple that it is accessible to schoolchildren. Such an explanation can be given without a single formula, recalling only the well-known physical laws from the school curriculum.
Advances in Sustainable Materials and Technology
Abhishek Kanoungo, PhD (Assistant Professor, Department of Civil Engineering, Chitkara University School of Engineering & Technology, Chitkara University, Himachal Pradesh, India), Sandeep Singh, PhD (Associate Professor, Department of Civil Engineering, Chandigarh University, Mohali, India), Shristi Kanoungo, M.E. (Research Scholar, Department of Civil Engineering, Punjab Engineering College, Chandigarh, India) and Ajay Goyal, PhD (Professor, Department of Civil Engineering, Chitkara University School of Engineering & Technology, Chitkara University, Himachal Pradesh, India)
In series: Civil Engineering and Architecture
Publication Date: 08/10/2022
204 pp.
Hardcover: 978-1-68507-967-3. $160.00
Advances in Sustainable Materials and Technology focuses on the core issues of sustainable development and materials with the least environmental impact. The book discusses numerous relevant areas and innovative technologies, such as key construction materials and production, materials with lower energy impact, production processes encouraging less use of ever-depleting natural raw materials, minimization of the generation of greenhouse gases, development of new, environmentally friendly materials and agents, characterization of the properties of construction materials, and methodologies applied in the building of structures.

Recent Advances in Structural Health Monitoring Research in Australia
Hong Guan (Professor, Griffith University, Research Theme Leader of Building Science and Construction Innovation, Australia), Tommy H.T. Chan (Professor, Queensland University of Technology, Founding Chair and President, Australian Network of Structural Health Monitoring, Australia) and Jianchun Li (Professor, University of Technology Sydney, Head of Discipline, Structural & Materials Engineering, Director, CBIR – Centre for Built Infrastructure Research, Australia)
In series: Civil Engineering and Architecture
Publication Date: 06/10/2022
394 pp.
Hardcover: 978-1-68507-41-9. $230.00
e-book: 978-1-68507-609-2. $230.00
Structural Health Monitoring (SHM), a process of utilising on-structure or remote sensing systems and/or imaging techniques to monitor the performance of structures and evaluate their health conditions, has rapidly grown worldwide on its research and industrial practices in recent years. Recent disastrous bridge failures, such as the collapses of the Nanfang'ao tied-arch bridge in Taiwan, the Wuxi National Highway 312 overpass in China, and the Pont de Mirepoix suspension bridge in France, all in the year 2019, and the Mexico City Metro overpass collapse in 2021, have further reminded us of the importance of structural health monitoring for civil infrastructures. During the last three decades, SHM has attracted enormous research efforts around the world because it targets on monitoring structural conditions to prevent catastrophic failure and to provide quantitative data for engineers and infrastructure owners to design reliable and economical asset management plans. This book showcases the recent advancement in SHM research, especially for civil engineering applications in Australia, covering the state-of-the-art SHM technologies together with its latest developments and successful applications. The book provides a glance on the research outcomes in SHM-related areas delivered by some of the experts in Australian universities. This book is launched to mark the significant milestone of the 10th Anniversary of Australian Network of Structural Health Monitoring (ANSHM) and its contribution to the SHM research and practice over the past 12 years since its inception in 2009. The preparation of this book for an intended completion in 2020 was
significantly delayed due to the impact of the COVID-19 pandemic. The Network, comprising leading Australian SHM experts, aims to promote and advance SHM application, education, research and development in Australia. Although the title of the book highlights recent SHM advances in Australia, the technologies and approaches described can be applied around the world.

## Electronics

**Recent Trends in Microstrip Antennas for Wireless Applications**

*S. Kannadhasan, PhD (Assistant Professor, Department of Electronics and Communication Engineering, Cheran College of Engineering, Tamil Nadu, India) and R. Nagarajan, PhD (Professor, Department of Electrical and Electronics Engineering, Gnanamani College of Technology, Tamil Nadu, India)*

In series: *Electronics and Telecommunications Research*

Publication Date: 05/04/2022

95 pp.

Softcover: 978-1-68507-744-0. $82.00

e-book: 978-1-68507-828-7. $82.00

The book covers a broad range of topics, including basic antenna theory, analytical and numerical techniques in applied electromagnetics, antenna arrays (including adaptive), aperture antennas, antenna measurements, microwave engineering, industrial and medical microwave applications, and so on. 5G propagation, MIMO and array antennas, optical nano-antennas, scattering and diffraction, computational electromagnetics, radar systems, plasmonics and nanophotonics, and advanced EM materials and structures such as metamaterials and metasurfaces are among the subjects covered in the book.

## Energy

**Advances in Energy Research. Volume 36**

*Morena J. Acosta*

In series: *Advances in Energy Research*

Publication Date: 06/03/2022

229 pp.

Hardcover: 978-1-68507-869-0. $250.00

e-book: 978-1-68507-947-5. $250.00

This book includes eight chapters, each of which details recent advances in energy research. Chapter One examines wave power absorption using wave energy converters. Chapter Two discusses various synthesis methods for zinc oxide nanostructures, nanogenerator fabrication, and tests its performance. Chapter Three investigates the feasibility of form-stable phase change materials for thermoelectric energy harvesting applications. Chapter Four utilizes the semiotic square analysis to identify and elaborate the semantic categories of energy transition ideologies. Chapter Five deals with pyrolysis of peanut shells examining two possible routes to enhance yield and/or quality of the resulting bio-oils and to improve sustainability. Chapter Six provides an introduction to synchrotron-based X-ray techniques for analyzing energy storage materials. Chapter Seven addresses the application of Weibull distribution to analyze wind energy aspects. Finally, Chapter Eight explores the optimal design parameters of a three-magnet electromagnetic vibration-based generator under subsea conditions.

**Advances in Energy Research. Volume 37**

*Morena J. Acosta*

In series: *Advances in Energy Research*

Publication Date: 10/27/2022

225 pp.

Hardcover: 979-8-88697-392-1. $250.00

e-book: 979-8-88697-407-2. $250.00

This volume contains a selection of six chapters which review current advances in energy research, covering a wide variety of topics within that category. Chapter One analyzes the carbon footprint of hospitals and a number of potential solutions for their energy needs via “smart energy.” The second chapter discusses the potential for using ferroelectric
materials in photovoltaic energy harvesting and storage devices. Chapter Three reviews the development of advanced triboelectric nanogenerators for wave energy harvesting. The fourth chapter discusses potential alternative materials with higher capacity for energy in rechargeable batteries by examining the redox reactions for anomalous capacity. Chapter Five examines the potential of energy recovery and power production from butchery wastes in Malaysia. The final chapter reviews progress in biomass combustion and its application to energy sciences.

**Designing Efficient Utilization of Energy Systems: From Green Perspectives**

*Teena Mishra, PhD (PSS Central Institute of Vocational Education, Bhopal, Madhya Pradesh, India)*

In series: *Green Research, Developments, and Programs*

Publication Date: 09/21/2022

168 pp.

Softcover: 979-8-88697-051-7. $95.00
e-book: 979-8-88697-239-9. $95.00

Energy is an essential component of all life. The increasing demand for energy for human life and its impact on the environment necessitate a rethinking of the energy use system. Green energy is the solution to many of the environmental issues that we face today. The book concentrates on the notion of green energy and its application.

**Energy Conversion: Methods, Technology and Future Directions**

*Saurabh Mani Tripathi, PhD (Founder/Coordinator, Power & Energy Research Centre (Perc), (Centre of Excellence), Assistant Professor, Department of Electrical Engineering, Kamla Nehru Institute of Technology, (An Academic Autonomous Govt. Funded Institute), Sultanpur, India) and Asheesh Kumar Singh, PhD (Professor, Department of Electrical Engineering, Motilal Nehru National Institute of Technology, Allahabad, Prayagraj, India)*

In series: *Energy Science, Engineering and Technology*

Publication Date: 12/08/2022

341 pp.

Hardcover: 979-8-88697-370-9. $230.00
e-book: 979-8-88697-424-9. $230.00

This edited book is intended to serve as a resource for engineers, researchers, scientists and experts wishing to become familiar with energy conversion technologies. This edited volume contains thirteen selected chapters that deal with cutting-edge studies on energy conversion and storage technologies. A comprehensive collection of relevant topics on the subject area has been produced in this edited book. Readers are expected to find all the chapters inspiring and very useful while doing their research in the subject area.

**The Future of Biodiesel**

*Michael F. Simpson*

In series: *Energy Science, Engineering and Technology*

Publication Date: 08/29/2022

151 pp.

Softcover: 979-8-88697-166-8. $82.00
e-book: 979-8-88697-172-9. $82.00

Biodiesel is a renewable and biodegradable form of diesel derived from vegetable oils, animal fats, or recycled grease. Biodiesel offers a number of benefits compared to standard diesel, including environmental and safety benefits. This book includes five chapters that explain various aspects of biodiesel. Chapter One focuses on various aspects of biodiesel production from microalgal species that have the potential to remediate different types of wastewaters. Chapter Two aims to show whether microreactors can replace conventional biodiesel production processes and how this replacement technology could be carried out. Chapter Three studies the effects of Cynara biodiesel-bioethanol-diesel fuel mixtures on engine performance characteristics. Chapter Four presents a study of flash point and refractive index in biodiesel/butanol and
biodiesel/diesel/butonal blends. Lastly, Chapter Five presents how microbial biodegradation may ultimately affect the overall degradation of hydrocarbons, including biodiesel.

**Nuclear Energy**

**A Complete Perspective of Nuclear Energy**

*J. Jason Chao, PhD (Nuclear Engineering and Design, Elsevier, Nuclear Resilience Group, Inc., Cupertino, CA, USA)*

In series: *Nuclear Materials and Disaster Research*

Publication Date: 05/17/2022

339 pp.

Hardcover: 978-1-68507-821-8. $230.00
e-book: 978-1-68507-924-6. $230.00

All the relevant subjects on nuclear power are explained in plain language to provide an across-the-board perspective on this interesting topic. Examples are designed to make the strenuous and challenging concepts easy to understand. All the topics of nuclear power are included: nuclear safety, nuclear waste, nuclear weapons, nuclear power plants, nuclear accidents, nuclear rockets, nuclear fusion, nuclear medicine, nuclear vaccines, proliferation, and some light versions of nuclear physics and nuclear fuels.

**Renewable Energy**

**Microbial Fuel Cell: Electricity Generation and Environmental Remediation**

*Arpita Roy, PhD (Assistant Professor, Department of Biotechnology, School of Engineering & Technology, Sharda University, Greater Noida, India) and Amit Kumar Roy, PhD (Assistant Professor, Department of Electrical Engineering, J.S.S. Academy of Technical Education, Noida, India)*

In series: *Renewable Energy: Research, Development and Policies*

Publication Date: 10/06/2022

304 pp.

Hardcover: 979-8-88697-190-3. $230.00
e-book: 979-8-88697-238-2. $230.00

This book provides comprehensive knowledge on the mechanisms of microbial fuel cells and their in-depth application in the field of bio-remediation and electricity production. It provides full coverage of the basic concepts of the environmental remediation process occurring through a microbial fuel cell and reviews the latest applications of microbial fuel. Researchers will be able to find all relevant applications of microbial fuel cells in this book.

**Power Electronic Converters and Induction Motor Drives**

*Jorge Rodas, PhD (Professor, Faculty of Engineering, National University of Asuncion, Paraguay)*

In series: *Renewable Energy: Research, Development and Policies*

Publication Date: 11/03/2022

397 pp.

Hardcover: 978-1-68507-950-5. $230.00

With the increased emphasis on climate change and reducing harmful emissions in the atmosphere, interest in power electronics converters and electric motor drives has led to significant new developments in renewable energy systems or electric propulsion. By and large, an electric machine and a power converter are required as a means of propulsion in transportation-related applications, and an electric generator and a power converter are indispensable parts of many wind-energy-based generation systems. This book resulted in five chapters covering some of the following topics: Linear and nonlinear control of three-phase and multiphase motor drive systems; Linear and nonlinear control of power electronics converters; Winding types of multiphase machines; and Fault-tolerant control of multiphase machines. The
chapters published in this book, written by the world’s leading researchers in the field, will provide a further impetus to the developments in the field, stimulating new research endeavours in an area that will likely increase in importance in the forthcoming years.

**Smart Grid Technologies in Electric Systems for Renewable Energy**

*Eugene Chaikovskaya, PhD (Senior Researcher, Associate Professor, Department of Theoretic, General and Nonconventional Power Engineering, Odessa Polytechnic National University, Ukraine)*

In series: *Energy Science, Engineering and Technology*

Publication Date: 12/01/2022

181 pp.

Softcover: 979-8-88697-387-7. $95.00

e-book: 979-8-88697-432-4. $95.00

The book includes six chapters in which represented integrated Smart Grid systems for coordination of production and consumption of the electric power on the basis of forecasting of change of parameters of technological processes are developed. Chapter One provides a mathematical and methodological substantiation of smart grid technologies for maintaining the function of electrical systems. Chapter Two discusses the uses of a smart grid system in maintaining a biogas cogeneration system. Chapter Three gives similar insight into use of these systems in maintaining a biodiesel cogeneration system. Chapter Four explores the uses of smart grid technologies for the maintenance of the function of a drying plant as part of a cogeneration system. Chapter Five reviews smart grid technologies for maintaining wind-solar electric systems, and the final chapter, Chapter Six, similarly reviews technologies for maintaining photoelectric charging stations.

**The Future of Wind Energy**

*M. Dhurgadevi, PhD (Associate Professor, Computer Science and Engineering, Mahendra Engineering College, Tamilnadu, India), P. Sakthivel, PhD (Associate Professor, Mechanical Engineering, Sri Krishna College of Technology, Coimbatore, Tamilnadu, India) and K. Gunasekaran, PhD (Associate Professor, Computer Science and Engineering, Sri Indhu College of Engineering and Technology, Telengana, India)*

In series: *Renewable Energy: Research, Development and Policies*

Publication Date: 10/13/2022

129 pp.

Softcover: 979-8-88697-232-0. $95.00

e-book: 979-8-88697-344-0. $95.00

This book provides fundamental concepts of wind energy systems and discusses the design issues for the future as well as the challenges in wind energy research. The future of wind energy relies on Artificial Intelligence, Cloud Computing, IoT, Block chain and big data analytics for wind energy generation and monitoring.

**Industrial Technology**

**Applications of AHP Methodology for Decision-Making in Cleaner Production Processes**

*Fisnik Osmani, PhD (Assistant Professor, Faculty of Mechanical Engineering and Computers, University “Isa Boletini,” Mitrovica, Kosovo and Atanas Kochov, PhD (Professor, Mechanical Engineering, Ss. Cyril and Methodius University, Skopje, North Macedonia)*

In series: *Environmental Science, Engineering and Technology*

Publication Date: 06/30/2022

100 pp.

Softcover: 978-1-68507-882-9. $82.00

e-book: 979-8-88697-012-8. $82.00
This book addresses the theoretical and scientific foundations and practical research of technologies in clean production processes based on multi-criteria decision-making. The analyzed/selected model is a realistic and appropriate model for the field of research. Comparisons are made with traditional decision-making methods and new advanced scientific methods are incorporated. The book will be of interest to engineers and researchers who focus on multi-criteria decision-making and research in clean production processes, as well as students and professors at universities that deal with this field.

Machinery

The Fault-Tolerant Control of Induction Motors

Mykhaylo V. Zagirnyak, Rector, D. Sc. (Eng.) (Professor, Kremenchuk Mykhailo Ostrohradsky National University, Kremenchuk, Ukraine), Andrii P. Kalinov, Cand. Sc. (Eng.) (Associate Professor, Kremenchuk Mykhailo Ostrohradsky National University, Kremenchuk, Ukraine), Anna V. Kostenko, Cand. Sc. (Eng.) (Kremenchuk Mykhailo Ostrohradsky National University, Kremenchuk, Ukraine) nad Viacheslav O. Melnykov, Cand. Sc. (Eng.) (Associate Professor, Kremenchuk Mykhailo Ostrohradsky National University, Kremenchuk, Ukraine)

In series: Electrical Engineering Developments
Publication Date: 11/03/2022
276 pp.
Hardcover: 979-8-88697-223-8. $230.00
e-book: 979-8-88697-302-0. $230.00

Under the conditions of increased consumption of energy resources, the problem of their conservation and rational use is topical. About 50-70 % of all energy produced in the world is consumed by the electric drive. However, its operation is often accompanied by the appearance of various kinds of defects and damage caused by poor-quality manufacturing or repair, failure of individual elements of electric motors without loss of performance. It results in more energy consumption and premature repair of electrical equipment, and hence in an increase in material costs and enlarged use of energy resources. To eliminate the negative consequences of the operation of an electric drive with defects and damage to induction motors, the monograph presents methods and systems of fault-tolerant control that allow the adjustment of the operating modes using the means of a variable-frequency electric drive. The main idea of such systems is to maintain the operability of technological mechanisms in the event of various malfunctions. The worked out methods and systems make it possible to detect various types of damage at the initial stages of their development. Then, based on the obtained information, they allow upgrading the control algorithm to maintain the operable state of the electromechanical equipment to the possibility of replacing the corresponding equipment or repairing the electric drive motor. That is, the most rational area for using the developed fault-tolerant control systems is industrial equipment, which must continue to operate, despite the deterioration in dynamic characteristics and energy efficiency.

Materials Science

Advances in Materials Science Research. Volume 52

Maryann C. Wythers

In series: Advances in Materials Science Research
Publication Date: 05/06/2022
232 pp.
Hardcover: 978-1-68507-813-3. $250.00
e-book: 978-1-68507-856-0. $250.00

This volume includes seven chapters that present recent updates in materials science research. Chapter One reviews recent theoretical investigations on designing single-atom catalysts as efficient electrocatalysts in key energy conversion reactions including the oxygen evolution reaction, hydrogen evolution reaction, oxygen reduction reaction, and carbon dioxide reduction reaction. Chapter Two investigates the potential of zirconium-based adsorbents for the sequestration of dyes and heavy metals from water bodies. Chapter Three highlights the active centers of catalytic synthesis of ammonia on a sequence of single-atom catalysts, metal alloys and clusters using density functional theory calculations, semi-empirical calculations, microkinetic modeling and experimental data. Chapter Four deals with the application of zirconium and zirconium alloys in the biomedical field. Chapter Five summarizes the latest commercially available strategies for reducing and replacing the use of toxic and polluting sanitizing agents in the food industry while still allowing for a long-lasting effect against bacterial
contamination. Chapter Six includes the results of a study of metal matrix composites for identification of non-agglomerated nanodiamonds. Lastly, Chapter Seven shows that electron tunneling through a potential barrier that separates two colloidal quantum dots of germanium leads to the splitting of electron states localized over spherical interfaces.

**Advances in Materials Science Research. Volume 53**

*Maryann C. Wythers*

In series: *Advances in Materials Science Research*

Publication Date: 09/07/2022

263 pp.

Hardcover: 979-8-88697-080-7. $250.00
e-book: 979-8-88697-096-8. $250.00

This book includes eight chapters covering recent advances in materials science research. Chapter One focuses on various sustainable isolation methods, properties, and potential applications of nanocellulose. Chapter Two covers the use of microwave irradiation in the formation of biomaterials based on calcium phosphates and their complexes with biopolymers. Chapter Three reviews the medico-biological aspects of hydroxylapatite application and its bioactive coatings. Chapter Four discusses active materials which can be integrated in food packaging to advance its functionality. Chapter Five deals with the use of temperature-programmed desorption technique to characterize the strength of amine interaction with the metal surface in palladium catalysts. Chapter Six involves the synthesis of binary copper oxide-doped cadmium oxide nanocrystals by hydrothermal technique in a basic medium. Chapter Seven concerns the synthesis of ErNbO₄ samples by the sol-gel method, through the citrate route, and heat-treated at different temperatures. Finally, Chapter Eight represents and assembles the entire progress and prospect of metal-guided photochromic materials.

**Advances in Materials Science Research. Volume 54**

*Maryann C. Wythers*

In series: *Advances in Materials Science Research*

Publication Date: 09/21/2022

270 pp.

Hardcover: 979-8-88697-194-1. $250.00
e-book: 979-8-88697-241-2. $250.00

This volume includes seven chapters that present recent advances in materials science research. Chapter One explores metal-based antioxidant nanomaterials and their potential role in regulating the oxidative stress response of spondyloarthritis. Chapter Two deals with the in situ synthesis and characterization of anaphoretic multifunctional coatings on titanium with enhanced properties. Chapter Three presents the basics of the development of sensors with zeolites and their applications. Chapter Four reviews the methods of synthesis and electrochemical applications of graphite and its analogues. Chapter Five includes a brief overview of the obtaining of pyrite, its applications, efficiency and the mechanisms of its actions in different processes and devices. Chapter Six reviews coprecipitation, which is one of the principal synthetic methodologies used to prepare magnetic nanoparticles, followed by coating them with silica and their applications in catalytic reactions. Lastly, Chapter Seven uses a full factorial design to identify the factors in thermomechanical processes that affect the mechanical properties of low carbon steel rebars.

**Advances in Materials Science Research. Volume 55**

*Maryann C. Wythers*

In series: *Advances in Materials Science Research*

Publication Date: 10/20/2022

323 pp.

Hardcover: 979-8-88697-213-9. $250.00
e-book: 979-8-88697-323-5. $250.00

This book consists of eight chapters on the latest advances in materials science research. Chapter 1 considers the production of nano-layered materials for various functional applications. Chapter 2 presents the results of a research project aimed at increasing the mechanical properties of a rolled sheet of S355 steels, microalloyed with a complex of V-Nb-Al, by means of optimization of its chemical composition and parameters of normalizing heat treatment. Chapter 3 deals with the selection criteria of brake pad material for both dry and wet environmental conditions. The review provides an insight knowledge in the development of dry and wet friction brake pad materials. Chapter 4 explores a strategy for preparing potentially useful iron oxide nanoparticles utilizing ferrocene and its derivates as source materials through the solid state thermal
decomposition technique. Chapter 5 presents a detailed review on the recent research directed towards developing epoxy-based materials for radiation shielding applications. Chapter 6 focuses on the evolution of microcrystalline cellulose (MCC) in co-processed excipient technology. In Chapter 7, the drilling and machining behavior such as speed, feed, drill bit type, drill bit diameter, feed rate and their influence of natural fiber reinforced epoxy composites are discussed. In Chapter 8, the physical properties of alkali borate glasses are reviewed, as well as their relation to the changes of microscopic structure such as structural units, bridging and nonbridging oxygens. The mixed alkali effect of borate glass is also discussed.

**Advances in Materials Science Research. Volume 56**  
*Maryann C. Wythers*  
In series: *Advances in Materials Science Research*  
Publication Date: 10/20/2022  
316 pp.  
Hardcover: 979-8-88697-331-0. $250.00  
e-book: 979-8-88697-354-9. $250.00  
Chapter One is focused on the basic concept of magnetron sputtering, magnetic configurations and applied power for various applications. The deposition of thin films of metals, metal oxides, metal nitrides and transition metal dichalcogenide materials by magnetron sputtering techniques for various applications is also examined. In Chapter Two, the limitations for the conventional magnetron sputtering plasma are introduced. Chapter Three begins with an overview of conjugated polymers for optoelectronic applications and the purpose of polymer blending. The chapter also addresses various blending strategies like the molecular weight of the non-conjugated polymer, blending approach, degree of crystallization, aggregation and solvation. In Chapter Four, the effect of carbon nanotubes (CNTs) on the crystallization of PLA nanocomposites is investigated. Chapter Five provides a detailed discussion of the main findings of various studies carried out for different combinations of polymer blend films consisting of insulating polymers, and blend films consisting of insulating and conducting polymers. Chapter Six focuses on degradable, biocompatible polymer blend films for microwave absorption. The last chapter of this book reviews the structure, advantages and disadvantages for a general understanding of carbon nanotubes (CNT) and then focuses on the applications of CNTs in a variety of electronic devices such as lithium-ion batteries, fuel cells, supercapacitors and solar cells.

**Advances in Materials Science Research. Volume 57**  
*Maryann C. Wythers*  
In series: *Advances in Materials Science Research*  
Publication Date: 11/24/2022  
286 pp.  
Hardcover: 979-8-88697-363-1. $250.00  
e-book: 979-8-88697-384-6. $250.00  
This volume includes eight chapters that present recent advances in materials science research. Chapter One discusses the potential for using conjugated polymers in enzyme-based electrochemical biosensors. The second chapter reviews the synthesis and applications of BODIPY based conjugated polymers. The third chapter discusses the...
bioprospecting of biofilm producers for bioconcrete production. Chapter Four examines the past, present, and future of iron removal from kaolin through bioleaching. Chapter Five reviews the use of coir fibers as reinforcement in polymer composites. Chapter Six reviews the molecular arrangement of long-chain ferrocenyl derivatives which have asymmetric carbon in their organized molecular films and formation of its helical nanofibers. Chapter Seven is an investigation of the spectral characteristics of composite structures based on porous materials/colloidal quantum dots/ metal and metal oxide nanoparticles for optoelectronic devices and biomedical application. Chapter Eight is a quantum mechanical study (chemical activity descriptors, nlo, nbo, dna/ect cleavage) of '4-[4-(1h-benzo[d]imidazol-2-yl)phenoxy]phthalonitrile dimethyl sulfoxide monosolvate' compounds containing dimethyl sulfoxide (DMSO).

Advances in Materials Science Research. Volume 59
Maryann C. Wythers
In series: Advances in Materials Science Research
Expected Publication Date: 02/01/2023
316 pp.
Hardcover: 979-8-88697-559-8. $250.00
e-book: 979-8-88697-570-3. $250.00
This book contains nine chapters selected for their description of advances in materials science research. Chapter One is an investigation of the various properties of delafossite CulnO2 for transparent electronic applications. Chapter Two examines how x-ray tomography may be used for the characterization of performance materials. Chapter Three reviews applications of thin silicon oxide films in integrated circuits. Chapter Four examines the use of ultrasound to prepare ionic liquid-based emulsions. Chapter Five describes thermal degradation and why it matters. Chapter Six reviews the role of silicon oxide in the oxidative dehydrogenation of ethane to produce ethylene, focusing on nickel based catalysts. Chapter Seven details the synthesis and applications of chitosan sulfonic acid. Chapter Eight examines electrical and optical properties of organic semiconductors. Chapter Nine is a review of pulsed-discharge treatment of the Al-Ti-C modification system.

Advances in Materials Science Research. Volume 60
Maryann C. Wythers
In series: Advances in Materials Science Research
Expected Publication Date: 03/20/2023
Hardcover: 979-8-88697-543-7. $250.00
e-book: 979-8-88697-631-1. $250.00
This book contains seven selected chapters discussing advances in materials science research. Chapter One reviews recent studies on indium recovery from metal production waste. Chapter Two examines piezoelectric transducers polarized for acoustic applications. Chapter Three provides an overview of glass and rubberized concrete mix design. Chapter Four examines a variety of characteristics of lightweight concrete design through multifarious testing methods. Chapter Five is a brief review of recent advances in barium oxide based heavy metal glasses. Chapter Six provides an overview of the elementary basics and uses of piezoelectric materials.

Aerogels: Properties and Applications
Alina Iuliana Pruna, PhD (Professor, Institute of Materials Technology, Universitat Politecnica de Valencia, Valencia, Spain; Center for Surface Science and Nanotechnology University Politechnica of Bucharest, Bucharest, Romania)
In series: Materials Science and Technologies
Publication Date: 05/13/2022
244 pp.
Hardcover: 978-1-68507-788-4. $195.00
This book, entitled Aerogels: Synthesis and Applications, aims to provide an insight into the synthesis and applications of varying materials in their aerogel form. The book covers the recent advances and reviews the state of the art of aerogels prepared from varying nanomaterials including carbon nanomaterials, silica, bioaerogels and hybrid aerogels in applications such as energy storage, electronics, or environmental remediation, in terms of water and air. The book serves as a fundamental information source on the techniques and methodologies applied to obtain the aerogel form of different nanomaterials, their characterization, and their post-synthesis modification or hybridization. The information enclosed in this book will be invaluable for experts to consolidate their knowledge and provide insight for newcomers to the field. Moreover, the book also includes the evolution of student satisfaction regarding a novel teaching approach based on the use of a teaching mobility event (International Week) as a
platform to introduce engineering students to nanotechnology and specifically to graphene aerogels which could serve to improve teaching abilities and outcomes.

**Bioceramics: Advances in Applications and Research**
*Michael B. Heidelberg*

In series: *Materials Science and Technologies*
Publication Date: 08/10/2022
191 pp.
Hardcover: 979-8-88697-129-3. $160.00
e-book: 979-8-88697-137-8. $160.00

Bioceramics refers to materials that are used for repairing or replacing damaged bone tissues. This book contains four chapters that review bioceramics from a variety of perspectives. Chapter One provides salient information on the structure and properties of several calcium orthophosphates designed and used in a wide range of medical applications. Chapter Two presents a detailed review of studies of isomorphic substitutions and morphotropic transformations in compounds with the crystal structure of apatite. Chapter Three discusses the source, manufacturing methods and advantages of using calcium orthophosphates scaffolds for bone tissue engineering applications. Lastly, Chapter Four focuses on the preparation and characterization of beta-calcium pyrophosphate macroporous scaffolds from avian eggshell waste by using the polymer replication method.

**Cerium Oxide: Structure, Occurrence and Applications**
*Jorben Gerritsen*

In series: *Materials Science and Technologies*
Publication Date: 07/22/2022
180 pp.
Hardcover: 978-1-68507-928-4. $160.00
e-book: 978-1-68507-938-3. $160.00

Cerium oxide is a pale yellow-white powder with commercial applications in optics and welding, among other domains. This book explores the synthesis, properties and applications of cerium oxide. Chapter One exposes the different types of cerium oxide nanostructures, with emphasis on the nanotubular structure, the synthesis process, and the influence of using heat treatment. Chapter Two reviews the principal synthetic methodologies used to form cerium oxide and develop its activity. Chapter Three describes the use of metal-doped cerium oxide nanoparticles for the degradation of dyes. Lastly, Chapter Four assesses the catalytic activity of cerium oxide species towards selective catalytic reduction of SO2 with CH4.

**Materials Science: Future Aspects**
*Kalpana Awasthi (Assistant Professor, Department of Physics, K.N. Govt. P.G. College, Gyanpur, Bhadohi, India, Arti Srivastava (Assistant Professor, Department of Chemistry, Guru Ghasidas Vishwavidyalaya, Bilaspur, India) and Mridula Tripathi (Department of Chemistry, CMP Degree College, Prayagraj, India)*

In series: *Materials Science and Technologies*
Publication Date: 07/08/2022
264 pp.
Hardcover: 978-1-68507-843-0. $195.00
e-book: 979-8-88697-008-1. $195.00

Nanomaterials are materials with individual units ranging in size from 1 to 1000 nanometers. Nanomaterials research necessitates collaboration between materials science and nanotechnology, improved materials metrology, and synthesis. This book is made up of chapters that cover the most important aspects of nanotechnology. The majority of the subjects covered in this book are related to nanomaterial properties, synthesis, procedures, and applications. This edited book provides a comprehensive overview of the current state of this vital area. The different materials and their presentations in energy, ceramics, alloys, catalysis, membrane, pollution, and biomedical sciences are covered in this edited book. It addresses a range of aspects because these materials’ structure can be tailored at extremely small scales to achieve specific properties, thus greatly expanding the materials science toolkit. It explores several applications that could potentially be used to improve the environment and to more efficiently and cost-effectively produce energy, such as producing solar cells that generate electricity at a competitive rate, so the book offers a valuable asset for a broad
readership, including professionals, students, and researchers from materials science/engineering, polymer science, composite technology, nanotechnology, and biotechnology whose work involves various types of nanomaterials. Increased coverage of important background science makes this a valuable self-contained text, and extensive expanded referencing engages readers with the newest research and industrial advancements in the subject. This edited book contains twelve chapters of valuable studies from recent years.

**Metamaterials for Microwave and Terahertz Applications: Absorbers, Sensors and Filters**

_Bhargav Appasani, PhD (Assistant Professor and Research Faculty, School of Electronics Engineering, Kalinga Institute of Industrial Technology, Bhubaneswar, Odisha, India), Om Prakash Acharya (School of Electronics Engineering, Kalinga Institute of Industrial Technology, Bhubaneswar, Odisha, India), Amitkumar Vidyakant Jha (School of Electronics Engineering, Kalinga Institute of Industrial Technology, Bhubaneswar, Odisha, India) and Nisha Gupta (Department of Electronics and Communication Engineering, Birla Institute of Technology, Mesra, Jharkhand, India)  
In series: Advances in Applied Science and Engineering  
Publication Date: 12/08/2022  
208 pp.  
Hardcover: 978-8-88697-330-3. $160.00  
e-book: 978-8-88697-419-5. $160.00  

The research on advanced materials is moving at a pace to achieve better performance with limited resources and time. Electromagnetic materials made up of materials such as metals and dielectrics, when scaled down to subwavelength dimensions and when arranged in a periodic manner, begin to exhibit some unique properties that cannot be obtained or that cannot be observed using the conventional materials. These materials are known as meta-materials and have attracted the attention of the electromagnetic community because of their myriad applications. They are usually arranged in repeating patterns, at scales that are smaller than the wavelengths of the phenomena they influence. Their precise shape, geometry, dimensions, orientation and arrangement gives them the ability to influence the electromagnetic waves and achieve benefits that go beyond what is possible with conventional materials. Over the last few years, metamaterials have discovered an unprecedented rise in practical applications in various fields of science and engineering, particularly, in microwave and terahertz frequency regimes. This book will provide a glimpse into the design of filters, sensors and absorbers in microwave and terahertz frequencies. The main objective of this book is to create awareness among young researchers about this challenging and growing field of this metamaterial, and to provide them detailed theory of designing such structures.

**Photosensitizers and Their Applications**

_Davor Margetic, PhD (Senior Scientist, Head of Division, Organic Chemistry and Biochemistry, Head of Laboratory, Physical-Organic Chemistry, Rudjer Boskovic Institute Bijenicka, Zagreb, Croatia) and Renjith Thomas, PhD (Assistant Professor, Department of Chemistry, Theoretical Chemistry and Chemical Physics Lab, St. Berchman’s College, Changanassery, Kerala, India) 
In series: Materials Science and Technologies  
Publication Date: 07/27/2022  
356 pp.  
Hardcover: 978-1-68507-880-5. $230.00  
e-book: 978-8-88697-039-5. $230.00  

Application of light in chemistry presents an active field of research with a very promising outlook, particularly in technology and medicine. Molecules which mediate the transfer of light to another molecule (photosensitizers) are the cornerstone of exploitation of light. The current state of research and recent progress in applications of photosensitizers in diverse fields are documented in twelve chapters written by scientists from around the world. Chapter 1 gives a general overview on the applications of photosensitizers in synthetic organic chemistry. This review is followed by Chapters 2-7, which deal with the various applications of photosensitizers in medicine, in particular for photodynamic cancer therapy. The subsequent Chapters 8-12 cover different aspects of applications of photosensitizers in material science, such as for dye-sensitized solar cells and photo-responsive materials.
Silk Fibroin: Advances in Applications and Research
Shivaji H. Pawar, PhD (Distinguished Professor and Former Vice Chancellor, D. Y. Patil University, Kolpahur, India, Emeritus Professor in Physics & Founder Director, Centre for Innovative and Applied Research (CIAR), T. C. College, Baramati, India)
In series: Recent Trends in Biotechnology
Publication Date: 01/26/2023
332 pp.
Hardcover: 979-8-88697-402-7. $230.00
e-book: 979-8-88697-516-1. $230.00
This book is an extensive collection of new research on nanoscience and nanomaterials by experts working in the fields of nanoscience, material science, energy, agriculture, computer science and engineering, atmospheric nanoscience, medicine, and nanobiotechnology.

Metal Alloys

Magnesium Alloys: Advances in Research and Applications
Catalin Iulian Pruncu, PhD (Visiting Researcher, Departimento di Meccanica, Matematica e Management, Bari, Italy) and Kavian Omar Cooke (Associate Professor of Material Science and Engineering, University of Bradford, UK); Kavian Omar Cooke, PhD (Associate Professor of Material Science and Engineering, University of Bradford, UK)
In series: Materials Science and Technologies
Publication Date: 09/30/2022
133 pp.
Softcover: 978-1-68507-975-8. $82.00
e-book: 979-8-88697-237-5. $82.00
As the world moves towards electrification of a large percentage of the transportation networks in wealthy countries such as the United Kingdom, the United States of America and several European nations, magnesium alloys and their fundamental research are important in order to create robust platforms for delivering lighter weight structures which in turn helps to promote an eco-environmental society. This manuscript contains a comprehensive discussion of the recent research dedicated to improving the strength and formability of the magnesium alloy while identifying potential applications for different critical sectors. Further, the present book provides a substantial review of the most recent developments of magnesium alloys and their use in self-healing technology and battery storage, among several other areas.

The Fundamentals of Metal-Matrix Composites
Sezgin Ersoy, PhD (Professor, Department of Mechatronics Engineering, Faculty of Technology, Marmara University, Istanbul, Turkey)
In series: Materials Science and Technologies
Publication Date: 07/27/2022
197 pp.
Hardcover: 978-1-68507-952-9. $160.00
e-book: 979-8-88697-091-3. $160.00
Developing production technology tries to respond to human needs. Meeting these needs requires the development of new products or an increase in the supply of raw materials. Although polymer-based, recycled, and natural resources are used as raw materials, it does not reduce the importance of metal-based structures. However, there is a need to use these metal-based materials at lower costs or to improve their existing properties. This book offers relational studies to these issues.
Nanotechnology

Advancements in the Science and Technology of Conjugated Polymers

Nimisha Kaippamangalath, PhD (Assistant Research Officer, Drug Standardization Unit, Government Ayurveda College Thiruvananthapuram, Ayurveda Medical Education, Kerala, India) and G. Unnikrishnan, PhD (Professor, Department of Chemistry, National Institute of Technology Calicut, Kerala, India)

In series: New Developments in Nanotechnology Research
Publication Date: 06/01/2022
245 pp.
Hardcover: 978-1-68507-804-1. $195.00
e-book: 978-1-68507-898-0. $195.00

Pi-conjugated polymers (PCPs) are organic macromolecular systems characterized by backbone chains with alternating single and double bonds and are fascinating materials for energy-related applications. The first chapter shall help those readers who are new to the domain of PCPs to assimilate the fundamental features and the excellent opportunities associated with such macrosystems. Chapter 2 focuses on a special and growing class of PCPs – heavy main group element containing heterocyclic systems and their unique properties. The dynamic domain of conjugated porous polymers, versatile photocatalysts, is discussed in Chapter 3. The synthetic strategies, functional modifications, characteristics, and recent applications of poly(oxadiazole)s and poly(indolocarbazole)s have been presented in Chapter 4. A basic understanding of the photophysics of conjugated polymer nanoparticles and the related fabrication routes are illustrated in Chapter 5, followed by the illustration of the theory behind the utilization for modeling and simulation in Chapter 6.

Mechanical Engineering

Analytical Models of Thermal Stresses in Porous Two-Component Materials

Ladislav Ceniga (Research Professor, Institute of Material Research, Kosice, Slovak Republic)

In series: Mechanical Engineering Theory and Applications
Expected Publication Date: 02/28/2023
93 pp.
e-book: 979-8-88697-113-2. $82.00

This book presents original analytical models of stress-strain fields around pores in two-component materials. These fields are induced by thermal stresses in/around isotropic components of the porous two-component materials. The thermal stresses, which are observed during a cooling process, originate below relaxation temperature of a porous two-component material. These stresses are a consequence of different thermal expansion coefficients of material components. The thermal stresses and the stress-strain fields are determined for such a model material system, which corresponds to two types of real porous two-component materials with isotropic components. Results of this book are applicable within basic research (solid continuum mechanics, theoretical physics, materials science), as well as within the practice of engineering. The analytical models in this book can be incorporated into analytical, computational and experimental models of material stresses, interactions of energy barriers with dislocations and magnetic domain walls. Material scientists and engineers can determine such numerical values of structural parameters to result in maximum values of the thermal stresses and the stress-strain fields. Consequently, these maximum values result in maximum mechanical properties of the real porous two-component materials. Finally, this book presents such mathematical methods, which are required to determine these analytical models.
Nanotechnology and MEMS

Advances in Nanotechnology. Volume 27
Zacharie Bartul and Jérôme Trenor
In series: Advances in Nanotechnology
Publication Date: 09/01/2022
209 pp.
Hardcover: 979-8-88697-171-2. $250.00
e-book: 979-8-88697-183-5. $250.00
This volume includes five chapters that detail recent advancements in nanotechnology. Chapter One presents some of the potential applications of nanotechnology in the food industry. Chapter Two provides a systematized approach of the main synthesis and characterization methods of silver nanoparticles, their main biological activities, and their most common daily applications. Chapter Three reviews the use of nanoparticles in the pharmaceutical industry. Chapter Four describes the application of graphene in solar cells, capacitors, batteries, and more. Chapter Five explores the potential of hydrogen peroxide in detecting diseases. Chapter Six deals with the use of nanosilver-labeled polymer glycoconjugates for specific lectins sensing. Chapter Seven explores some nanotechnological methods for DNA damage using the Monte Carlo method. Chapter Eight reviews recent reports on clay-based adsorbent for the purification of wastewater contaminated with toxic dyes and heavy metals. Lastly, Chapter Nine studies an absolute stability of a nanomechatronics system with an electroelastic actuator.

Advances in Nanotechnology. Volume 28
Zacharie Bartul and Jérôme Trenor
In series: Advances in Nanotechnology
Publication Date: 12/15/2022
272 pp.
Hardcover: 979-8-88697-440-9. $250.00
e-book: 979-8-88697-462-1. $250.00
This volume contains eight selected chapters discussing recent advances in nanotechnology research and development. Chapter One discusses the dielectric and microwave absorbing properties of epoxy composites which are comprised of nanocarbon and/or inorganic particles. Chapter Two examines the use of electromagnetic heating enhanced with magnetic nanoparticles to perform cryopreservation of a large volume cell suspension. Chapter Three reviews the current state of the art and perspectives on clay-epoxy nanocomposites. Chapter Four provides an overview of the process to synthesize hematite nanoparticles and an examination of their applications. Chapter Five reviews a process to synthesize nano- and microstructured layers of silver via the photo and thermal destruction of polyvinyl alcohol with silver nitrate. Chapter Six reviews the application of polyvinyl alcohol as a stabilizer for nanoparticles and the formation of nanocomposites. Chapter Seven provides a CUDA-based very fast analysis of sacrificial nanomaterials for epoxy coatings. Chapter Eight is a brief review on copper oxide nanoparticles for catalytic degradation.

Applications of Gold Nanoparticles
George L. Morrow
In series: Nanotechnology Science and Technology
Publication Date: 10/20/2022
282 pp.
Hardcover: 979-8-88697-272-6. $195.00
e-book: 979-8-88697-301-3. $195.00
Nanoscience is one of the most promising research areas in modern science with implausible applications in physics, chemistry, biology and materials science. Nanotechnology can be defined as the design, synthesis and application of materials and devices the size and shape of which have been developed at the nanoscale. In the first chapter, the authors bring to light various green methods used for gold nanoparticles (AuNPs) synthesis, their characterization and highlight their various applications. The second chapter focuses on the facile, low-cost and eco-friendly synthesis of gold nanoparticles using Caesalpina Crista seed extract and evaluates their antimicrobial, antioxidant and anticancer efficacies. The third chapter focuses on the efficacy of biogenically synthesized AuNPs in the reduction of dyestuff pollutants and in the catalytic reduction of nitrophenols to aminophenols in the presence of NaBH₄, as is the usage of plant extract-mediated
AuNPs as effective probes for the detection of heavy metal ions in water bodies. The last chapter examines the synthesis, characterizations and applications of gold nanoparticles using a 220 keV Ag Beam.

**Special Topics**

**Advances in Engineering Research. Volume 47**

*Victoria M. Petrova*

In series: *Advances in Engineering Research*

Publication Date: 05/06/2022

184 pp.

Hardcover: 978-1-68507-796-9. $250.00

e-book: 978-1-68507-902-4. $250.00

This volume includes six chapters, each of which provides updates in the field of engineering research. Chapter One reviews how cognitive radio schemes such as spectrum pooling among others improve the use of millimeter waves in mobile networks. Chapter Two introduces coupling theory and exhibits two manipulation methods for array antennas. Chapter Three describes a hardware implementation of a Simplified Gabor Wavelet transform-based approach for edge detection in image processing. Chapter Four presents a model of using multiple factor analysis and grouping to estimate the disparities in crop production development among different regions. Chapter Five models a cybernetic attack using colored petri nets to modify and delay the transmission of messages. Lastly, Chapter Six presents data mining techniques applied to a road traffic accidents database in Morocco to analyze choke points and intersection types that caused previous accidents.

**Advances in Engineering Research. Volume 48**

*Victoria M. Petrova*

In series: *Advances in Engineering Research*

Publication Date: 07/15/2022

253 pp.

Hardcover: 978-1-68507-894-2. $250.00

e-book: 978-9-88697-083-8. $250.00

This book includes nine chapters detailing recent advances in engineering research. Chapter One considers the factors affecting fuel consumption in the open pit mining model by investigating the existing equipment and machinery, and examines the results and consequences of reducing the effects of fuel mismanagement and increasing energy efficiency. Chapter Two aims to address the coaxial mixer principle and comprehensively discuss its agitation mechanism applied to the single and multiphase flows considering Newtonian and non-Newtonian fluids. Chapter Three presents a methodological framework for the implementation of Geographic Information Systems (GIS) for the management of cultural heritage. Chapter Four considers 182 licensed wind farms that are under operation in various parts of Turkey using the Data Envelopment Analysis. Chapter Five discusses the influence of cooling rate on microstructure evolution and mechanical properties for a thermomechanically processed near eutectoid steel, particularly with Nb microalloying. Chapter Six concerns a non-standard multicopter design. Chapter Seven reports on pulse generation via mode-locking and Q-switching. Chapter Eight proposes an energy-efficient write scheme for phase change memory. Finally, Chapter Nine reveals the orbiting satellite dynamics in the form of nonlinear stochastic differential equation (SDE) and state vectors.

**Advances in Engineering Research. Volume 49**

*Victoria M. Petrova*

In series: *Advances in Engineering Research*

Publication Date: 08/10/2022

221 pp.

Hardcover: 979-8-88697-132-3. $250.00

e-book: 979-8-88697-156-9. $250.00

This volume includes nine chapters that describe recent advancements in engineering research. Chapter One proposes an automatic data acquisition system using a low-cost camera for optical character recognition in industrial applications. Chapter Two describes the basic concepts and advanced techniques of Forster Resonance Energy Transfer. Chapter Three examines Hidden Markov Models and their properties. Chapter Four deals with identifying file types using file header signatures and file extensions in the context of computer forensics. Chapter Five analyzes the experience of implementing the Kanban system for inventory management at an automotive component company. Chapter Six
provides an overview of online learning in engineering education. Chapter Seven examines tire servicing operations at a firm that maintains public service vehicles. Chapter Eight proposes an algorithm for mining actionable patterns from datasets. Lastly, Chapter Nine explains an energy-efficient home automation system using Li-Fi.

**Advances in Engineering Research. Volume 50**

*Victoria M. Petrova*

In series: Advances in Engineering Research

Publication Date: 10/20/2022

215 pp.

Hardcover: 979-8-88697-283-2. $250.00

e-book: 979-8-88697-353-2. $250.00

One of the multiple approaches employed to monitor older people and check their health status is the use of the Hidden Markov Models (HMM), a statistical model that uses observable facts to model hidden events. Chapter One presents a systematic review of using the Prisma Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) that was updated in 2020 to incorporate the latest technologies and techniques. The review aims to establish the state of the art of the subject and presents as a conclusion how the HMM has been used and which are the open issues that need deeper research or new development to get new insights. To achieve this aim, the PRISMA methodology is carried out on Web of Science, PubMed, and Scopus. Chapter Two focuses on developing processes that provide tools (including soft and hard, analog and digital technologies) to any type of population, to break the inequality gaps in the context of the 4th industrial revolution. Chapter Three provides an overview, applications and challenges of VLC ODFM (orthogonal frequency division multiplexing) systems. In Chapter Four, the authors propose a low-cost, simple, and durable IoT-based system for the following two purposes: 1) predicting crops suitable for a given piece of land based on the soil parameters, namely, soil potential of Hydrogen (pH) and soil temperature and 2) monitoring and automating some of the recurrent processes, i.e., adding fertilizer such as Nitrogen, Phosphorus, and Potassium (NPK) and irrigation of the land. Chapter Five focuses on the effect of noise on the dynamics of natural processes. Chapter Six presents a study regarding the contribution of inrush current to the occurrence of mechanical fatigue in windings of a power transformer and, consequently, the impact of that phenomenon on the equipment’s lifetime. Chapter Seven presents a design for short circuit withstand capability of a transformer. The short circuit test is carried out to verify the integrity of short circuits developed when short circuit current flows through the transformer. In the final chapter, the problem of initial orientation of strapdown navigation system on a movable base is solved using inertial measurements under the most general assumptions about the nature of random angular motion of the base. The solution to the problem is obtained in the form of an extended Kalman filter.

**Advances in Engineering Research. Volume 51**

*Victoria M. Petrova*

In series: Advances in Engineering Research

Expected Publication Date: 02/28/2023

245 pp.

Hardcover: 979-8-88697-556-7. $250.00

e-book: 979-8-88697-569-7. $250.00

This book contains eight selected chapters on advances in engineering research. Chapter One examines a new dielectric barrier discharge plasma actuator configuration for thermo-fluid dynamic applications. Chapter Two reviews the research on and applications of precision machining methods for aerospace engine casting. Chapter Three examines potentialities of infrared thermography in education. Chapter Four provides a review of infrared thermography in magnetism. Chapter Five reviews the use of different gas injection channel geometries to improve the performance of proton-exchange membrane fuel cells. Chapter Six explores the prospect of solving the idle LBO problem for next-generation aero combustors. Chapter Seven is an interdisciplinary study of the classification of cardiac arrhythmia using fractal dimension. Chapter Eight is a review of the operation and control of active distribution networks.
Cybersecurity and Digital Forensics: Challenges and Future Paradigms

Abdulrahman Yarali, PhD (Professor, Cybersecurity and Network Management, Murray State University, KY USA), Randal Joyce, PhD (Instructor- Cybersecurity and Network Management, Murray State University, KY USA) and Faris Sahawneh, PhD (Cybersecurity and Network Management, Murray State University, KY USA)

In series: Cybercrime and Cybersecurity Research
Publication Date: 06/03/2022
188 pp.
Hardcover: 978-1-68507-810-2. $160.00
e-book: 979-8-88697-013-5. $160.00

The aim of this book is to have a detailed discussion of cybersecurity and digital forensics for creating effective defence, analysis, and investigation of cybercrime. A broad coverage of technical and socio-economic perspectives for utilizing information and communication technologies and developing practical solutions in cybersecurity, cybercrime, and cyber forensics will be discussed. The many academic areas covered in this book include, but are not limited to: Digital Transformation and New Crimes; Evolution of Digital Forensics; Cybercrime: Privacy, Security and Law Enforcement; Digital Forensics and Cybersecurity; Mobile, Cloud and Network Forensics; Virtual Crimes of the Information Age; AI and Cybersecurity; Securing Next Generation Internet Services. There will be comprehensive discussion/research on cybercrimes and forensics, a somewhat new field, as true internet/online crimes have really only started to gain recognition in the past 10-20 years. This book presents a thorough analysis of mobile forensics, big data and cloud forensics, social networking forensics, and instant messaging apps in forensics, with the challenges that law enforcement agencies are encountering.

Nonlinear Systems: Chaos, Advanced Control and Application Perspectives

Piyush Pratap Singh, PhD (Assistant Professor, Department of Electrical Engineering, National Institute of Technology Meghalaya, Shillong, India)

In series: Technology in a Globalizing World
Publication Date: 05/23/2022
137 pp.
Softcover: 978-1-68507-660-3. $95.00
e-book: 979-8-88697-001-2. $95.00

The book covers different subjects in the field of nonlinear dynamics, especially applications and investigation of chaos and chaotic systems in electrical engineering, information technology, communication engineering and mechanical engineering. This book is suitable as a textbook at the graduate or advanced undergraduate level and will appeal to postgraduate-level students and young researchers in different fields. This book provides technological advancement in nonlinear dynamics and chaos and explores the fields of communication, electric vehicles, power systems and rotational machines with centrifugal flyball governor system. An autonomous chaotic system is explored with real and complex state variables; their projective synchronisation is reported with application to secure communication. Secure communication is achieved using Masking-Modulation and Diffie-Hellman Key Exchange encryption techniques. Further, electric vehicles are the necessity of upcoming trends. To optimize the control performance of the permanent-magnet synchronous motor with different disturbances and uncertainties, a nonlinear control for the permanent-magnet synchronous motor using sliding-mode control is reported and Cascaded PI sliding mode control technique is explored to control the chaotic behaviour in electric vehicles. Chaos behaviour is explored in power systems and its control is presented using higher order sliding mode control. Comparative performances are analysed followed by control of chaos in the Rotational Machine with Centrifugal Flyball Governor system where chaos is controlled using recursive backstepping sliding mode control. All the simulations are carried out in the MATLAB environment and reveal successful achievement of the objectives. Researchers from academia and industry, who are working in the research areas Nonlinear Dynamical Systems & Chaos, Electrical Engineering, Computer Science Engineering, Information Technology, Communication Engineering and Mechanical Engineering may be principal audiences. Also, the book will be helpful for (i) graduate or advanced undergraduate level students as a textbook or major reference book for courses such as electrical circuits, nonlinear dynamical systems, mathematical modelling, computational science, numerical simulation, and many others and (ii) postgraduate level students and young researchers in the following fields: Communication Engineering; Computer Science; Electrical and Electronic Engineering; Mechanical Engineering; Engineering Mathematics; Computational Physics.
Sustainable Production: Definitions, Aspects, and Elements
Kamran Kheiralipour (Associate Professor, Mechanical Engineering of Biosystems Department, Ilam University, Ilam, Iran)
In series: Technology in a Globalizing World
Publication Date: 09/29/2022
124 pp.
Softcover: 979-8-88697-057-9. $82.00
e-book: 979-8-88697-208-5. $82.00
Production has high importance in each country in point of technical, social, environmental, and economic aspects. On another side, sustainability is a hyper-disciplinary issue which became one of the main concerns across the world. It encompasses sections of society as academic fields, and all companies, factories, organization systems, and consumers. It is a hyper-disciplinary issue because involves all aspects of human life as economic, environmental, and social aspects. Therefore, it is necessary to define and explain the various considerations and elements of sustainable production. The goal of the book is to define all aspects and elements of sustainable production for readers. This book introduces and describes sustainable production elements. It includes production, design, implementation, management, and sustainability description. Sustainable production has different aspects as technical, economic, environmental, and social. Each of these aspects has different elements in sustainable production. In this book, different elements in each aspect have been described where many of them are affected by each other. For the production a product, all or some of the elements may be considered to be respected. This book can assist the readers in considering the sustainability elements in their lives, jobs, and researches. The readers may be students, researchers, manufacturers, and those who conduct any producing or servicing activity.

Facial Recognition Technology: Usage by Federal Law Enforcement
Mari F. Burke
In series: Technology in a Globalizing World
Publication Date: 09/07/2022
197 pp.
Hardcover: 979-8-88697-124-8. $160.00
e-book: 979-8-88697-175-0. $160.00
Facial recognition—a type of biometric technology—mimics how people identify or verify others by examining their faces. Recent advancements have increased the accuracy of automated FRT resulting in increased use across a range of applications. As the use of facial recognition technology (FRT) continues to expand, it has become increasingly important to understand its use across the federal government in a comprehensive way. Law enforcement agencies’ use of FRT has received increased attention from policymakers and the public. Some of the concerns raised revolve around the accuracy of the technology, including potential race-, gender-, and age-related biases; the process of collecting, retaining, and securing images contained in various facial recognition databases; public notification of the use of facial recognition and other image-capturing technology; and policies or standards governing law enforcement agencies’ use of the technology. Some of these concerns have manifested in actions such as federal, state, and city efforts to prohibit or bound law enforcement agencies’ use of FRT. In addition, some companies producing facial recognition software have placed new barriers to law enforcement using their technologies. This book provides an overview of federal law enforcement agencies’ use of FRT, including the current status of scientific standards for its use.

Perspectives and Practices of Gamification
Mageswaran Sammugam, PhD (Senior Lecturer, Educational Technology, Universiti Sains Malaysia, Penang, Malaysia), Mohd Mokhzani Ibrahim, PhD (Senior Lecturer, Faculty of Science and Mathematics, Universiti Pendidikan Sultan Idris, Malaysia), Nurul Nadwa Zulkifli, PhD (Senior Lecturer, Educational Technology, Universiti Putra Malaysia Bintulu Campus, Sarawak, Malaysia), Syahrini Shawalluddin (Senior Lecturer, Faculty of Art and Design, Universiti Teknologi Mara Kedah Branch, Kedah, Malaysia) and
Irwan Mahazir Ismail, PhD (Senior Lecturer, Educational Technology, Universiti Sains Malaysia, Penang, Malaysia)

In series: Advancements in Learning and Instruction
Publication Date: 06/01/2022
335 pp.
Hardcover: 978-1-68507-806-5. $230.00

This book discusses the concept of gamification in a comprehensive and in-depth manner through an emphasis on its perspectives and practices in the field of education. Much effort has been expended to present the reader with comprehensive discussions about gamification from the kindergarten level to the tertiary level of education. As a result, this book serves as a comprehensive resource for anyone interested in learning more about the concept of gamification. This book’s chapters are separated into two categories, namely: (i) concept article and (ii) research article. The authors of each chapter made every attempt to be accessible and appropriate to the majority of interested parties, such as prospective teachers and researchers. Readers will be able to delve into the theories that underpin the concept of gamification in each concept article, including Game Theory, definitions, and gamification features. The basic concepts mentioned show that this book is appropriate for all levels of readers, whether they are new to gamification or have been active in gamification-related studies for a long time. Furthermore, several chapters discuss gamification-related review studies, allowing the reader to see the most recent research trends as well as research gaps that can be explored for further study. The discussion in the research articles is primarily focused on the development of a product, such as games and modules, and their implementation. At the start of each of these research articles, the author focused on current issues that prompted the development of the product. Following that, the reader will be introduced to theories and models pertinent to the product’s development. Discussions on data analysis and conclusions for each chapter were detailed and in-depth, based on evidence and credible reference sources. We wish the readers a pleasant reading experience while reading this book. We hope that the book will assist readers in solidifying their understanding of gamification and putting it into practice. Furthermore, we hope that this book will serve as a catalyst for readers to explore other areas of gamification.

TRANSPORTATION

Industrial Health and Safety

Motor Vehicles

Automated Vehicles: Safety, Benefits, and Implications
Norman D. Hart

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Publication Date: 09/29/2022
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Automated vehicles (AVs), including automated trucks and buses, are vehicles in which the safety-critical control functions (e.g., steering, acceleration, or braking) can occur without direct driver input. There are at least 1,400 automated vehicles, including automated trucks, currently in testing by more than 80 companies across 36 states, according to the U.S. Department of Transportation (DOT). This book explores the impact of automated vehicle deployment, including automated trucks and buses, on mobility, infrastructure, safety, workforce, and other economic and societal implications or benefits.
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