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### QUINN ROGERS

This book contains 14 invited contributions written by distinguished authors who participated in the VIII International Conference on Computational Plasticity held at CIMNE/UPC (www.cimne.com) from 5-8 September 2005, in Barcelona, Spain. The chapters present recent progress and future research directions in the field of computational plasticity.

Solvent systems are integral to drug development and pharmaceutical technology. This single topic encompasses numerous allied subjects running the gamut from recrystallization solvents to biorelevant media. The goal of this contribution to the AAPS Biotechnology: Pharmaceutical Aspects series is to generate both a practical handbook as well as a reference allowing the reader to make effective decisions concerning the use of solvents and solvent systems. To this end, the monograph was created by inviting recognized experts from a number of fields to author relevant sections. Specifically, 15 chapters have been designed covering the theoretical background of solubility, the effect of ionic equilibria and pH on solubilization, the use of solvents to effect drug substance crystallization and polymorph selection, the use of solvent systems in high throughput screening and early discovery, solvent use in preformulation, the use of solvents in bio-relevant dissolution and permeation experiments, solvents and their use as toxicology vehicles, solubilizing media and excipients in oral and parenteral formulation development, specialized vehicles for protein formulation and solvent systems for topical and pulmonary drug administration. The chapters are organized such that useful decision trees are included together with the scientific underpinning for their application. In addition, trends in the use of solvent systems and a balance of current views make this monograph useful to both the novice and experienced researcher and to scientists at all developmental stages from early discovery to late pharmaceutical operations.

Timber construction is one of the most prevalent methods of constructing buildings in North America and an increasingly significant method of construction in Europe and the rest of the world. Timber Engineering deals not only with the structural aspects of timber construction, structural components, joints and systems based on solid timber and engineered wood products, but also material behaviour and properties on a wood element level. Produced by internationally renowned experts in the field, this book represents the state of the art in research on the understanding of the material behaviour of solid wood and engineered wood products. There is no comparable compendium currently available on the topic - the subjects represented include the most recent phenomena of timber engineering and the newest development of practice-related research. Grouped into three different sections, 'Basic properties of wood-based structural elements', 'Design aspects on timber structures' and 'Joints and structural assemblies', this book focuses on key issues in the understanding of: timber as a modern engineered construction material with controlled and documented properties the background for design of structural systems based on timber and engineered wood products the background for structural design of joints in structural timber systems Furthermore, this invaluable book contains advanced teaching material for all technical schools and universities involved in timber engineering. It also provides an essential resource for timber engineering students and researchers, as well as practicing structural and civil engineers.

This reference work provides comprehensive information about the bioactive molecules presented in our daily food and their effect on the physical and mental state of our body. Although the concept of functional food is new, the consumption of selected food to attain a specific effect existed already in ancient civilizations, namely of China and India. Consumers are now more attentive to food quality, safety and health benefits, and the food industry is led to develop processed- and packaged-food, particularly in terms of calories, quality, nutritional value and bioactive molecules. This book covers the entire range of bioactive molecules presented in daily food, such as carbohydrates, proteins, lipids, isoflavonoids, carotenoids, vitamin C, polyphenols, bioactive molecules presented in wine, beer and cider. Concepts like French paradox, Mediterranean diet, healthy diet of eating fruits and vegetables, vegan and vegetarian diet, functional foods are described with suitable case studies. Readers will also discover a very timely compilation of methods for bioactive molecules analysis. Written by highly renowned scientists of the field, this reference work appeals to a wide readership, from graduate students, scholars, researchers in the field of botany, agriculture, pharmacy, biotechnology and food industry to those involved in manufacturing, processing and marketing of value-added food products.

Sickle cell disease (SCD) is a genetic disorder caused by an abnormality of hemoglobin. The disease is characterized by a chronic hemolytic anemia. The search for affordable and accessible medicines mainly from plants and having various modes of actions for managing SCD is a priority in Africa where the disease is endemic. The first chapter in this book reviews children with Sickle Cell Disease (SCD). The authors also present their research that shows that clinically, children with SCD behave differently regarding their genetics. The second chapter gives an overview of the current progress in research in calcium handling in red blood cells of sickle cell disease patients, followed by an outlook into the potential use of blockers of the cation channels for therapy of SCD patients. The third chapter reviews and validates the pharmacological relevance of *Gardenia ternifolia* and sustains the use of this herbal medicine in the management of SCD in traditional medical systems. The fourth chapter reviews the search and the development of antiskingling herbal drugs in Africa, where Sickle cell disease (SCD) is an endemic. The last chapter reviews SCD and its impact on sexual functioning as well as relationship dynamics. Conclusions support the importance of social support and its far-reaching impact into the coping mechanisms of patients with chronic illness as well as quality of life.

Special Topics in Structural Dynamics, Volume 6: Proceedings of the 31st IMAC, A Conference and Exposition on Structural Dynamics, 2013, the sixth volume of seven from the Conference, brings together contributions to this important area of research and engineering. The collection presents early

findings and case studies on fundamental and applied aspects of Structural Dynamics, including papers on: Teaching Experimental & Analytical Structural Dynamics Sensors & Instrumentation Aircraft/Aerospace Bio-Dynamics Sports Equipment Dynamics Advanced ODS & Stress Estimation Shock & Vibration Full-Field Optical Measurements & Image Analysis Structural Health Monitoring Operational Modal Analysis Wind Turbine Dynamics Rotating Machinery Finite Element Methods Energy Harvesting

This book is the second edition of Soft Actuators, originally published in 2014, with 12 chapters added to the first edition. The subject of this new edition is current comprehensive research and development of soft actuators, covering interdisciplinary study of materials science, mechanics, electronics, robotics, and bioscience. The book includes contemporary research of actuators based on biomaterials for their potential in future artificial muscle technology. Readers will find detailed and useful information about materials, methods of synthesis, fabrication, and measurements to study soft actuators. Additionally, the topics of materials, modeling, and applications not only promote the further research and development of soft actuators, but bring benefits for utilization and industrialization. This volume makes generous use of color figures, diagrams, and photographs that provide easy-to-understand descriptions of the mechanisms, apparatus, and motions of soft actuators. Also, in this second edition the chapters on modeling, materials design, and device design have been given a wider scope and made easier to comprehend, which will be helpful in practical applications of soft actuators. Readers of this work can acquire the newest technology and information about basic science and practical applications of flexible, lightweight, and noiseless soft actuators, which differ from conventional mechanical engines and electric motors. This new edition of Soft Actuators will inspire readers with fresh ideas and encourage their research and development, thus opening up a new field of applications for the utilization and industrialization of soft actuators.

This original book develops a systematic zero-net-profit comparative statics theory to shed new light on the microeconomics of industry equilibrium.

Vincent Bulone et al.: Cellulose sources and new understanding of synthesis in plants Thomas Heinze et al.:Cellulose structure and properties Thomas Rosenau, Antje Potthast, Ute Henniges et al.: Recent developments in cellulose aging (degradation / yellowing / chromophore formation) Sunkyu Park et al.:Cellulose crystallinity Lina Zhang et al.:Gelation and dissolution behavior of cellulose Yoshiyuki Nishio et al.:Cellulose and derivatives in liquid crystals Alessandro Gandini, Naceur Belgacem et al.:The surface and in-depth modification of cellulose fibers Emily D. Cranston et al.:Interfacial properties of cellulose Herbert Sixta, Michael Hummel et al.Cellulose Fibers Regenerated from Cellulose Solutions in Ionic Liquids Qi Zhou et al.:Cellulose-based biocomposites Orlando Rojas et al.:Films of cellulose nanocrystals and nanofibrils Pedro Fardim et al.:Functional cellulose particles Wadood Hamad et al.:Cellulose Composites

Plants, being sessile and autotrophic in nature, must cope with challenging environmental aberrations and therefore have evolved various responsive or defensive mechanisms including stress sensing mechanisms, antioxidant system, signaling pathways, secondary metabolites biosynthesis, and other defensive pathways among which accumulation of osmolytes or osmo-protectants is an important phenomenon. Osmolytes with organic chemical nature termed as compatible solutes are highly soluble compounds with no net charge at physiological pH and nontoxic at higher concentrations to plant cells. Compatible solutes in plants involve compounds like proline, glycine betaine, polyamines, trehalose, raffinose family oligosaccharides, fructans, gamma aminobutyric acid (GABA), and sugar alcohols playing structural, physiological, biochemical, and signaling roles during normal plant growth and development. The current and sustaining problems of climate change and increasing world population has challenged global food security. To feed more than 9 billion, the estimated population by 2050, the yield of major crops needs to be increased 1.1–1.3% per year, which is mainly restricted by the yield ceiling. A major factor limiting the crop yield is the changing global environmental conditions which includes drought, salinity and extreme temperatures and are responsible for a reduction of crop yield in almost all the crop plants. This condition may worsen with a decrease in agricultural land or the loss of potential crop yields by 70%. Therefore, it is a challenging task for agricultural scientists to develop tolerant/resistant varieties against abiotic stresses. The development of stress tolerant plant varieties through conventional breeding is very slow due to complex multi-gene traits. Engineering compatible solutes biosynthesis by deciphering the mechanism behind the abiotic tolerance or accumulation in plants cell is a potential emerging strategy to mitigate adverse effects of abiotic stresses and increase global crop production. However, detailed information on compatible solutes, including their sensing/signaling, biosynthesis, regulatory components, underlying biochemical mechanisms, crosstalk with other signaling pathways, and transgenic development have not been compiled into a single resource. Our book intends to fill this unmet need, with insight from recent advances in compatible solutes research on agriculturally important crop plants.

Chromogenic materials change their optical properties in response to an external stimulus. Due to their potential applications as light valve (e.g., in sun protecting glazing) or as temperature sensor, thermotropic, and thermochromic materials have come more and more into the focus of research and development. Commercialization of such high-tech products has already started and certainly many others will enter the market in near future. This book is the first to give an overview of the scientific and applicative aspects of the entire class of thermochromic and thermotropic materials. It discusses the origin of the thermo-optical effects at the molecular level and presents the macroscopic optical and material properties of chromogenic materials as well as their present and potential future application. With a view to particular potential applications, the book outlines the specific development strategies of these materials. The book addresses scientific and application-oriented researchers as well as students in the fields of smart adaptive polymers and sun-protecting materials. By providing the fundamental knowledge and outlining the future trends of thermochromism, this book familiarizes the readers with the entire field of the phenomenon.

This contributed volume applies the insights of supramolecular chemistry to biomedical applications such as ions/water transport through nano-scale channels, gene therapy, tissue engineering and drug delivery, to cite some of the major investigations. The challenge is to understand the mechanisms of transport through tissues particularly in the therapeutic treatment of a disease where the active drug must be delivered directly to diseased cells without affecting healthy cells. As a result, smaller quantities of active substances can be used to treat the disease. Another interest concerns new ways to administer gene therapy. If genes are often delivered to their target cells by adapted viruses, the supramolecular non-viral 'vectors' using dynamic nano-frameworks and nano-structures are presented. In addition, it is important to reconstruct damaged tissues by mimicking natural processes in cells and polymers, such as tissue engineering and self-healing. Different options are here discussed: e.g. hydrogels based on chitosan, a carbohydrate polymer, are proving especially promising for tissue engineering and drug delivery. For controlled delivery of drugs or other biologically active compounds, hydrogels sensitive to the most important stimuli in the human body, such as temperature, pH, ionic strength, glucose and biomolecules released by the organism in pathological conditions have been developed. Finally, to assist and validate the experimental studies, computer modelling and simulations of large-sized molecular structures and systems using different molecular dynamics and quantum mechanical techniques are developed based on the experimental and chemistry synthesis. This book is of great interest for graduate students, researchers and health professionals interested in acquiring a better understanding of the mechanisms of medical treatments. In addition, it provides numerous tools to develop better therapies for human diseases.

Applying the general deterministic approach of systems computational biology, the monograph considers questions related to the biomechanics of the human urinary bladder in conjunction with the peripheral and central nervous systems. The step-by-step development of mathematical models of separate structural elements and their assembly into a unique self-regulatory system offers, for the first time, a holistic overview and allows the investigation of the dynamics of the lower urinary tract system at its hierarchical levels. This book provides a coherent description and explanation for intertwined intracellular pathways in terms of spatiotemporal, whole body, tractable representations which are supported by numerous computational simulations.

Organochalcogen Compounds: Synthesis, Catalysis and New Protocols with Greener Perspectives, in the Advances in Green and Sustainable Chemistry series, reviews the state-of-the-art in new green protocols involving organochalcogen compounds (Se, S and Te), including the use of non-conventional reaction media, alternative solvents and solvent-free protocols to prepare these important compounds. The book provides an authoritative overview of the current state of the field and compiles recent advances in methodologies for the application of green chemistry principles in compound development, including the use of organochalcogen compounds as intermediates, catalysts or target products across a range of applications. The recent developments outlined in the book reflect the efforts of researchers in this area to move towards a more sustainable chemistry, giving the book the dual benefit of highlighting the latest developments in the field. Highlights green synthetic methods with potential application in the synthesis of natural compounds or other biologically active scaffolds Explores the chemical modification of natural compounds by insertion of organochalcogen groups for the preparation of boosted bioactive semisynthetic molecules Discusses how redox catalysis and catalysis in flow conditions using eco-friendly oxidant can provide new opportunities for the synthesis of linear and cyclic derivatives

The mammalian genome is constantly challenged by exogenous and endogenous threats. Although much is known about the mechanisms that maintain genome integrity, little is known about the applications of this knowledge to combat human disease. The past 20 years has witnessed extensive research and progress in this area and scientists started to design new therapies harnessing individual genetic differences among patients to combat degenerative disorders and cancer. We summarize these advancements and discuss perspectives for the future of personalized medicine.

Ramp up the tension and keep your readers hooked! Inside you'll find everything you need to know to spice up your story, move your plot forward, and keep your readers turning pages. Expert thriller author and writing instructor James Scott Bell shows you how to craft scenes, create characters, and develop storylines that harness conflict and suspense to carry your story from the first word to the last. Learn from examples of successful novels and movies as you transform your work from ho-hum to high-tension. • Pack the beginning, middle, and end of your book with the right amount of conflict. • Tap into the suspenseful power of each character's inner conflict. • Build conflict into your story's point of view. • Balance subplots, flashbacks, and backstory to keep your story moving forward. • Maximize the tension in your characters' dialogue. • Amp up the suspense when you revise. Conflict & Suspense offers proven techniques that help you craft fiction your readers won't be able to put down.

This edited book focusses on green chemistry as the research community endeavours to create eco-friendly materials and technologies. It provides an in-depth overview of the fundamentals, key concepts and experimental techniques for eco-friendly synthesis of organic compounds and metal/metal oxide nanoparticles/nanomaterials. It also emphasizes the mechanisms, designing and industrial technologies for green synthesis and its applications. Each chapter brings the recent developments, state of the art, challenges and perspectives which cover all the aspects in one place, and which concern the green synthesis and evolution. Authored by world-renowned experts in a broad range of green chemistry sectors, this book is an archival reference guide for researchers, engineers, scientists and postgraduates working in the field of sustainable science, green chemistry, environmental science, engineering sciences and industrial technologies.

This book is a theoretical investigation of the influence of human learning on the development through time of a 'pure labour' economy. The theory proposed is a simple one, but aims to grasp the essential features of all industrial economies. Economists have long known that two basic phenomena lie at the root of long-term economic movements in industrial societies: capital accumulation and technical progress. Attention has been concentrated on the former. In this book, by contrast, technical progress is assigned the central role. Within a multi-sector framework, the author examines the structural dynamics of prices, production and employment (implied by differentiated rates of productivity growth and expansion of demand) against a background of 'natural' relations. He also considers a number of institutional problems. Institutional and social learning, know-how, and the diffusion of knowledge emerge as the decisive factors accounting for the success and failure of industrial societies.

Marine organisms have been under research for the last decades as a source for different active compounds with various biological activities and application in agriculture, pharmacy, medicine, environment, and industries. Marine polysaccharides from these active compounds are used as antibacte-

rial, antiviral, antioxidant, anti-inflammation, bioremediations, etc. During the last three decades, several important factors that control the production of phytoplankton polysaccharides have been identified such as chemical concentrations, temperature, light, etc. The current book includes 14 chapters contributed by experts around the world; the chapters are categorized into three sections: Marine Polysaccharides and Agriculture, Marine Polysaccharides and Biological Activities, and Marine Polysaccharides and Industries.

Exhibiting both homogeneous and heterogeneous catalytic properties, nanocatalysts allow for rapid and selective chemical transformations, with the benefits of excellent product yield and ease of catalyst separation and recovery. This book reviews the catalytic performance and the synthesis and characterization of nanocatalysts, examining the current state of the art and pointing the way towards new avenues of research. Moreover, the authors discuss new and emerging applications of nanocatalysts and nanocatalysis, from pharmaceuticals to fine chemicals to renewable energy to biotransformations. Nanocatalysis features contributions from leading research groups around the world. These contributions reflect a thorough review of the current literature as well as the authors' first-hand experience designing and synthesizing nanocatalysts and developing new applications for them. The book's nineteen chapters offer a broad perspective, covering: Nanocatalysis for carbon-carbon and carbon-heteroatom coupling reactions Nanocatalysis for various organic transformations in fine chemical synthesis Nanocatalysis for oxidation, hydrogenation, and other related reactions Nanomaterial-based photocatalysis and biocatalysis Nanocatalysts to produce non-conventional energy such as hydrogen and biofuels Nanocatalysts and nanobiocatalysts in the chemical industry Readers will also learn about the latest spectroscopic and microscopy tools used in advanced characterization methods that shed new light on nanocatalysts and nanocatalysis. Moreover, the authors offer expert advice to help readers develop strategies to improve catalytic performance. Summarizing and reviewing all the most important advances in nanocatalysis over the last two decades, this book explains the many advantages of nanocatalysts over conventional homogeneous and heterogeneous catalysts, providing the information and guidance needed for designing green, sustainable catalytic processes.

This Special Issue of Marine Drugs gathers recent investigations on the proteomes, metabolomes, transcriptomes, and the associated microbiomes of marine jellyfish and polyps, including bioactivity studies of their compounds and more generally, on their biotechnological potential, witnessing the increasingly recognized importance of Cnidaria as a largely untapped Blue Growth resource for new drug discovery. These researches evoke the outstanding ecological importance of cnidarians in marine ecosystems worldwide, calling for a global monitoring and conservation of marine biodiversity, so that the biotechnological exploitation of marine living resources will be carried out to conserve and sustainably use the natural capital of the oceans.

The thesis provides the necessary experimental and analytical tools to unambiguously observe the atomically resolved chemical reactions. A great challenge of modern science has been to directly observe atomic motions during structural transitions, and while this was first achieved through a major advance in electron source brightness, the information content was still limited and new methods for image reconstruction using femtosecond electron diffraction methods were needed. One particular challenge lay in reconciling the innumerable possible nuclear configurations with the observation of chemical reaction mechanisms that reproducibly give the same kind of chemistry for large classes of molecules. The author shows that there is a simple solution that occurs during barrier crossing in which the highly anharmonic potential at that point in nuclear rearrangements couples high- and low-frequency vibrational modes to give highly localized nuclear motions, reducing hundreds of potential degrees of freedom to just a few key modes. Specific examples are given in this thesis, including two photoinduced phase transitions in an organic system, a ring closure reaction, and two direct observations of nuclear reorganization driven by spin transitions. The emerging field of structural dynamics promises to change the way we think about the physics of chemistry and this thesis provides tools to make it happen.

A rapidly growing field, this book covers the recent advances in screening technology, ion channel structure and modelling, with up-to-date case histories.

Activation, inhibition, or destruction of the nervous system or its component parts as a vital tool for the investigation of function has undergone remarkable development; indeed, new approaches have been developed that allow for these actions to be used as therapeutic tools. In Stimulation and Inhibition of Neurons, experts in the field provide an overview of modern methods for generating lesions as well as for stimulating and inhibiting neural pathways. Many new techniques such as optogenetics and the use of the in situ perfused preparation are examined, while, in other sections, the use and validity of more well-known approaches are reassessed. Written for the Neuromethods series, chapters examine their respective topics thoroughly and include the kind of detail and implementation advice that ensures successful results in the laboratory. Authoritative and cutting-edge, Stimulation and Inhibition of Neurons serves as an ideal guide for researchers seeking to gain further knowledge of the complex functions of the brain.

Third edition of the best-selling Cambridge English: First (FCE) course. The Student's Book contains fresh, updated texts and artwork that provide solid language development, lively class discussion and training in exams skills. The 24 topic-based units include examples from the Cambridge English Corpus to highlight common learner errors while vocabulary sections informed by the English Vocabulary Profile ensure that students are learning the most useful language required at this level. A phrasal verb list provides a handy reference for students. The interactive CD-ROM provides comprehensive extra practice of the language and topics covered in the book.

"This book is designed to help students organize their thinking about psychology at a conceptual level. The focus on behaviour and empiricism has produced a text that is better organized, has fewer chapters, and is somewhat shorter than many of the leading books. The beginning of each section includes learning objectives; throughout the body of each section are key terms in bold followed by their definitions in italics; key takeaways, and exercises and critical thinking activities end each section"--BCCampus website.

Currently, hemoglobin (Hb)-based oxygen carriers (HBOCs) are leading candidates as red blood cell substitutes. In addition, HBOCs are also potential oxygen therapeutics for treatment of patients with critical ischemic conditions due to atherosclerosis, diabetes and other conditions. This book will provide readers a comprehensive review of topics involved in the HBOC development. It focusses on current products and clinical applications as well as on emerging technologies and future prospects.

This new volume, number 123, of Methods in Cell Biology looks at methods for quantitative imaging in cell biology. It covers both theoretical and prac-

tical aspects of using optical fluorescence microscopy and image analysis techniques for quantitative applications. The introductory chapters cover fundamental concepts and techniques important for obtaining accurate and precise quantitative data from imaging systems. These chapters address how choice of microscope, fluorophores, and digital detector impact the quality of quantitative data, and include step-by-step protocols for capturing and analyzing quantitative images. Common quantitative applications, including co-localization, ratiometric imaging, and counting molecules, are covered in detail. Practical chapters cover topics critical to getting the most out of your imaging system, from microscope maintenance to creating standardized samples for measuring resolution. Later chapters cover recent advances in quantitative imaging techniques, including super-resolution and light sheet microscopy. With cutting-edge material, this comprehensive collection is intended to guide researchers for years to come. Covers sections on model systems and functional studies, imaging-based approaches and emerging studies Chapters are written by experts in the field Cutting-edge material

Weighing in on the growth of innovative technologies, the adoption of new standards, and the lack of educational development as it relates to current and emerging applications, the third edition of Introduction to Instrumentation and Measurements uses the authors' 40 years of teaching experience to expound on the theory, science, and art of modern instrumentation and measurements (I&M). What's New in This Edition: This edition includes material on modern integrated circuit (IC) and photonic sensors, micro-electro-mechanical (MEM) and nano-electro-mechanical (NEM) sensors, chemical and radiation sensors, signal conditioning, noise, data interfaces, and basic digital signal processing (DSP), and upgrades every chapter with the latest advancements. It contains new material on the designs of micro-electro-mechanical (MEMS) sensors, adds two new chapters on wireless instrumentation and microsensors, and incorporates extensive biomedical examples and problems. Containing 13 chapters, this third edition: Describes sensor dynamics, signal conditioning, and data display and storage Focuses on means of conditioning the analog outputs of various sensors Considers noise and coherent interference in measurements in depth Covers the traditional topics of DC null methods of measurement and AC null measurements Examines Wheatstone and Kelvin bridges and potentiometers Explores the major AC bridges used to measure inductance, Q, capacitance, and D Presents a survey of sensor mechanisms Includes a description and analysis of sensors based on the giant magnetoresistive effect (GMR) and the anisotropic magnetoresistive (AMR) effect Provides a detailed analysis of mechanical gyroscopes, clinometers, and accelerometers Contains the classic means of measuring electrical quantities Examines digital interfaces in measurement systems Defines digital signal conditioning in instrumentation Addresses solid-state chemical microsensors and wireless instrumentation Introduces mechanical microsensors (MEMS and NEMS) Details examples of the design of measurement systems Introduction to Instrumentation and Measurements is written with practicing engineers and scientists in mind, and is intended to be used in a classroom course or as a reference. It is assumed that the reader has taken core EE curriculum courses or their equivalents.

This reference work presents the origins of cells for tissue engineering and regeneration, including primary cells, tissue-specific stem cells, pluripotent stem cells and trans-differentiated or reprogrammed cells. There is particular emphasis on current understanding of tissue regeneration based on embryology and evolution studies, including mechanisms of amphibian regeneration. The book covers the use of autologous versus allogeneic cell sources, as well as various procedures used for cell isolation and cell pre-conditioning, such as cell sorting, biochemical and biophysical pre-conditioning, transfection and aggregation. It also presents cell modulation using growth factors, molecular factors, epigenetic approaches, changes in biophysical environment, cellular co-culture and other elements of the cellular microenvironment. The pathways of cell delivery are discussed with respect to specific clinical situations, including delivery of ex vivo manipulated cells via local and systemic routes, as well as activation and migration of endogenous reservoirs of reparative cells. The volume concludes with an in-depth discussion of the tracking of cells in vivo and their various regenerative activities inside the body, including differentiation, new tissue formation and actions on other cells by direct cell-to-cell communication and by secretion of biomolecules.

The book is an excellent reference for scientists, researchers and students working in the field of areas of biopolymeric biomaterials, biomedical engineering, therapeutics, tissue engineering and regenerative medicine. The book is divided into two parts: Part I will focus on the tissue engineering and Part II focuses on therapeutics, functionalization and computer-aided techniques. The book consists of 13 chapters contributed by 20 international contributors who are leading experts in the field of biopolymers and its applications. It will focus on the advancements of chitin and chitosan in regenerative medicine. Regenerative medicine in tissue engineering is the process of replacing or regenerating human cells, tissues, or organs to restore or establish normal function. It is an incredibly progressive field of medicine that may, in the near future, help with the shortage of life-saving organs

available through donation for transplantation vis-a-vis regenerative medicine focuses on therapeutics, functionalization and computer-aided techniques. It also covers physical and chemical aspects of chitin and chitosan, structural modifications for biomedical applications, chitosan based scaffolds and biomodelling in tissue engineering, nanomedicines and therapeutic applications. With the broad range of applications, the world is waiting for biopolymers to serve as the basis for regenerative medicine and biomedical applications.

The ASCRS Textbook of Surgery of the Colon and Rectum offers a comprehensive textbook designed to provide state of the art information to residents in training and fully trained surgeons seeking recertification. The textbook also supports the mission of the ASCRS to be the world's authority on colon and rectal disease. The combination of junior and senior authors selected from the membership of the ASCRS for each chapter will provide a comprehensive summary of each topic and allow the touch of experience to focus and temper the material. This approach should provide the reader with a very open minded, evidence based approach to all aspects of colorectal disease. Derived from the textbook, The ASCRS Manual of Surgery of the Colon and Rectum offers a "hands on" version of the textbook, written with the same comprehensive, evidence-based approach but distilled to the clinical essentials. In a handy pocket format, readers will find the bread and butter information for the broad spectrum of practice. In a consistent style, each chapter outlines the condition or procedure being discussed in a concise outline format - easy to read, appropriately illustrated and referenced.

This book features the latest advances and future trends in water science and technology. It also discusses the scientific popularization and quantitative resolution of a variety of mysterious properties of water and ice from the perspective of hydrogen-bond cooperativity in response to stimuli such as chemical contamination, electrification, magnetification, mechanical compression, molecular undercoordination, and thermal excitation. Anomalies include the floating of ice, the Hofmeister effect in solutions, regelation of ice, slipperiness of ice, water's tough skin, the Mpemba paradox, and the floating bridge. It also addresses the superfluidity of microchannels, hydrogen bond potentials, nanodroplet and bubble thermodynamics, quasisolidity and supersolidity, controlling superhydrophobicity-superhydrophilicity transition, and high-pressure ice formation. The target audience for this book includes students, senior scholars, engineers and practitioners in the area of physical chemistry, biology, as well as aqueous and colloid solutions.

Offering extensive information on tardigrades, this volume begins with a chapter on the history of tardigrades, from the first description by Goeze in 1773, until 1929, when the most comprehensive monographic approach by E. Marcus was published. Tardigrades' organ systems, including their integument, body cavity, digestive, muscular, nervous and reproductive systems, as well as their overall external morphology, are summarized in the second chapter. Subsequent chapters present the current state of knowledge on tardigrade phylogeny, biogeography, paleontology, cytology and cytogenetics. In addition, the book provides insights into the ecology of tardigrades in marine, freshwater and terrestrial habitats. The reproduction, development and life cycles are summarized and the extraordinary environmental adaptations of encystment and cyclomorphosis, desiccation tolerance, freezing tolerance and radiation tolerance are discussed in detail. Further chapters provide an overview of key approaches in molecular tardigrade studies and describe techniques for sampling and sample processing. The book closes with a list of tardigrade taxa up to a sub-generic level, including the type species of each genus, the numbers of lower taxa in each taxon, and the main environments in which the taxa were found. Given its depth of coverage, the volume offers an invaluable resource for scientists from various disciplines who plan to research tardigrades, and for all others who are interested in these fascinating animals.

The present Special Issue of Symmetry is devoted to two important areas of global Riemannian geometry, namely submanifold theory and the geometry of Lie groups and homogeneous spaces. Submanifold theory originated from the classical geometry of curves and surfaces. Homogeneous spaces are manifolds that admit a transitive Lie group action, historically related to F. Klein's Erlangen Program and S. Lie's idea to use continuous symmetries in studying differential equations. In this Special Issue, we provide a collection of papers that not only reflect some of the latest advancements in both areas, but also highlight relations between them and the use of common techniques. Applications to other areas of mathematics are also considered.

Focusing on a variety of coatings, this book provides detailed discussion on preparation, novel techniques, recent developments, and design theories to present the advantages of each function and provide the tools for better product performance and properties. • Presents advantages and benefits of properties and applications of the novel coating types • Includes chapters on specific and novel coatings, like nanocomposite, surface wettability tunable, stimuli-responsive, anti-fouling, antibacterial, self-healing, and structural coloring • Provides detailed discussion on recent developments in the field as well as current and future perspectives • Acts as a guide for polymer and materials researchers in optimizing polymer coating properties and increasing product performance