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The chapters of this book report cutting-edge research on molecular events in adiposity and type 2 diabetes, thus opening the way for innovative drug-based therapeutic strategies. It addresses all those who wish to keep in touch with recent developments in the field.

The book illustrates the use of putative microbial agents which provide good protection to the plant from biotic pathogens attack. An up to date knowledge on plant-microbiome interaction strategies in terms of improved sustainability has been discussed. Information from experts across the globe on the application of microbes for providing amicable solution in sustainable agriculture has been gathered. In addition, information related to microbes mediated resistance levels leading to enhanced plant health has been well presented. The chapters have emphasised the use of Plant Growth Promoting Rhizobacteria (PGPR) and other potential biocontrol agents/antagonists in the management of plant diseases which provide extensive information to the readers. Literature on microbial root colonization, plant growth promotions, and also on the protection of plants from attack of various soil borne pathogens have been presented in a coherent way. Information on the application of potential strain of the bio-control fungi, endophytes, actinomycetes strengthening the

plants ability which rescue the plant from pathogens attack leading to improved plant health has also been underpinned.

The last several years have been a landmark period in the ubiquitin field. The breadth of ubiquitin's roles in cell biology was first sketched, and the importance of ubiquitin-dependent proteolysis as a regulatory mechanism gained general acceptance. The many strands of work that led to this new perception are re counted in this book. A consequence of this progress is that the field has grown dramatically since the first book on ubiquitin was published almost a decade ago [M. Rechsteiner (ed.), Ubiquitin, Plenum Press, 1988]. In this span, students of the cell cycle, transcription, signal transduction, protein sorting, neuropathology, cancer, virology, and immunology have attempted to chart the role of ubi quit in in their particular experimental systems, and this integration of the field into cell biology as a whole continues at a remarkable pace. We hope that for active researchers in the field as well as for newcomers and those on the fence, this book will prove helpful for its breadth, historical perspective, and practical tips. Structural data are now available on many of the components of the ubiquitin pathway. The structures have provided basic insights into the unusual biochemical mechanisms of ubiquitination and proteasome-mediated proteolysis. Because high-speed computer graphics can convey structures

more effectively than print media, we have supplemented the figures of the book with a Worldwide Web site that can display the structures in a flexible, viewer-controlled format.

This second edition of the textbook presents a systematic introduction to the structural mechanics of composite components. The book focusses on modeling and calculation of sandwiches and laminated composites i.e. anisotropic material. The new edition includes an additional chapter covering the latest advances in both research and applications, which are highly relevant for readers. The textbook is written for use not only in engineering curricula of aerospace, civil and mechanical engineering, but also for materials science and applied mechanics. Furthermore, it addresses practicing engineers and researchers. No prior knowledge of composite materials and structures is required for the understanding of its content. The book is close to classical courses of "Strength of Materials" and "Theory of Beams, Plates and Shells" but it extends the classic content on two topics: the linear elastic material behavior of isotropic and non-isotropic structural elements, and inhomogeneous material properties in the thickness direction. The Finite Element Analysis of laminate and sandwich structures is briefly presented. Many solved examples illustrate the application of the techniques learned.

New materials and stricter energy-efficiency requirements have brought about radical changes in timber construction in recent years. Whether built on site or pre-fabricated, this publication provides a concise survey of modern timber construction, the materials and their applications.

This book is for those familiar with solution-state NMR who are encountering solid-state NMR for the first time. It presents the current understanding and applications of solid-state NMR with a rigorous but readable approach, making it easy for someone who merely wishes to gain an overall impression of the subject without details. This dual requirement is met through careful construction of the material within each chapter. The book is divided into two parts: "Fundamentals" and "Further Applications." The section on Fundamentals contains relatively long chapters that deal with the basic theory and practice of solid-state NMR. The essential differences and extra scope of solid-state NMR over solution-state is dealt with in an introductory chapter. The basic techniques that all chapters rely on are collected into a second chapter to avoid unnecessary repetition later. Remaining chapters in the "Fundamentals" part deal with the major areas of solid-state NMR which all solid-state NMR spectroscopists should know about. Each begins with an overview of the topic that puts the chapter in context. The basic principles upon which the techniques in the chapter rely are

explained in a separate section. Each of these chapters exemplifies the principles and techniques with the applications most commonly found in current practice. The "Further Applications" section contains a series of shorter chapters which describe the NMR techniques used in other, more specific areas. The basic principles upon which these techniques rely will be expounded only if not already in the Fundamentals part.

This monograph covers a novel technology to deliver drugs and cosmetics through the skin in a minimally invasive manner. Microneedles – a bed of miniaturized needles is one of the most studied topics in delivering actives through the skin barrier. This book enables readers to understand the delivery of ingredients through the skin, describes a novel and simple method to fabricate microneedles containing a range of small and large molecular weight compounds, studies their physical properties as well as delivery through the skin layers. Readers will discover this book to be extremely beneficial to help them understand the state of the field of transdermal drug delivery, with extensive coverage including experimental data on basics of microneedle fabrication technology using photolithography, encapsulation of drugs within the polymeric matrix of microneedles and studying their release patternsin vitro and ex vivo . Academic researchers, pharmaceutical and cosmeceutical

industry as well as students of skin science will find this account very useful in their pursuits. As microneedles grow and develop into a commercial reality with more actives being delivered and significant clinical research being put in, this account will hold well in providing basic principles and knowledge together with rigorous experimental data.
This book uses a wide range of case studies from different invertebrate taxa to describe the numerous forms of social recognition occurring in this large group of animals and traces the evolution of this cognitive ability. The authors provide several examples of direct (i.e. the target of recognition is a conspecific) and indirect recognition (i.e. recognition of a reliable proxy rather than an individual, such as a den or a substrate) and discuss cases of familiar recognition (i.e. an animal remembers a conspecific but cannot tell what class it comes from or recognize its identity). Class-level recognition (i.e. an animal assigns a conspecific to an appropriate class of animals), and true individual recognition (i.e. an animal both identifies and recognizes a conspecific on an individual basis) are also addressed.
Quiet Whispers is a collection of inspirational poetry written in the years after the death of Susan Elaine Collinsa youngest son in 1997. Her son was killed instantly, and Susan was shaken to the innermost part of her being. The tragic loss of her child is reflected in much of her poetryathe writing of which

has become a healing path for her. Throughout Quiet Whispers, Susan conveys a feeling of encouragement to the reader. Her faith in God is uppermost in her thoughts. She writes of her love for God and His love for all of us. She writes about family, children, growing old, and past and present times. She also writes story poetry. Most of these story poems are written with a twista]things that might or might not have happened.

Confidently face the challenges of proteomics research specific to plant science with the information in Plant Proteomics, which will introduce you to the techniques and methodologies required for the study of representative plant species. Read about proteomics studies in Arabidopsis, rice, and legumes and find information about common technologies like mass spectrometry and gel electrophoresis. Discover expression proteomics, functional proteomics, structural proteomics, bioinformatics, and systems biology, understand how to conduct proteomics studies in developing countries and underfunded laboratories, and gain access to guidelines for sample preparation.

This volume provides a comprehensive overview of aquatic redox chemistry through chapters contributed by many of the leading investigators in the field.

Heparins remain amongst the most commonly used drugs in clinical practice. Almost 100 years have

passed since the initial discovery of this complex substance and, during this time, understanding of the nature and uses of heparin and related molecules has grown dramatically. The aim of this volume is to summarise the developments that have led to the current status of both heparins as drugs and the field of heparin research, with a focus on the particularly rapid progress that has been made over the past three decades. Individual sections are dedicated to the nature of heparin as a biological molecule, the current approaches and techniques that are used to ensure the safety and reliability of heparin as a medicine, the clinical pharmacology of heparin as an anticoagulant drug, effects and potential applications of heparin aside of those involving haemostasis and, finally, the nature and potential uses of heparin-like materials from both natural and synthetic sources.

This handbook provides a comprehensive overview of Partial Least Squares (PLS) methods with specific reference to their use in marketing and with a discussion of the directions of current research and perspectives. It covers the broad area of PLS methods, from regression to structural equation modeling applications, software and interpretation of results. The handbook serves both as an introduction for those without prior knowledge of PLS and as a comprehensive reference for researchers and practitioners interested in the most recent

advances in PLS methodology.
Provides timely, comprehensive coverage of in vivo chemical reactions within live animals This handbook summarizes the interdisciplinary expertise of both chemists and biologists performing in vivo chemical reactions within live animals. By comparing and contrasting currently available chemical and biological techniques, it serves not just as a collection of the pioneering work done in animal-based studies, but also as a technical guide to help readers decide which tools are suitable and best for their experimental needs. The Handbook of In Vivo Chemistry in Mice: From Lab to Living System introduces readers to general information about live animal experiments and detection methods commonly used for these animal models. It focuses on chemistry-based techniques to develop selective in vivo targeting methodologies, as well as strategies for in vivo chemistry and drug release. Topics include: currently available mouse models; biocompatible fluorophores; radionuclides for radiodiagnosis/radiotherapy; live animal imaging techniques such as positron emission tomography (PET) imaging; magnetic resonance imaging (MRI); ultrasound imaging; hybrid imaging; biocompatible chemical reactions; ligand-directed nucleophilic substitution chemistry; biorthogonal prodrug release strategies; and various selective targeting strategies for live animals. -Completely covers current

techniques of in vivo chemistry performed in live animals -Describes general information about commonly used live animal experiments and detection methods -Focuses on chemistry-based techniques to develop selective in vivo targeting methodologies, as well as strategies for in vivo chemistry and drug release -Places emphasis on material properties required for the development of appropriate compounds to be used for imaging and therapeutic purposes in preclinical applications Handbook of In Vivo Chemistry in Mice: From Lab to Living System will be of great interest to pharmaceutical chemists, life scientists, and organic chemists. It will also appeal to those working in the pharmaceutical and biotechnology industries.

The increasing availability of molecular and genetic databases coupled with the growing power of computers gives biologists opportunities to address new issues, such as the patterns of molecular evolution, and re-assess old ones, such as the role of adaptation in species diversification. In the second edition, the book continues to integrate a wide variety of data analysis methods into a single and flexible interface: the R language. This open source language is available for a wide range of computer systems and has been adopted as a computational environment by many authors of statistical software. Adopting R as a main tool for phylogenetic analyses will ease the workflow in biologists' data analyses, ensure greater scientific repeatability, and enhance the exchange of ideas and methodological developments. The second edition is completed updated, covering the full gamut of R packages for this area that have been introduced to the market since its

previous publication five years ago. There is also a new chapter on the simulation of evolutionary data. Graduate students and researchers in evolutionary biology can use this book as a reference for data analyses, whereas researchers in bioinformatics interested in evolutionary analyses will learn how to implement these methods in R. The book starts with a presentation of different R packages and gives a short introduction to R for phylogeneticists unfamiliar with this language. The basic phylogenetic topics are covered: manipulation of phylogenetic data, phylogeny estimation, tree drawing, phylogenetic comparative methods, and estimation of ancestral characters. The chapter on tree drawing uses R's powerful graphical environment. A section deals with the analysis of diversification with phylogenies, one of the author's favorite research topics. The last chapter is devoted to the development of phylogenetic methods with R and interfaces with other languages (C and C++). Some exercises conclude these chapters.

This open access book was prepared as a Final Publication of the COST Action IC1406 “High-Performance Modelling and Simulation for Big Data Applications (cHiPSet)“ project. Long considered important pillars of the scientific method, Modelling and Simulation have evolved from traditional discrete numerical methods to complex data-intensive continuous analytical optimisations. Resolution, scale, and accuracy have become essential to predict and analyse natural and complex systems in science and engineering. When their level of abstraction raises to have a better discernment of the domain at hand, their representation gets increasingly demanding for computational and data resources. On the other hand, High Performance Computing typically entails the effective use of parallel and distributed processing units coupled with efficient storage, communication and visualisation systems to underpin

complex data-intensive applications in distinct scientific and technical domains. It is then arguably required to have a seamless interaction of High Performance Computing with Modelling and Simulation in order to store, compute, analyse, and visualise large data sets in science and engineering. Funded by the European Commission, cHiPSet has provided a dynamic trans-European forum for their members and distinguished guests to openly discuss novel perspectives and topics of interests for these two communities. This cHiPSet compendium presents a set of selected case studies related to healthcare, biological data, computational advertising, multimedia, finance, bioinformatics, and telecommunications.

Summarizing all the latest trends and recent topics in one handy volume, this book covers everything needed for a solid understanding of photochromic materials. Following a general introduction to organic photochromic materials, the authors move on to discuss not only the underlying theory but also the properties of such materials. After a selection of pplications, they look at the latest achievements in traditional solution-phase applications, including photochromic-based molecular logic operations and memory, optically modulated supramolecular system and sensors, as well as light-tunable chemical reactions. The book then describes the hotspot areas of photo-switchable surfaces and nanomaterials, photochromic-based luminescence/electronic devices and bulk materials together with light-regulated biological and bio-chemical systems. The authors conclude with a focus on current industrial applications and the future outlook for these materials. Written with both senior researchers and entrants to the field in mind.

Epithelial mucins are large complex cell surface and secreted glycoproteins produced by mucosal epithelial cells. In, Mucins: Methods and Protocols expert researchers in the field

detail many of the methods which are now commonly used to study Mucins. These include methods and techniques for the best approaches to analysing each specific area of mucin biochemistry, physiology and biophysics before providing individual detailed experimental protocols together with troubleshooting and interpretation tips. Written in the highly successful Methods in Molecular BiologyTM series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and key tips on troubleshooting and avoiding known pitfalls. Authoritative and practical, Mucins: Methods and Protocols is designed to be a useful resource for those entering the mucin field and to facilitate those already studying mucins to broaden their experimental approaches to understanding mucosal biology. Luminescence, for example, as fluorescence, bioluminescence, and phosphorescence, can result from chemical changes, electrical energy, subatomic motions, reactions in crystals, or stimulation of an atomic system. This subject continues to have a major technological role for humankind in the form of applications such as organic and inorganic light emitters for flat panel and flexible displays such as plasma displays, LCD displays, and OLED displays. Luminescent Materials and Applications describes a wide range of materials and applications that are of current interest including organic light emitting materials and devices, inorganic light emitting diode materials and devices, down-conversion materials, nanomaterials, and powder and thin-film electroluminescent phosphor materials and devices. In addition, both the physics and the materials aspects of the field of solid-state luminescence are presented. Thus, the book may be used as a reference to gain an understanding of various types and mechanisms of luminescence and of the implementation of luminescence into practical devices. The

book is aimed at postgraduate students (physicists, electrical engineers, chemical engineers, materials scientists, and engineers) and researchers in industry, for example, at lighting and display companies and academia involved in studying conduction in solids and electronic materials. It will also provide an excellent starting point for all scientists interested in luminescent materials. Finally it is hoped that this book will not only educate, but also stimulate further progress in this rapidly evolving field.

Significant progress has been made in recent years in quenched-phosphorescence oxygen sensing, particularly in the materials and applications of this detection technology that are open to commercialization, like uses in brain imaging and food packaging. Prompted by this, the editors have delivered a dedicated book that brings together these developments, provides a comprehensive overview of the different detection methodologies, and representative examples and applications. This book is intended to attract new researchers from various disciplines such as chemistry, physics, biology and medicine, stimulate further progress in the field and assist in developing new applications. Providing a concise summary at the cutting edge, this practical guide for current experts and new potential users will increase awareness of this versatile sensing technology.

Nanostructures refer to materials that have relevant dimensions on the nanometer length scales and reside in the mesoscopic regime between isolated atoms and molecules in bulk matter. These materials have unique physical properties that are distinctly different from bulk materials. Self-Assembled Nanostructures provides systematic coverage of basic nanomaterials science including materials assembly and synthesis, characterization, and application. Suitable for both beginners and experts, it balances the chemistry aspects of nanomaterials with physical principles. It also

highlights nanomaterial-based architectures including assembled or self-assembled systems. Filled with in-depth discussion of important applications of nano-architectures as well as potential applications ranging from physical to chemical and biological systems, Self-Assembled Nanostructures is the essential reference or text for scientists involved with nanostructures.

This book provides an essential overview of existing state-of-the-art quantitative imaging methodologies and protocols (intensity-based ratiometric and FLIM/PLIM). A variety of applications are covered, including multi-parametric quantitative imaging in intestinal organoid culture, autofluorescence imaging in cancer and stem cell biology, Ca2+ imaging in neural ex vivo tissue models, as well as multi-parametric imaging of pH and viscosity in cancer biology. The current state-of-the-art of 3D tissue models and their compatibility with live cell imaging is also covered. This is an ideal book for specialists working in tissue engineering and designing novel biomaterial.

This book will cover the most recent progress on the use of low-cost nanomaterials and development of low-cost/large scale processing techniques for greener and more efficient energy related applications, including but not limited to solar cells, energy storage, fuel cells, hydrogen generation, biofuels, etc. Leading researchers will be invited to author chapters in the field with their expertise. Each chapter will provide general introduction to a specific

topic, current status of research and development, research challenges and outlook for future direction of research. This book aims to benefit a broad readership, from undergraduate/graduate students to researchers working on renewable energy.

The book Carbon Nanotubes - Recent Progress contains a number of recent researches on synthesis, growth, characterization, development, and potential applications on carbon materials especially CNTs in nanoscale. It is a promising novel research from top to bottom that has received a lot of interest in the last few decades. It covers the advanced topics on the physical, chemical, and potential applications of CNTs. Here, the interesting reports on cutting-edge science and technology related to synthesis, morphology, control, hybridization, and prospective applications of CNTs are concluded. This potentially unique work offers various approaches on the R

This book presents the proceedings of the 4th International Conference on Internet of Things and Connected Technologies (ICIoTCT), held on May 9–10, 2019, at Malaviya National Institute of Technology (MNIT), Jaipur, India. The Internet of Things (IoT) promises to usher in a revolutionary, fully interconnected “smart” world, with relationships between objects and their environment and objects and people becoming more tightly intertwined. The prospect of the Internet of Things as a ubiquitous

array of devices bound to the Internet could fundamentally change how people think about what it means to be “online”. The ICIotCT 2019 conference provided a platform to discuss advances in Internet of Things (IoT) and connected technologies, such as various protocols and standards. It also offered participants the opportunity to interact with experts through keynote talks, paper presentations and discussions, and as such stimulated research. With the recent adoption of a variety of enabling wireless communication technologies, like RFID tags, BLE, ZigBee, embedded sensor and actuator nodes, and various protocols such as CoAP, MQTT and DNS, IoT has moved on from its infancy. Today smart sensors can collaborate directly with machines to automate decision-making or to control a task without human involvement. Further, smart technologies, including green electronics, green radios, fuzzy neural approaches, and intelligent signal processing techniques play an important role in the development of the wearable healthcare devices.

Covering the fundamentals of air-borne particles and settled dust in the indoor environment, this handy reference investigates: * relevant definitions and terminology, * characteristics, * sources, * sampling techniques and instrumentation, * exposure assessment, * monitoring methods. The result is a useful and comprehensive overview for chemists,

physicists and biologists, postgraduate students, medical practitioners, occupational health professionals, building owners and managers, building, construction and air-conditioning engineers, architects, environmental lawyers, government and regulatory professionals.

Multiple senses, like multiple intelligences, are a key to brain variability and therefore human evolution. Besides the traditional five senses (vision, olfaction, gustation, audition, and somatosensory), humans can also perceive the body's own position (the sense of proprioception) and movement (the vestibular sense). Interoception is the feeling one has about the internal physiological conditions of the entire body. Additionally there is a sense of intuition, also known as the sixth sense. Despite their best efforts, researchers are still unable to concur in specifying the nature of the sixth sense; some consider the sense of proprioception as the sixth sense, whereas others prefer to consider that as a part of interoception. This book will provide a scientific system for the human sixth sense using relevant biophysical and neurophysiological evidence. The power of "sixth sense" seems to be underestimated, due to difficulties in defining the concept clearly. According to socioeconomics and neural physics, the sixth sense is that which permits humans to create perception or to enhance the quality of their perception of events. Roughly

speaking, the sixth sense engages a metacognitive process through which prior knowledge and the information received from other sensory modalities are synergized. It is not restricted to specific arrow of time and type of mind or to the observer's body, but it considers all arrows of time (past, present, future), types of mind (conscious and unconscious), and physical bodies (self and other). However it is expected that the observer has specific biases towards what happens now or would happen in the future and its relation to himself. Particularly, humans appeal to the sixth sense on the road to achieving success in social competitions and to reduce uncertainty in complex decision making processes. In addition to evidence linking genetic components to the sixth sense submodalities, there have been developed strategies for increasing the quality of perceptions provided by the sixth sense. Meditation, through which individuals try to be detached from the world, increases gamma-band activity and that increased gamma-band activity is found following top-down processing. Therefore it can be inferred that the detachment from the environment may enhance synchronization of the wave functions in favor of strengthening the sixth sense. It can serve as the mechanism of enhancement of the sixth sense in those whose sensory systems are intact, it can also serve as the mechanism of compensation in those who have

sensory deficiencies. In the latter case, it in fact encourages creativity in the use of relatively strong senses. This justifies Beethoven's deafness and his great musical creativity or Bramblitt's blindness and his enormous capability to paint and many other similar examples. In summary, the present book is divided into five parts. Part 1 (chapters 1-6) provides information about the system of proprioception and its neurophysiology and biophysics. Part 2 (chapters 7-10) examines the system of interoception. The information provided in these two parts would enable us to move towards the next three parts of the story, aimed at developing a scientific system of the sixth sense. The first chapter of part 3 begins with concepts and uses them to arrive at reasonable conclusion that there must be a sense that requires multistep information processing and that is separate from the sense of proprioception and the sense of interoception. Such sense is commonly known as the sixth sense. However it should be re-numbered because the sense of proprioception is already known as the sixth sense. The second chapter of this part is to draw neurocircuitry that innervates the sixth sense in the mind of a man, while the third chapter would address the questions whether the sixth sense system requires an optimal competence or consciousness of mind to function properly and if so which is the optimal state: conscious or unconscious and competence or incompetence. In

the fourth chapter of this part, we will focus on the self-other mergence as a pivotal step of the sixth sense system. The next chapter would be of great interest to neurobiologists. It talks about that the human sixth sense of the unseen world, either the unseen arrow of time or the unseen events, requires creativity and therefore the human sixth sense should be considered a source of creativity, variability and thus evolution. In the sixth chapter, the sixth sense is viewed as an economic activity stimulated by social environments. This chapter arisen from the fact that humans are full of enthusiasm to heighten their sixth sense and its accuracy and that they owe their enthusiasm largely to achieving the best possible profit and in other words to wining intense competitions in their life holds mainly on the concept of elasticity. Finally this part is finished by an amazing discussion on the art of the sixth sense. The first chapter of part 4 discusses physical theories that support the existence of sixth sense in the universe. The next chapter is to apply the Bayes' theory to the sixth sense, leading to the conclusion that the sixth sense improves multisensory integration through optimizing uncertainty of information received from other sensory modalities. Chapter three in this part would address whether relative timing is applicable to the sixth sense like other senses. The last part of book aimed at directly discussing the sixth sense into the

context of human health and behavior is organized into four chapters. The first chapter is to discuss neurodevelopmental changes in the sixth sense, while the second and third ones will discuss that in relation to psychiatric and neurological disorders. The most striking question how much power the sixth sense the sixth sense have over human health and behavior is addressed in the fourth chapter of this part and final chapter of book, which will be prepared using neural network models and sophisticated portraits possible for the system of sixth sense.

The field of lifestyle medicine, which is the study of how daily habits and actions impact on both short- and long-term health and quality of life, continues to expand globally. The scientific and medical literature that supports the success of these lifestyle habits and actions is now overwhelming. Thousands of studies provide evidence that regular physical activity, maintenance of a health body weight, following sound nutritional practices, stress reduction, and other good practices all profoundly impact both health and quality of life. Following its predecessors, Lifestyle Medicine, Third Edition, is edited by lifestyle medicine pioneer, cardiologist Dr. James Rippe. This edition has been thoroughly updated and represents the expert opinions of 20 section editors as well as more than 150 expert chapter authors whose knowledge span all aspects

of this emerging discipline. Topics cover lifestyle medicine practices including regular physical activity, proper nutrition, and weight management. These principles are applied to the prevention and or treatment of a wide variety of chronic conditions ranging from heart disease and diabetes to cancer, mental health, addiction, and injury prevention. This book serves as evidence base for individuals who wish to practice lifestyle medicine or incorporate some of its principles into either general medicine or subspecialty practice. It provides valuable information to healthcare workers in the fields of nutrition, exercise physiology, psychology, behavioral medicine, health promotion, and public policy where lifestyle medicine principles play an ever-increasing role.

The material given in this 'Introduction to astronomical photometry' is the subject matter of a lecture at the University of Geneva. It is, therefore, intended for those students, physicists or mathematicians, who have completed their bachelor's degree or diploma, and are intending to work for their Ph.D. in astronomy. We assume then the elementary ideas of astrophysics, magnitude, colour index, spectral classes, luminosity classes, gradient, atmospheric extinction are already known. The student may find it useful to re-read the work of Schatzman [1], Dufay [2] and Aller [254] before embarking upon the study of this 'Introduction to astronomical photometry'. It is not our aim in this book to deal with every aspect of stellar photometry. On the

contrary, we shall restriet ourselves to looking at subjects ofwhich knowledge seems to us essential for someone who has to use photometrie quantities in his astronomical research. We are, therefore, keeping the interests of the photometrie measurements user partieularly in mind. We shall only discuss very superficially the technical prob lems and reduction methods for atmospheric extinction. These problems are dealt with very clearly in Astronomical Techniques [3]; the first by A. Lallemand, H. L.

Darwin famously described special difficulties in explaining social evolution in insects. More than a century later, the evolution of sociality - defined broadly as cooperative group living - remains one of the most intriguing problems in biology. Providing a unique perspective on the study of social evolution, this volume synthesizes the features of animal social life across the principle taxonomic groups in which sociality has evolved. The chapters explore sociality in a range of species, from ants to primates, highlighting key natural and life history data and providing a comparative view across animal societies. In establishing a single framework for a common, trait-based approach towards social synthesis, this volume will enable graduate students and investigators new to the field to systematically compare taxonomic groups and reinvigorate comparative approaches to studying animal social evolution.

The series Structure and Bonding publishes critical reviews on topics of research concerned with chemical structure and bonding. The scope of the series spans the

entire Periodic Table and addresses structure and bonding issues associated with all of the elements. It also focuses attention on new and developing areas of modern structural and theoretical chemistry such as nanostructures, molecular electronics, designed molecular solids, surfaces, metal clusters and supramolecular structures. Physical and spectroscopic techniques used to determine, examine and model structures fall within the purview of Structure and Bonding to the extent that the focus is on the scientific results obtained and not on specialist information concerning the techniques themselves. Issues associated with the development of bonding models and generalizations that illuminate the reactivity pathways and rates of chemical processes are also relevant. The individual volumes in the series are thematic. The goal of each volume is to give the reader, whether at a university or in industry, a comprehensive overview of an area where new insights are emerging that are of interest to a larger scientific audience. Thus each review within the volume critically surveys one aspect of that topic and places it within the context of the volume as a whole. The most significant developments of the last 5 to 10 years should be presented using selected examples to illustrate the principles discussed. A description of the physical basis of the experimental techniques that have been used to provide the primary data may also be appropriate, if it has not been covered in detail elsewhere. The coverage need not be exhaustive in data, but should rather be conceptual, concentrating on the new principles being developed that will allow the

reader, who is not a specialist in the area covered, to understand the data presented. Discussion of possible future research directions in the area is welcomed. Review articles for the individual volumes are invited by the volume editors. Readership: research scientists at universities or in industry, graduate students Special offer For all customers who have a standing order to the print version of Structure and Bonding, we offer free access to the electronic volumes of the Series published in the current year via SpringerLink.

This book brings together highlights of a theme which is growing in interest: the creation of a sustainable society using catalysis as the main tool. Catalysts play key roles in the production of clean fuels, the conversion of waste and green raw materials into energy, clean combustion engines including control of NOx and soot production and reduction of greenhouse gases, production of clean water and of polymers, as well as reduction from polymers to monomers. Catalysts are also of prime importance in the developing H2 and syngas production technology, aimed at producing clean fuels for the coming decades. And catalysts can be recycled. Contents:Catalysis and the Environment (R A van Santen)Catalysts for Renewable Energy and Chemicals, the Thermal Conversion of Biomass (F Janssen)Fuel Cells (J A R van Veen)Catalytic Processes for High-Quality Transportation Fuels (K P de Jong)Oxidative Coupling of Methane and Related Reactions (J H Lunsford)Methane Utilisation via Synthesis Gas Generation — Catalytic Chemistry and Technology (J A Lercher et al.)Towards Catalysis in a Sustainable Fine

Chemical Industry (L A Hulshof)Catalytic Combustion (J W Geus & A J van Dillen)Water Treatment by Heterogeneous Photocatalysis (J-M Herrmann)Catalytical Removing Nitrate from Water (K-D Vorlop & Y Prüsse)Contribution of Catalysis Towards the Reduction of Atmospheric Air Pollution: Co2, CFCs, N2O, Ozone (A E van Diepen et al.)Emission Control from Mobile Sources: Otto and Diesel Engines (A E van Diepen et al.)Emission Control from Stationary Sources (F Janssen)Polymers, Back to Chemical Feedstocks (L A A Schöen & L C E Struik)Deactivation, Regeneration and Recycling of Hydroprocessing Catalysts (S Eijsbouts) Readership: Chemists and technologists active in catalysis research and application, environmental specialists and students. Keywords:Catalysis;Fuel Cells;Environmental Catalysis;Energy;Exhaust;Emisson;Fine Chemicals;Water TreatmentReviews:“… is a brilliant introduction for the addressed readership … All contributions demonstrate very impressively the increasing importance of applied environmental catalysis and moreover they define the progress of modern societies for minimizing the environmental impacts.”Applied Catalysis B: Environmental

This book follows up an Advanced Research Workshop dedicated to the subject of adsorption. It presents an up-to-date review of the latest achievements in the synthesis, characterization and applications of hybrid organic-inorganic materials and of carbon and combined adsorbents. The modeling of the adsorption process, including the simulation of carbon masks used for both

civil and military protection purposes is also addressed. Includes applications in environmental, military and post-disaster situations.