Dr M Zhu Chapter 4

The field of statistics not only affects all areas of scientific activity, but also many other matters such as public policy. It is branching rapidly into so many different subjects that a series of handbooks is the only way of comprehensively presenting the various aspects of statistical methodology, applications, and recent developments. The Handbook of Statistics, a series of self-contained reference books. Each volume is devoted to a particular topic in statistics with Volume 28 dealing with bioinformatics. Every chapter is written by prominent workers in the area to which the volume is devoted. The series is addressed to the entire community of statisticians and scientists in various disciplines who use statistical methodology in their work. At the same time, special emphasis is placed on applications-oriented techniques, with the applied statistician in mind as the primary audience. Comprehensively presents the various aspects of statistical methodology Discusses a wide variety of diverse applications and recent developments Contributors are internationally renowned experts in their respective areas

Progress in the application of machine learning (ML) to the physical and life sciences has been rapid. A decade ago, the method was mainly of interest to those in computer science departments, but more recently ML tools have been developed that show significant potential across wide areas of science. There is a growing consensus that ML software, and related areas of artificial intelligence, may, in due course, become as fundamental to scientific research as computers themselves. Yet a perception remains that ML is obscure or esoteric, that only computer scientists can really understand it, and that few meaningful applications in scientific research exist. This book challenges that view. With contributions from leading research groups, it presents in-depth examples to illustrate how ML can be applied to real chemical problems. Through these examples, the reader can both gain a feel for what ML can and cannot (so far) achieve, and also identify characteristics that might make a problem in physical science amenable to a ML approach. This text is a valuable resource for scientists who are intrigued by the power of machine learning and want to learn more about how it can be applied in their own field.

Graduate textbook and sourcebook on surface and thin film processes, with links to the World Wide Web.

Memory Mass Storage describes the fundamental storage technologies, like Semiconductor, Magnetic, Optical and Uncommon, detailing the main technical characteristics of the storage devices. It deals not only with semiconductor and hard disk memory, but also with different ways to manufacture and assembly them, and with their application to meet market requirements. It also provides an introduction to the epistemological issues arising in defining the process of remembering, as well as an overview on human memory, and an interesting excursus about biological memories and their organization, to better understand how the best memory we have, our brain, is able to imagine and design memory.

Advances in Molecular Toxicology features the latest advances in all of the subspecialties of the broad area of molecular toxicology. Toxicology is the study of poisons, and this series details the study of the molecular basis by which a vast array of agents encountered in the human environment and produced by the human body itself manifest themselves as toxins. Not strictly limited to documenting these examples, the series is also concerned with the complex web of chemical and biological events that give rise to toxin-induced symptoms and disease. The new technologies that are being harnessed to analyze and understand these events will also be reviewed by leading workers in the field. Advances in Molecular Toxicology will report progress in all aspects of these rapidly evolving molecular aspects of toxicology with a view toward detailed elucidation of both progress on the molecular level and on advances in technological approaches employed. * Cutting-edge reviews by leading workers in the discipline * In-depth dissection of molecular aspects of interest to a broad range of scientists, physicians and any student in the allied disciplines * Leading edge applications of technological innovations in chemistry, biochemistry and molecular medicine

Properties and Uses of Microemulsions is intended to provide the reader with some important applications and features of these systems. The intricate composition of microemulsions has made them applicable in many areas such as cosmetics, pharmaceuticals, food, agriculture, oil recovery, chemical synthesis of nanoparticles, and catalysts. An introductory chapter starts off with the description of these applications followed by methods of characterization. Thereafter, a few practical applications of microemulsions focusing on drug delivery, oil recovery, and formation of nanocatalysts are described followed by the third section discussing the theoretical and physical parameters predicting microemulsion properties. The use of spin-polarized paramagnetic probes, bending energetics, and study of self-propelled motion are some of the physical parameters employed to characterize the microemulsions.

Cancer Genomics addresses how recent technological advances in genomics are shaping how we diagnose and treat cancer. Built on the historical context of cancer genetics over the past 30 years, the book provides a snapshot of the current issues and state-of-the-art technologies used in cancer genomics. Subsequent chapters highlight how these approaches have informed our understanding of hereditary cancer syndromes and the diagnosis, treatment and outcome in a variety of adult and pediatric solid tumors and hematologic malignancies. The dramatic increase in cancer genomics research and ever-increasing availability of genomic testing are not without significant ethical issues, which are addressed in the context of the return of research results and the legal considerations underlying the commercialization of genomic discoveries. Finally, the book concludes with "Future Directions", examining the next great challenges to face the field of cancer genomics, namely the contribution of non-coding RNAs to disease pathogenesis and the interaction of the human genome with the environment. Tools such as sidebars, key concept summaries, a glossary, and acronym and abbreviation definitions make this book highly accessible to researchers from several fields associated with cancer genomics. Contributions from thought leaders provide valuable historical perspective to relate the advances in the field to current technologies and literature.

The understanding and control of transport phenomena in materials processing play an important role in the improvement of conventional processes and in the development of new techniques. Computer modeling of these phenomena can be used effectively for this purpose. Although there are several books in the literature covering the analysis of heat tra

In recent years the Japanese have funded a comprehensive study of carbon materials which incorporate other elements including boron, nitrogen and fluorine, hence the title of the project "Carbon Alloys". Coined in 1992, the phrase "Carbon Alloys" can be applied to those materials mainly composed of carbon materials in multi-component systems. The carbon atoms of each component have a physical and/or chemical interactive relationship with other atoms or compounds. The carbon atoms of the components may have different hybrid bonding orbitals to create quite different carbon components. Eiichi Yasuda and his team consider the definition of Carbon Alloys, present the results of the Carbon Alloys projects, describe typical Carbon Alloys and their uses, discuss recent techniques for their characterization, and finally, illustrate potential applications and future developments for Carbon Alloy science. The book contains over thirty chapters on these studies from as many researchers. The most modern of techniques, particularly in the area of spectroscopy, were used as diagnostic tools, and many of these are applicable to pure carbons also. Porosity in carbons received considerable attention.

This book provides a self-contained, comprehensive and up-to-date presentation of uncertainty theory. The purpose is to equip the readers with an axiomatic approach to deal with uncertainty. For this new edition the entire text has been totally rewritten. The chapters on chance theory and uncertainty theory are completely new. Mathematicians, researchers, engineers, designers, and students will find this work a stimulating and useful reference.

The efficient synthesis of heterocycles has become one of the main branches in organic chemistry due to their use in the synthesis of natural products and pharmaceuticals. Current sythentic strategies based on C-H activation methodologies are met with many problems like harsh reaction conditions and low reaction efficiency. Double functionalized chemicals offer a perfect alternative for the synthesis of heterocycles. Heterocycles from Double-Functionalized Arenes starts with a short discussion on the importance of heterocycles and a brief introduction on the preparation of double-functionalized arenes. Specific chapters then look at five-membered heterocycles synthesis, six-membered heterocycles synthesis and macroheterocycles synthesis. This is the first book dedicated to the topic of transition metal catalyzed coupling reactions of double functionalized arenes in heterocycle synthesis and can be used as a handbook for senior researchers and as an introduction for organic chemistry students.

Genomic Applications for Crop Breeding: Abiotic Stress, Quality and Yield Improvement is the second of two volumes looking at the latest advances in genomic applications to crop breeding. This volume focuses on advances improving crop resistance to abiotic stresses such as extreme heat, drought, flooding as well as advances made in quality and yield improvement. Chapters examine advances in such key crops as rice, maize, and sugarcane, among others. Genomic Applications for Crop Breeding: Abiotic Stress, Quality and Yield Improvement complements the earlier volume on biotic stressors and will be an essential purchase for those interested in crop science and food production.

Cancer: New Insights for the Healthcare Professional / 2012 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Cancer. The editors have built Cancer: New Insights for the Healthcare Professional / 2012 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Cancer in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Cancer: New Insights for the Healthcare Professional / 2012 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/.

The Third Edition was created around the 2014 National Standards for Physical Education for K-12 education. Written by experts with a wealth of experience designing and implementing thematic curriculum, this innovative resource guides readers through the process of writing dynamic curriculum in physical education. The text begins by looking at the new national standards and then examines physical education from a conceptual standpoint. It goes on to examine the development of performance-based assessments designed to measure the extent of student learning and explores the various curricular models common to physical education. It delves into sport education, adventure education, outdoor education, traditional/multi-activity, fitness, and movement education, describing each model and how it links with physical education standards. New and Key Features of the Third Edition: Includes a new Chapter 2, International Perspectives on the Implementation of Standards Includes a new Chapter 4, Building the Curriculum Includes a new Chapter 6, Creating Curricular Assessments Discusses the process of designing a standards-based curriculum by developing goals that are based on a sound philosphy Explores assessment and the importance of documenting students progress toward the standard Examines how teachers can provide students with opportunities to achieve their learning goals through challenging and motivating choices

This book describes the events of primary energy transduction in life processes. Life as we know it depends on pumping protons across membranes. New tools to study the protein complexes involved has led to recent intensified progress in the field. Primary Energy Transduction in Biology focusses on recent structural results and new biophysical insights. These have been made possible by recent advances in high-resolution protein structures, in physical techniques to study reactions in real time, and in computational methods to study and refine both structures and their dynamics. Written and edited by leading experts, chapters discuss the latest key questions in cell respiration, photosynthesis, bioenergetics, proton transfer, electron transfer and membrane transport. Biochemists, biophysicists and chemical biologists will find this book an essential resource for a complete understanding of the molecular machines of bioenergetics.

This book is a comprehensive text on the theory of the magnetic recording process.

This practical manual offers an active understanding of how to implement flow-cytometry when facing complex, haematological diseases.

The book develops a comprehensive understanding of the surface impedance of the oxide high-temperature superconductors in comparison with the conventional superconductor Nb3Sn. Linear and nonlinear microwave responses are treated separately, both in terms of models, theories or numerical approaches and in terms of experimental results. The theoretical treatment connects fundamental aspects of superconductivity to the specific high-frequency properties. The experimental data review the state of the art, as reported by many international groups. The book describes further the main features of appropriate preparation, handling, mounting, and refrigeration techniques, and finally discusses possible applications in passive and active microwave devices.

The field of extracellular vesicles (EVs) has progressed immensely in recent times with evidences highlighting their importance in physiology and pathology. This book entails extensive reflective literature on many subtypes of EVs including exosomes, exomeres, ectosomes, apoptotic vesicles, bacterial EVs and fungal EVs. The book further discusses the biogenesis and secretion of these EVs, detailing the biological pathways and proteins involved. Research investigating the biological functions of EVs is rapidly increasing and the current knowledge around their role in progression of diseases such as cancer, neurodegeneration and metabolic disorders is discussed in multiple chapters. The implications of EVs in intercellular communication and the significance of biologically active cargo carried within these EVs

are further examined. Moreover, the numerous applications of EVs in diagnostics and treatment of diseases are reviewed in detail, particularly their potential as biomarkers and drug delivery vehicles. Taken together, this book is a compilation of the key implications of EVs that are secreted by virtually all cell types. Readers will gain a perspective into the biology, functions and applications of EVs and their constantly evolving knowledge base.

In September 2002, a NATO-ASI was held in Cetraro (CS), Italy on the theme of "Metal-Ligand Interactions in Molecular-, Nano-, Micro-, and Macro-systems in Complex Environments". This event has followed the previous ones held in the same place in 1991, 1994 and 1998. In the present and the previous schools a broad interdisciplinary cross-section of experimental and theoretical researchers, interested in a better understanding of metal-ligand interactions from different viewpoints, was linked together to exchange experience, to review the state-of-the-art, to indicate new techniques and methods, to explore new fields and perspectives. Particular emphasis was given to the problems related with the crossing from molecular systems to nano-, macro-and micro-scale materials and to the effects of the environment on the properties of the molecular systems. The school was organized around lectures and special research seminares given by leading experts in the following fields: • metal clusters • inorganic complexes and materials • surface phenomena • adsorption and catalysis • organic and bio-inorganic systems • ab initio theory • density functional theory • classical and quantum dynamics This volume contains the formal lectures and selected contributed papers and describes the main aspects and problems tackled during the 12 days of the event.

Direct current machines are a quickly evolving domain whose applications affect many aspects of modern life from computers and printers to toys, electric vehicles, and traction applications. As their many uses continue to grow, it has become apparent that understanding these machines is the key to understanding our future. Operation, Construction, and Functionality of Direct Current Machines brings together many concepts, from the most basic working principles and construction of DC machines to more advanced topics such as electro-magnetism, armature reaction, parallel operations, and many more. Highlighting theoretical concepts and numerical problems, this book is an essential reference source for students, educators, and anyone interested in the field of electric machines.

This book gives a survey of the physics and fabrication of carbon nanotubes and their applications in optics, electronics, chemistry and biotechnology. It focuses on the structural characterization of various carbon nanotubes, fabrication of vertically or parallel aligned carbon nanotubes on substrates or in composites, physical properties for their alignment, and applications of aligned carbon nanotubes in field emission, optical antennas, light transmission, solar cells, chemical devices, bio-devices, and many others. Major fabrication methods are illustrated in detail, particularly the most widely used PECVD growth technique on which various device integration schemes are based, followed by applications such as electrical interconnects, nanodiodes, optical antennas, and nanocoax solar cells, whereas current limitations and challenges are also be discussed to lay the foundation for future developments.

This book includes within its scope studies of the structural, electrical, optical and acoustical properties of bulk, low-dimensional and amorphous semiconductors; computational semiconductor physics; interface properties, including the physics and chemistry of heterojunctions, metal-semiconductor and insulator-semiconductor junctions; all multi-layered structures involving semiconductor components; dopant incorporation, growth and preparation of materials, including both epitaxial (e.g. molecular beam and chemical vapour methods) and bulk techniques; and in situ monitoring of epitaxial growth processes. Also included are appropriate aspects of surface science such as the influence of growth kinetics and chemical processing on layer and device properties. The physics of semiconductor electronic and optoelectronic devices are examined, including theoretical modelling and experimental demonstration; and all aspects of the technology of semiconductor device and circuit fabrication. structures incorporating Langmuir-Blodgett films; and resists, lithography and metalisation where they are concerned with the definition of small geometry structure. The structural, electrical and optical characterisation of materials and device structures are also included. The scope encompasses materials and device reliability: reliability evaluation of technologies; failure analysis and advanced analysis techniques such as SEM, E-beam, optical emission microscopy, acoustic microscopy techniques; liquid crystal techniques; noise measurement, reliability prediction and simulation; reliability indicators; failure mechanisms, including charge migration, trapping, oxide breakdown, hot carrier effects, electro-migration, stress migration; package- related failure mechanisms; and effects of operational and environmental stresses on reliability.

The central theme, which threads through the entire book, concerns computational modeling methods for water. Modeling results for pure liquid water, water near ions, water at interfaces, water in biological microsystems, and water under other types of perturbations such as laser fields are described. Connections are made throughout the book with statistical mechanical theoretical methods on the one hand and with experimental data on the other. The book is expected to be useful not only for theorists and computer analysts interested in the physical, chemical, biological and geophysical aspects of water, but also for experimentalists in these fields.

Presents the philosophy, methodology, techniques, and applications of IDIS for engineering design. Looks at recent research, and details a five-step problem-solving strategy of problem definition, conceptual design, parameter design, design analysis, and design evaluation. Describes industrial applications of IDIS, including the design of a mechanical transmission, a heat exchanger network, and a process control system. For graduate courses on engineering design, artificial intelligence, and computer integrated manufacturing. No index. Annotation copyrighted by Book News, Inc., Portland, OR

This book focuses on the intelligent control design for both the induction motor (IM) and the permanent magnet synchronous motor (PMSM). Compared with traditional control schemes, such as the field-oriented control (FOC) and the direct torque control (DTC), the intelligent controllers designed in this book could overcome the influence of parameter uncertainty and load torque disturbance. This book is a research monograph, which provides valuable reference material for researchers who wish to explore the area of AC motor. In addition, the main contents of the book are also suitable for a one-semester graduate course. .

With techniques bridging the gap between surface science and heterogeneous catalysis the book presents a tool-kit for anyone wishing to prepare and define solid catalysts.

This book presents various computationally efficient component- and system-level design optimization methods for advanced electrical machines and drive systems. Readers will discover novel design optimization concepts developed by the authors and other researchers in the last decade, including application-oriented, multi-disciplinary, multi-objective, multi-level, deterministic, and robust design optimization methods. A multi-disciplinary analysis includes various aspects of materials, electromagnetics, thermotics, mechanics, power electronics, applied mathematics, manufacturing technology, and quality control and management. This book will benefit both researchers and engineers in the field of motor and drive design and manufacturing, thus enabling the effective development of the high-quality production of innovative, high-performance drive systems for challenging

applications, such as green energy systems and electric vehicles.
Macular Degeneration: Science and Medicine in Practice provides a unique overview of current thinking in the pathogenesis, incidence and treatment of AMD. It includes, for the first time, a synthesis of the views of the world's leading scientists and practitioners regarding retinal biology, basic mechanisms, clinical and pathogenetic processes, and rational approaches to intervention.
This exciting new book is a unique compilation of data from a wide range of chemical and spectroscopic instrumentation and the integration of nanostructure characterisation drawn from physical, chemical, electrochemical, spectroscopic and electron microscopic measurements. It fills a gap in the current nanomaterials literature by documenting the latest research from scientific journals to provide a concise yet balanced and integrated treatment of an interesting topic: titanium oxide nanostructures within the emerging and fashionable area of nanomaterials. The book, a valuable reference point, is aimed at professionals, postgraduates and industrial research workers in nanomaterials. Readers will gain a knowledge of the methods for synthesising nanomaterials as well as an understanding of their structure and resulting physical characteristics together with a knowledge of their (existing and potential) applications.
Nanoparticles in Pharmacotherapy explores the most recent findings in how nanoparticles used in pharmacotherapy, starting with their synthesis, characterization and current or potential uses. Offering he book will be a valuable resource of recent scientific progress, along with most known applications of nanoparticles on the pharmacotherapy to be used by researchers, medical doctors and academia individuals.
This book introduces the latest methods for the controlled growth of nanomaterial systems. The coverage includes simple and complex nanomaterial systems, ordered nanostructures and complex nanostructure arrays, and the essential conditions for the controlled growth of nanostructures with different morphologies, sizes, compositions, and microstructures. The book also discusses the dynamics of controlled growth and thermodynamic characteristics of two-dimensional nanorestricted systems. The authors introduce various novel synthesis methods for nanomaterials and nanostructures, such as hierarchical growth, heterostructures growth, doping growth and some developing template synthesis methods. In addition to discussing applications, the book reviews developing trends in nanomaterials and nanostructures.
In 1974 the editors of the present volume published a well-received book entitled ``Latin Squares and their Applications''. It included a list of 73 unsolved problems of which about 20 have been completely solved in the intervening period and about 10 more have been partially solved. The present work comprises six contributed chapters and also six further chapters written by the editors themselves. As well as discussing the advances which have been made in the subject matter of most of the chapters of the earlier book, this new book contains one chapter which deals with a subject (r-orthogonal latin squares) which did not exist when the earlier book was written. The success of the former book is shown by the two or three hundred published papers which deal with questions raised by it.
The achievement of large critical currents is critical to the applications of high-temperature superconductors. Recent developments have shown that melt processing is suitable for producing high Jc oxide superconductors. Using magnetic forces between such high Jc oxide superconductors and magnets, a person could be levitated. This book has grown largely out of research works on melt processing of high-temperature superconductors conducted at ISTEC Superconductivity Research Laboratory. The chapters build on melt processing, microstructural characterization, fundamentals of flux pinning, critical current, and applications of bulk monolithic superconductors. The text also describes the basic mechanism of levitation and its application. This book will be useful for research workers, engineers, and graduate students in the field of superconductivity. List of Authors: H Fujimoto, S Gotoh, T Izumi; N Koshizuka, K Miya, M Murakami, N Nakamura, Y Nakamura, Y Shiohara, H Takaichi, T Taguchi, M Uesaka, H W Weber, K Yamaguchi. Contents: IntroductionPhase Diagram of the Y-Ba-Cu-O SystemMelt ProcessingCrystal GrowthMicrostructureMagnetic Properties I: DC MagnetizationMagnetic Properties II: AC MagnetizationMagneto-Optical ObservationCritical CurrentFlux Pinning IFlux Pinning II: Y2BaCuO5 InclusionFlux Pinning III: Fast Neutron IrradiationFlux Creep and Irreversibility LineLevitation and SuspensionFracture ToughnessApplication I: Levitation and SuspensionApplications II: Magnetic Bearing and FlywheelApplication III: Permanent MagnetAppendix: Electromagnetic Units Readership: Materials scientists, experimental physicists, chemists, ceramists and engineers. keywords:
The Oxford Handbook of Neuronal Protein Synthesis reviews the mechanisms of translational control used by the nervous system, as well as how nervous system functions, such as plasticity and homeostasis, depend on accurate translational control. The handbook extensively covers how dysregulation of protein synthesis can manifest itself in many distinct pathological processes, including neurodevelopmental, neuropsychiatric, and neurodegenerative diseases.
In June 1965, a small group of European economic geologists gathered in Heidelberg, Germany, at the invitation of Professor G. C. Amstutz and decided to establish the Society for Geology Applied to Mineral Deposits (SGA) and to start a journal to be called Mineralium Deposita. The first issue of the journal came out in May 1966, and has now matured to a leading journal in economic geology The first Biennial SGA Meeting was held successfully in Nancy, France, in 1991, with subsequent meetings in Grenada (Spain; 1993), Prague (Czech Republic; 1995), Turku (Finland; 1997), London (United Kingdom; 1999), Krakov (Poland; 2001) and Athens (Greece; 2003). In 2002, th the SGA Council decided that its 8 Biennial Meeting in 2005 should be held in Beijing, China, making this the first Biennial Meeting to be convened outside - th rope. Significantly, 2005 also marks the 40 anniversary of the SGA. The decision to host this year’s premier meeting in Beijing reflects the Society’s successful transition from its traditional European focus to a truly global organization, with 24% of SGA members situated in North America, 13% in Australia and Oceania, and 5% in Asia. Over the last 27 years China has made dramatic progress

towards political and economic reform, and opening the nation to the outside world. China’s rapid e- nomic development demands increasing amounts of minerals, fuels and materials, and this is currently a major driver for the global economic markets.

Direct-Write Technologies covers applications, materials, and the techniques in using direct-write technologies. This book provides an overview of the different direct write techniques currently available, as well as a comparison between the strengths and special attributes for each of the techniques. The techniques described open the door for building prototypes and testing materials. The book also provides an overview of the state-of-the-art technology involved in this field. Basic academic researchers and industrial development engineers who pattern thin film materials will want to have this text on their shelves as a resource for specific applications. Others in this or related fields will want the book to read the introductory material summarizing isuses common to all approaches, in order to compare and contrast different techniques. Everyday applications include electronic components and sensors, especially chemical and biosensors. There is a wide range of research and development problems requiring state-of-the-art direct write tools. This book will appeal to basic researchers and development engineers in university engineering departments and at industrial and national research laboratories. This text should appeal equally well in the United States, Asia, and Europe. Both basic academic researchers and industrial development engineers who pattern thin film materials will want to have this text on their shelves as a resource for specific applications. An overview of the different direct write techniques currently available A comparison between the strengths and special attributes for each of the techniques An overview of the state-of-the-art technology involved in this field

This volume focuses on the synthesis, properties and applications of nanowires and nanobelts based on functional materials. Novel devices and applications made from functional oxide nanowires and nanobelts will be presented first, showing their unique properties and applications.