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## Sci-Tech Book News Reviews

Susan Fingerman

APUS, smfinfo@verizon.net

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## Sci-Tech Book News Reviews Susan Fingerman, Selector



The following section consists of 100 book reviews selected from *Sci-Tech Book News*, reprinted with the permission of Book News Inc. This review journal is published four times a year, each issue reviewing over 2,000 new titles in the physical and biological sciences, mathematics, engineering, computer science, technology, and agriculture. For a sample issue and subscription information, contact Book News Inc. at 5739 NE Sumner Street, Portland, OR 97218. Phone: (503)281-9230; Fax: (503)287-4485; E-mail: [booknews@booknews.com](mailto:booknews@booknews.com).

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### GEOGRAPHY

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G70 9780819487872

#### **Hyperspectral remote sensing.**

Eismann, Michael Theodore.

*SPIE*, ©2012 725 p. \$135.00

Eismann, a researcher in electro-optical and infrared technology, hyperspectral remote sensing, and optical information processing who is associated with the Air Force Research Laboratory and teaches at the Air Force Institute of Technology, provides students with a textbook on hyperspectral remote sensing that focuses on its physical principles as opposed to applications. He describes spectroscopic principles from the perspectives of classical electromagnetic theory and quantum mechanical theory, spectroscopy from the standpoint of measured spectral properties, remotely sensed spectral radiance, and imaging system, dispersive spectrometer, and Fourier transform spectrometer design and analysis, as well as additional designs, imaging spectrometer calibration, atmospheric compensation, spectral data models, and hyperspectral image classification and target detection.

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### HYDROLOGY, OCEANOGRAPHY

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GB656 9781439877456

#### **Multiscale hydrologic remote sensing; perspectives and applications.**

Title main entry. Ed. by Ni-Bin Chang and Yang Hong.

*CRC Press*, ©2012 550 p. \$129.95

Civil and other engineers synthesize research over the past decade or so into how climate change could interrupt the hydrologic cycle on varying scales and endanger the structure, function, and services provided by aquatic ecosystems. More specifically, they are concerned with how hydrologic observatories may be adequately configured to overcome barriers when collecting necessary feedback within the constrained hydrologic system at multiple scales. They consider hydrological remote sensing at the local, urban, watershed, regional, and continental and global scales. Among the topics are advanced ground-penetrating radar for soil moisture retrieval, modeling stream flow

changes with the aid of multisource remote sensing data in a poorly gauged watershed, multispectral satellite data for monitoring floods and mapping inundation, radar polarimetry for estimating rain, and microwave vegetation indices from satellite passive microwave sensors for mapping global vegetation cover.

HA31 9781849208123

#### **Designing & doing survey research.**

Andres, Lesley.

*Sage Publications*, ©2012 197 p. \$99.95

In this accessible guide for senior undergraduates and graduate students, small business owners, and institutional researchers, Andres (educational studies, U. of British Columbia) explains how to design questions for survey research and how to conduct different types of survey research, adding a touch of humor with b&w cartoons. Chapters cover mapping out the survey research process, conceptualizing the survey research study, survey formats, developing questions, sampling theory and practice, validity, administering surveys, and data analysis. Learning features include chapter summaries, exercises, and ethics alerts. The book is illustrated with b&w screenshots and surveys.

HV8073 9780470749067

#### **Infrared and Raman spectroscopy in forensic science.**

Title main entry. Ed. by John M. Chalmers et al. *John Wiley & Sons*, ©2012 618 p. \$190.00

Scientists mostly in Britain introduce novice and established spectroscopic practitioners of analytical chemistry to the technical elements of Raman and infrared spectroscopy as applied in various areas of forensic science. After explaining the principles underlying the technology, they combine overviews and case studies relating to crime scenes, counter-terrorism and homeland security, drugs of abuse, archaeology and mineralogy, and pharmaceuticals and other consumer products. The topics include vibrational spectroscopy sampling techniques, the forensic analysis of hair by infrared spectroscopy, the non-invasive detection of concealed liquids and powder explosives using spatially offset Raman spectroscopy, studying manuscripts by vibrational spectroscopy, Raman spectroscopy of ceramics and glasses, and infrared spectroscopy for detecting adulteration in foods.

HV8074 9781439871409

**The neuroscience of handwriting; applications for forensic document examination.**

Caligiuri, Michael P. and Linton A. Mohammed. (International forensic science and investigation series)

CRC Press, ©2012 247 p. \$139.95

At a time when the validity and reliability of document examination is being closely scrutinized, Caligiuri (psychiatry, U. of California San Diego) and Mohammed, a forensic document examiner, explore the neuroscientific principles of normal and pathological hand motor control and handwriting for forensic documentation examination and legal professionals and researchers and discuss relevant theory and practice with examples from recent studies. They provide background on the fundamentals of motor control, with reference to handwriting; the fundamental principles of neuroanatomy and neurochemistry of hand motor control; theories of motor control and their application to handwriting research; common neurodegenerative diseases and their epidemiology, pathophysiology, and motor characteristics; common psychotropic medications for depression, bipolar disorder, and psychosis, their mechanisms of action, and why they are important in understanding motor behavior and handwriting; and the effects of the aging process on motor control and handwriting. The second section covers advances in the quantitative approach to signature authentication, mainly the kinematic approach to genuine, disguised, and forged signatures, and presents data from the authors' studies that tested specific hypotheses about whether a signature is authentic or forged, followed by a final section outlining their studies on the effects of medication and disease on handwriting, including progressive supranuclear palsy, neurological diseases, psychotropic medications, and substance abuse.

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**SCIENCE (GENERAL)**

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Q141 9781412976886

**Leadership in science and technology; a reference handbook; 2v.**

Title main entry. Ed. by William Sims Bainbridge. Sage Publications, ©2012 928 p. \$325.00

This thoughtfully organized handbook addresses a topic that draws from numerous disciplines and is garnering increased attention as a discipline in itself. The first of the two volumes begins with an introductory essay. Following are 50 contributed chapters arranged in sections on scientific approaches (e.g. anthropology, cognitive science, economics, futures studies, political science, network science, and social psychology); key concepts (controversies, group processes, research groups and misconduct, among other topics); contexts (fallibility and authority, moral exemplars, multicultural teams, among others); and tactics and tools (e.g. simulation, creative cognition, followership, gatekeeping, management tools for innovation). The second

volume comprises 50 case studies pertaining to an extraordinary range of contexts including artificial intelligence, science fiction, data-intensive astronomy, Polar research, the Apollo project, harpsichord makers, environmentally compatible textiles, educational games, and undergraduate biology education--to name just a few. Editor Bainbridge taught sociology in universities for 20 years then joined the National Science Foundation where he directs the program on human-centered computing. He authored more than a handful of the chapters and brought together 123 contributors affiliated with academic institutions, government agencies, and private industry in at least half dozen countries.

Q223 9781439854792

**Clear and concise communications for scientists and engineers.**

Speight, James G.

CRC Press, ©2012 200 p. \$59.95 (pa)

For scientists and engineers at every level of education, Speight offers advice on presenting their ideas in a clear, understandable, and logical manner. The goal, he says, is for listeners of oral presentations or readers of journal articles or company reports to be able to discuss the matter with peers. He considers such matters as types of scientific and engineering writing, appearance and physical layout, preparing to write, teamwork, technical presentations, and correspondence.

Q387 9783037853689

**Intelligent system and applied material; proceedings; 2v.**

Int'l Conference on Intelligent System and Applied Material (2012: Taiyuan, China) Ed. by Wu Jinhui et al. (Advanced materials research; vs.466-467)

Trans Tech Publications, ©2012 1445 p. \$414.00 (pa)

Arranged in two volumes, this collection represents the proceedings of the International Conference on Intelligent System and Applied Material, held in Taiyuan China in January 2012, showcasing current scholarship in a wide variety of subject areas relating to materials science and engineering. The articles in volume one are divided into sections covering material sciences and manufacturing processes, while volume two continues with additional essays on manufacturing technologies such as robotics, civil engineering and infrastructure construction, intelligent transport system hardware, and servo-motor design. Individual papers include keyword lists, abstracts, illustrations, tables, bibliographies and notes, and the complete set is indexed by both author and keyword. Contributors are academics and industry researchers from primarily Chinese institutions and firms.

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**MATH, COMPUTERS**


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QA76 9780123852410

**The UX book; process and guidelines for ensuring a quality user experience.**

Hartson, Rex and Pardha S. Pyla.

*Morgan Kaufmann Pub., Inc.*, ©2012 937 p. \$89.95

This textbook on front end computer programming provides designers and programmers with practical information on the design of user interfaces that definitively enhance the user experience (UX). Topics discussed include general principles of UX design; contextual analysis; constructing design-informing models; UX goals, metrics, and targets; rapid evaluation methods; UX methods for agile development processes; and integration with general software engineering. Chapters include clear objectives, color illustrations, case studies, interviews with practitioners, and chapter exercises. Harston is a UX consultant and Pyla is a senior UX specialist with a mobile software development firm.

QA76.54 9780769546674

**Real-time and embedded technology and applications; proceedings.**

IEEE Real-Time and Embedded Technology and Applications Symposium (18th: 2012: Beijing, China)

*Computer Society Press*, ©2012 330 p. \$194.00 (pa)

The symposium returns to Asia after 11 years, and continues to shift its emphasis from basic science to applications and systems. The 30 papers cover resource management and scheduling, real-time architectures for memory storage and caches, real-time systems with temperature constraints, hard-wired/soft-wired codesign, real-time applications, models and analysis methods for real-time architectures, real-time operating systems and tools, wireless sensor networks, energy efficient designs, and designing efficient task models. There is no subject index.

QA76.575 9781439830864

**Multimedia image and video processing, 2d ed.**

Title main entry. Ed. by Ling Guan et al. (Image processing series)

*CRC Press*, ©2012 769 p. \$149.95

Guan (multimedia and computer technology and electrical and computer engineering, Ryerson U., Canada) et al. bring together 28 chapters (21 new in this edition) that explore recent developments in multimedia research and applications, for researchers, educators, undergraduate and graduate students, and engineers. They cover standards, including video, still image, and audio coding, multimedia interface, and multimedia framework; fundamental methods for histogram processing, image enhancement, and feature extraction and classification; the design of an efficient application-specific multimedia architecture; the typical architecture of a multimedia information mining system; recent methods in multimodal information fusion

and the strength and weaknesses of different fusion levels; and bidirectional, human-to-computer and computer-human, affective interaction techniques. Subsequent sections address the coding of video and multimedia content; multimedia search, retrieval, and management; security, including multimedia forensics and biometrics, biometric systems and techniques for measuring system performance, watermarking and fingerprinting, and content-based fingerprinting; communications and networking; the architecture design and implementation for image and video processing; and systems and applications, such as a mixed-reality environment for learning and a Second Life HugMe prototype system that bridges the gap between virtual and real-world events.

QA76.76 9781611972061

**The art of differentiating computer programs; an introduction to algorithmic differentiation.**

Naumann, Uwe. (Software, environments, and tools)

*SIAM*, ©2012 340 p. \$93.00 (pa)

Naumann (computer science, Rhenish-Westphalian Technical U. Aachen, Germany) describes a set of techniques for modifying the semantics of numerical simulation programs, such that the desired first and higher derivatives can be computed accurately and efficiently. Because computer programs implement algorithms, the process is called algorithmic differentiation. He covers first derivation code, higher derivation code, an introductory tutorial on derivative code compilers, and a prototype derivation code compiler. Chapter-end exercises are provided, with hints on solutions in the back matter. The supplemental website contains sources of all the software he discusses, further exercises and comments on their solutions, links to other sites, and errata.

QA76.76 9781118104354

**Case study research in software engineering; guidelines and examples.**

Runeson, Per et al.

*John Wiley & Sons*, ©2012 237 p. \$69.95

Software engineers and computer scientists at Lund University in Sweden and the University of Hertfordshire in England share their experience of adapting case study methodology from other fields and applying it to software engineering. They describe the methodology, but--not surprisingly--find the best way to explain the case study approach is with case studies. Their topics include designing the case study, data collection, scaling up case study research to real-world software practice, a case study of extreme programming in a stage-gate context, and a large-scale case study of requirements and verification alignment.

QA76.76 9781466601499

**Handbook of research on serious games as educational, business and research tools; 2v.**

Title main entry. Ed. by Maria Manuela Cruz-Cunha.

*Information Science Reference*, ©2012 1429 p. \$480.00

Arranged in two volumes, this collection of articles on gaming, presents sixty-three essays showcasing current scholarship in the use of games and game processes in the development of educational tools, business data acquisition processes, and health and health care improvement programs. Volume one covers topics relating to game technology as learning tools, technological aspects of serious games, psychological and social effects of gaming, and applications for business. Volume two covers game applications in education, games in research and development programs, gaming and the defense industry, and applications in e-health and health care. Individual essays include abstracts, illustrations, tables, bibliographies, and notes, and a publication wide compilation of reading resources is provided. Contributors are academics in computer and behavioral sciences from institutions around the world.

QA76.9 9781466616493

**Anonymous security systems and applications; requirements and solutions.**

Tamura, Shinsuke.

*Information Science Reference*, ©2012 251 p. \$195.00

Tamura (engineering, U. of Fukui, Japan) discusses the requirements for anonymous security technologies designed to obscure the identities of users and the fundamental security components such as encryption functions and digital signatures. He then discusses schemes for protecting data owned by anonymous entities from illegitimate modifications, deletions, and additions, as well as schemes for exchanging messages without disclosing identities of senders or receivers to others and calculating aggregate values of data without knowing their individual values. The last section covers anonymous authentication systems and electronic payment, electronic procurement, and electronic governance systems (e-voting).

QA76.9 9781118027806

**Cyber security policy guidebook.**

Title main entry. Ed. by Jennifer L Bayuk et al. *John Wiley & Sons*, ©2012 270 p. \$89.95

Bayuk, a cybersecurity consultant who teaches at Stevens Institute of Technology, et al. examine current organizational cybersecurity policy issues, for students, scholars, executive advisors, educators, researchers, legislative staff, practitioners, and technical decision makers. They integrate explanations of policy across executive, legislative, judiciary, commercial, military, and diplomatic areas, and describe the relationship between cyberspace, cybersecurity, and policy; the history and domains of cybersecurity; the

state of practice in measurement, with case studies of e-commerce, industrial control systems, and personal mobile devices; guidance for decision makers on establishing a strategy and policy and their integration with the organization's mission and purpose; a catalog of various issues in governance, users, conflict, management, and infrastructure and specific policies and explanations; the environment faced by decision makers; efforts by the US government to align cybersecurity strategy and policy; and the impact of historical events.

QA76.9 9781439869468

**Foundations of predictive analytics.**

Wu, James and Stephen Coggeshall. (Chapman & Hall/CRC data mining and knowledge discovery series)

*CRC Press*, ©2012 317 p. \$89.95

Both with a San Diego company, Wu and Coggeshall summarize techniques of data analysis and modeling that they have encountered and used during their two decades each in applied data mining across many different fields. They provide the information necessary to understand the common techniques for exploratory data analysis and modeling, and explain details of the algorithms behind these techniques, including underlying assumptions and mathematical formulations. Among their topics are properties of statistical distributions, linear modeling and regression, time series analysis, preparing data and selecting variables, and optimization methods.

QA76.9 9780123869791

**Practical text mining and statistical analysis for non-structured text data applications. (DVD-ROM included)**

Miner, Gary et al.

*Academic Press*, ©2012 1051 p. \$79.95

The underlying premise is that almost all data in databases takes the form of unstructured text, or summaries of unstructured text, and that historians, marketers, crime investigators, and others need to know how to search that text for meaningful patterns--a very different process than reading. Contributors in a range of fields share their insights and experience with the process. After setting out the principles, they present tutorials and case studies, then move on to advanced topics. Academic Press is an imprint of Elsevier.

QA76.9 9781466609549

**Speech, image, and language processing for human computer interaction; multi-modal advancements.**

Title main entry. Ed. by Uma Shanker Tiwary and Tanveer J. Siddiqui.

*Information Science Reference*, ©2012 372 p. \$195.00

The first section of this volume surveys user modeling techniques for human-computer interaction (HCI), categorizes HCI architectures according to cognition, and compares interactive cognitive models of the cooperative design environment. The second section collects

methods for speech, image, and language processing for multimodal interaction while the final section describes multimodal interfaces. Topics of the 15 papers include digital audio spatialization, Hindi speech recognition from visual cues, multi-finger gesture recognition and classification, HCI for enhanced metasearching, and automatic speech analysis for evaluating speech disorders.

QA521 9781466601130

**3-D surface geometry and reconstruction; developing concepts and applications.**

Title main entry. Ed. by Umesh Chandra Pati. *Information Science Reference*, ©2012 383 p. \$195.00

Contributors from computer science, mechanical engineering, information science, psychology, and other disciplines explain techniques for modeling three-dimensional objects for human vision; earlier techniques only had to make the model accurate enough that robots and computers could recognize it. The topics include projective geometry for the three-dimensional modeling of objects, the three-dimensional reconstruction of underwater natural scenes and objects using stereo vision, image-based three-dimensional modeling and rendering from single-view perspective images, surface modeling using discrete basis functions for real-time automatic inspection, and detecting and reassembling three-dimensional complementary fragments.

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## ASTRONOMY

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QB51 9781439841730

**Advances in machine learning and data mining for astronomy.**

Title main entry. Ed. by Michael J. Way et al. (Chapman & Hall/CRC data mining and knowledge discovery series) *CRC Press*, ©2012 698 p. \$99.95

Scientists from all three disciplines look across the border at the others to discuss foundational issues; astronomical applications in source identification, classification, signal processing (time-series) analysis, and the largest data sets; and machine learning methods. The topics include probability and statistics in astronomical machine learning and data mining, the sky pixelization for cosmic microwave background mapping, database-driven analyses of astronomical spectra, the virtual observatory and distributed data mining, and randomized algorithms for matrices and data.

QB466 9783527410378

**Relativistic jets from active galactic nuclei.**

Title main entry. Ed. by Markus Boettcher et al. *Wiley-VCH*, ©2012 406 p. \$135.00

Much remains unknown about extragalactic jets, such as what they are made of and how they are launched, accelerated, and collimated; some observational evidence is available and some theories have been devised, but they do not fit together very well. Nevertheless, specialists have compiled what is known into a reference

and inspiration for graduate students, teachers, and researchers who are interested in active galactic nuclei and their relativistic outflows. After an introduction and history, they look at theory basics, phenomenology, and particle acceleration in turbulent magnetohydrodynamics shocks.

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## PHYSICS

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QC20 9781420086126

**Understanding physics and physical chemistry using formal graphs. (CD-ROM included)**

Vieil, Eric.

*CRC Press*, ©2012 799 p. \$159.95

Vieil, a researcher in physical chemistry with the French Alternative Energies and Atomic Energy Commission (CEA) in Grenoble, presents a universal tool kit--Formal Graphs--for understanding a wide range of scientific domains. A Formal Graph is another way to write equations, he says, that differs from algebra by drawing relationships instead of writing them, and by involving the notion of order--topology to be precise. He writes mainly for graduate students, researchers and specialists, and engineers; the process itself would even be accessible to undergraduate students, but the book uses some notions that undergraduates will not have studied yet. The disk contains all the graphs, in color bitmap files, and software for building simple electric circuits and translating them into Formal Graphs.

QC173 9780762434343

**The dreams that stuff is made of; the most astounding papers on quantum physics--and how they shook the scientific world.**

Title main entry. Ed. by Stephen Hawking.

*Running Press*, ©2011 1071 p. \$30.00

Hawking (theoretical cosmology and mathematics, U. of Cambridge) brings together the most paradigm-shifting works on quantum physics in the 20th century, giving insight into how each selected paper shattered previous scientific understanding of Newtonian physics and, in time, created entirely new frameworks by which to understand the nature of matter, quantum mechanics and subatomic particles. The first time they have been presented together, papers from luminaries such as Bohr, Plank, Heisenberg, Born, Schrodinger, Feynman and Einstein are sorted into groupings by the concepts they address and prefaced by an introduction by Hawking examining the concepts, their context and revolutionary qualities. Surprisingly readable and thoughtfully curated, Hawking delivers his customary clarity and infectious sense of wonder.

QC176 9781439869321

**Magnetic nanoparticles; from fabrication to clinical applications.**

Title main entry. Ed. by Nguyen T.K. Thanh.

CRC Press, ©2012 584 p. \$189.95

Biomedical engineers, along with scientists toward the engineering and physical science side and toward the biology and medicine side, examine magnetic nanoparticles and the applications in health care. Their topics include synthesizing and characterizing iron oxide ferrite nanoparticles and ferrite-based aqueous fluids, the functionalizing magnetic iron oxide nanoparticles, separating and characterizing magnetic particulate materials, putting therapeutic nanoparticles where they need to go by magnet systems design and control, and surgical magnetic systems and tracers for cancer staging.

QC176 9780470669372

**Solid state proton conductors; properties and applications in fuel cells.**

Title main entry. Ed. by Philippe Knauth and Maria Luisa Di Vona.

John Wiley & Sons, ©2012 410 p. \$180.00

International contributors describe the latest work on characterization techniques, modeling, and physical and chemical properties of solid state organic and inorganic proton conductors. Coverage encompasses morphology and structure of solid acids, structure and diffusivity in proton-conducting membranes studied by quasielastic neutron scattering, broadband dielectric spectroscopy, and mechanical and dynamic mechanical analysis of proton-conducting polymers. Also covered are *ab initio* modeling of the transport and structure of solid state proton conductors, perfluorinated sulfonic acids as proton conductor membranes, proton conductivity of aromatic polymers, and inorganic solid proton conductors. The book includes color and b&w diagrams and images on every page. Knauth is affiliated with Aix-Marseille University, France. Di Vona is affiliated with the University of Rome Tor Vergata, Italy

QC446 9781439845479

**Nonlinear optical systems; principles, phenomena, and advanced signal processing.**

Title main entry. Ed. by Le Nguyen Binh and Dang Van Liet. (Optics and photonics)

CRC Press, ©2012 451 p. \$129.95

The interaction between multiple elements of an engineered system--for example capacitors, inductors, and laser fibers in an energy storage system--become so complex that nonlinear techniques are required to analyze them. Here physicists and electrical and electronic engineers treat such nonlinear systems in terms of fundamental principles and associated phenomena and their applications in signal processing in contemporary optical systems for communications and laser systems. They include a touch of mathematical representation of nonlinear equations, which provides some insight into the nonlinear dynamics at different

phases. Among the topics are soliton fiber lasers, multibound solitons, the deterministic dynamics of solitons in passive mode-locked fiber lasers, nonlinear fiber ring lasers, and nonlinear photonic signal processing using third-order nonlinearity.

QC449 9781848213449

**Digital holography.**

Picart, Pascal and Jun-chang Li.

ISTE/Wiley, ©2012 358 p. \$145.00

For engineers, researchers and science students at the master's level, Picart (engineering, U. of Maine, France) and Li (laser applications, Kunming U. of Sciences and Technologies, China) explain the mathematical and physical elements of digital holography. After reviewing the mathematical prerequisites, they discuss the scalar theory of diffraction, calculating diffraction by fast Fourier transform, fundamentals of holography, digital off-axis Fresnel holography, reconstructing wavefronts propagated through an optical system, and digital holography interferometry and its application.

QC454 9781118062531

**X-ray photoelectron spectroscopy; an introduction to principles and practices.**

Van der Heide, Paul.

John Wiley & Sons, ©2012 241 p. \$89.95

Author van der Heide (most recently, Surface Analysis Department, Samsung Austin Semiconductor) offers a detailed introduction to the field of X-ray photoelectron spectroscopy (XPS). He defines and describes key concepts and identifies examples of real-world applications. Topics include XPS instrumentation, data collection and quantification, spectral interpretation, and case studies. A number of very helpful features are included: a series of informative appendices, a technique abbreviations list, a glossary, and a question and answer section designed to measure the reader's comprehension of the text.

QC611 9780470562949

**Functionalization of semiconductor surfaces.**

Title main entry. Ed. by Franklin (Feng) Tao and Steven L. Bernasek.

John Wiley & Sons, ©2012 434 p. \$149.95

US and Asian chemists describe both the basic science and current applications of functionalizing semiconductor surfaces through direct molecular attachment in order to tailor the chemical, physical, or electronic properties of the surfaces. Writing for researchers and students, they consider such topics as structures of semiconductor surfaces and origins of surface reactivity with organic molecules, the chemical binding of five-membered and six-membered aromatic molecules, *ab initio* molecular dynamics studies of conjugated dienes on semiconductor surfaces, forming organic monolayers through wet chemistry, and immobilizing biomolecules at semiconductor interfaces.

QC665 9781439881545

**Wide-band slow-wave systems; simulation and applications.**

Title main entry. Ed. by Stanislovas Staras et al.

*CRC Press*, ©2012 438 p. \$79.95

A team of Lithuanian researchers explain electrodynamic, multiconductor line, and numerical methods they have developed to analyze, synthesize, and design slow-wave structures for modern electronic devices with super-wide pass-bands. Their topics include the analysis of nonhomogeneous helical systems using electrodynamic methods, calculating characteristic impedance of multiconductor lines, investigating slow-wave systems with versatile electromagnetic simulation and design tools, applying slow-wave structures to deflect electron beams, and the computer-aided design of electrodynamic delay lines. Much of the material has not been published in English before.

QC689 9783527411009

**Nonlinear laser dynamics; from quantum dots to cryptography.**

Title main entry. Ed. by Kathy Lüdge. (Reviews in nonlinear dynamics and complexity)

*Wiley-VCH*, ©2011 387 p. \$135.00

Physicists and engineers survey recent developments in the mathematical, physical, and experimental aspects of nonlinear laser dynamics. The section on nanostructured devices reviews the dynamic properties and modeling aspects of quantum dot lasers, vertical cavity surface emitting lasers, and quantum cascade lasers. A second section, on coupled laser devices, focuses on the complex dynamics and bifurcations induced by self-coupling, delay coupling, or mode coupling lasers. The final section is on synchronization and cryptography, and discusses the chaotic dynamics of excitable systems and their application for secure communication or for generating synchronized cluster states in networks.

QC787 9781608070909

**RF linear accelerators for medical and industrial applications.**

Hanna, Samy.

*Artech House*, ©2012 202 p. \$119.00

Hanna, an engineer who heads a consulting company in RF (radio frequency) engineering and has taught electrical engineering at universities, overviews the applications of RF linear accelerators and the basic concepts related to their operation. He explains the manufacturing process behind commercial accelerators to professionals like engineers, medical physicists, oncologists, and chemists, and medical and industrial applications such as cancer radiation therapy, environmental applications, the sterilization of medical products and food irradiation, wastewater treatment, and security and inspection applications, as well as the RF systems needed to run them and how they are manufactured. Electrostatic accelerators that are also linear devices are mentioned briefly,

as are some of the circular accelerators and their applications. He ends with discussion of recent developments and future trends in the technology.

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**CHEMISTRY**

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QD79 9780470467091

**Applications of ion chromatography for pharmaceutical and biological products. (website access included)**

Title main entry. Ed. by Lokesh Bhattacharyya and Jeffrey S. Rohrer.

*John Wiley & Sons*, ©2012 463 p. \$125.00

Academic researchers in biological fields and researchers with public agencies are joined by scientists from drug and electronic equipment companies to explore the current use of the imaging technology in pharmaceutical and biotechnology companies, emphasizing methods that have been developed and validated over the past two decades. After reviewing the principles, mechanism, and instrumentation, they look in turn at applications in pharmaceuticals, biotechnology, and vaccines. The topics include a new perspective on retention processes in ion-exclusion chromatography, the ion chromatography analysis of aminoglycoside antibiotics, analyzing pharmaceuticals for authenticity and adulteration, two-dimensional ion chromatography for simultaneously determining amino acids and carbohydrates, and analyzing biological products.

QD96 9780470536735

**Mass spectrometry handbook.**

Title main entry. Ed. by Mike S. Lee. (Wiley series on pharmaceutical science and biotechnology)

*John Wiley & Sons*, ©2012 1340 p. \$199.95

The handbook is intended to serve as a reference for beginners, practitioners, and experts in mass spectrometry as it is used in academic, business, and clinical laboratories. It is not intended to be comprehensive, but provides details about selected aspects of the technology. The areas covered are biotechnology/proteins, pharmaceuticals, clinical analysis, forensics, space exploration, homeland security, food analysis, environmental science, geology, archaeology, surface analysis, polymers, and analytical techniques.

QD139 9783527329243

**Mass spectrometry in polymer chemistry.**

Title main entry. Ed. by Christopher Barner-Kowollik et al.

*Wiley-VCH*, ©2012 483 p. \$160.00

Chemists explore the imaging technology and its application to characterizing polymers from such perspectives as the tandem mass spectrometry analysis of polymer structures, surface analysis and imaging techniques, automated data processing and quantification in polymer mass spectrometry, the elucidation of reaction mechanisms, and polymer degradation. Scientists in either field may be interested in the combination.



QD181 9783527325757

**Monolithic silicas in separation science; concepts, syntheses, characterization, modeling and applications.**

Title main entry. Ed. by Klaus K. Unger et al. Wiley-VCH, ©2011 344 p. \$155.00

Researchers in chemistry and chemical engineering, pharmaceuticals, and various medical specialties summarize the current state of monolithic silica columns for separation in high-performance liquid chromatography, as a new generation of technology is replacing the commercial devices released a decade ago. The topics include synthesis concepts and preparing silica monoliths, characterizing the pore structure, comparing the performance of particle-packed and monolithic columns, monolithic chiral stationary phases for liquid-phase enantioseparation techniques, and silica monoliths for the small-scale purification of drug-discovery compounds.

QD453 9780470889251

**The physical chemist's toolbox.**

Metzger, Robert M.

John Wiley & Sons, ©2012 949 p. \$165.00

In an era when over-specialization is rampant--somewhat inevitably because of advances in every field--Metzger (chemistry, U. of Alabama) has prepared this broad-coverage handbook that will no doubt serve as an important reference for years to come. The intended audience includes beginning researchers who must reconcile classroom knowledge with current problems, approaches, and techniques in research labs and who need convenient access to discipline-crossing fundamentals and current practices. Coverage encompasses particles, forces, and mathematical methods; quantum, mechanics; thermodynamics; statistical mechanics; kinetics, equilibria, and electrochemistry; symmetry; solid-state physics; electrical circuits, amplifiers, and computers; sources sensors, and detection methods; instrument; and topics pertaining to crystals and molecules. Problems of varying difficulty are interspersed throughout.

QD480 9781439840788

**Molecular modeling for the design of novel performance chemicals and materials.**

Title main entry. Ed. by Beena Rai. CRC Press, ©2012 382 p. \$139.95

This book describes molecular modeling techniques and details a broad spectrum of applications, from pharmaceuticals to construction. It opens with a review of molecular modeling tools, then presents three chapters dealing with the modeling of mineral-reagent interactions. Later chapters examine the application of molecular modeling tools in the creation of surfactant systems, the design of novel porous materials for improved industrial processes, the study of wettability on solid surfaces, and the use of density functional theory in hydrogen storage materials, semiconductor alloys, and cement clinker compounds. Illustrated with a wealth of color images and process diagrams, the book will be of interest to practicing

engineers and chemists. Rai is affiliated with the Process Engineering Innovation Lab at Tata Research Development & Design Center.

QD516 9780470226223

**Fundamentals of turbulent and multi-phase combustion.**

Kuo, Kenneth K. and Ragini Acharya.

John Wiley & Sons, ©2012 879 p. \$150.00

The subject is relevant in diverse fields including those dealing with energy, the environment, propulsion, transportation, industrial safety, and nanotechnology. Kuo (mechanical engineering, Pennsylvania State U.) and Acharya (United Technologies Research Center) offer graduate-level students coverage of the basics and the importance of turbulent and multiphase combustion followed by chapters on laminar premixed and non-premixed flames, premixed and non-premixed flames, multiphase flows with reactions, and spray atomization and combustion. This is the first of two volumes (sold separately), the second focusing on applications.

QD878 9780470746400

**Supramolecular chemistry; from molecules to nanomaterials; 8v.**

Title main entry. Ed. by Philip A. Gale and Jonathan W. Steed.

John Wiley & Sons, ©2012 3978 p. \$1,995.00

Fifteen years have elapsed since the predecessor to this reference was published in 1996; *Comprehensive Supramolecular Chemistry* "summarized all of the major systems studied in fields based in supramolecular chemistry since its inception in clathrate chemistry in the early nineteenth century and cation receptor chemistry in the mid-1960s" (from the preface). This eight-volume set reflects advances made since then in its content as well as its organization. Because supramolecular concepts have become integrated into and in fact underlie much of molecule-based science, the vision for this reference was to offer an integrated and interlocking series of tutorial-style articles, to aid advanced students and practitioners in finding their way to key science and techniques. Material is organized into ten sections (in eight volumes) as follows: concepts; techniques; molecular recognition; supramolecular catalysis reactivity; supramolecular catalysis chemical biology; self-assembly; supramolecular devices; supramolecular materials chemistry; soft matter; and nanotechnology. A glossary and index conclude the eighth volume. The two editors-in-chief of this important set are affiliated as follows: Philip A. Gale (U. of Southampton, UK) and Jonathan W. Steed (Durham U., UK).

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**CHEMISTRY**

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QD381 9783527323210

**Supramolecular polymer chemistry.**

Title main entry. Ed. by Akira Harada.

Wiley-VCH, ©2011 372 p. \$195.00

This monograph details a broad range of applications made available by scientific advances

in the burgeoning field of supramolecular chemistry, including drug delivery and catalysis. Topics are formatted in three parts: formation of supramolecular polymers, supramolecular polymers with unique structures, and properties and functions. Written by industry professionals, the book is intended for supramolecular polymer researchers, but also would interest young researchers and students. While technical, the writing is clear and well-supported by numerous high quality images and illustrations. Editor is Harada (macromolecular science, Osaka U., Japan).

QP517 9780819489739

**Dictionary of biomedical optics and biophotonics.**

Tuchin, Valery.

*SPIE*, ©2012 575 p. \$39.00 (pa)

Tuchin (optics and biomedical physics, Saratov State U., Russia) defines approximately 2,500 terms related to biomedical optics and biophotonics. The dictionary is based on his earlier book, *Tissue Optics: Light Scattering Methods and Instruments for Medical Diagnosis* and its second edition, although terms and definitions have been expanded to short articles that serve as brief introductions to biomedical topics such as acoustic wave, chemotherapy, infrared fiber, and ultra-high-resolution optical coherence tomography. The book is aimed at researchers, practitioners, and professionals in biomedicine, laser physics and technology, fiber optics, spectroscopy, material science, biology, and medicine, and graduate and undergraduate students studying biomedical physics and engineering, biomedical optics and biophotonics, and medical science.

QP519 9781893997660

**Extreme chromatography; faster, hotter, smaller.**

Title main entry. Ed. by William Craig Byrdwell and Michal Holcapek.

*AOCS Press*, ©2011 486 p. \$204.00

Like any other technology, chromatography is a mix of what one might consider 'traditional' mature forms, as in gas and conventional high performance liquid chromatography--and newer developments that expand the field, its capabilities, and applications. And, as in other technologies, the evolution of new techniques and practices inevitably yields successes and failures. The authors here assess the state of the art of chromatography and provide a resource for analytical chemists to help them in their decision making processes. The common thread that runs through the book is one of conditions, instruments, or components that would be thought of as extreme by conventional standards. Topics include: hydrophobic interaction chromatography, high temperature liquid chromatography, multiple parallel mass spectrometry techniques for lipid and vitamin D analysis, and nano-liquid chromatographic separations. Editors William Craig Byrdwell (educator, researcher, author) and Michal Holcapek (University of Pardubice,

Czech Republic, Mass Spectrometry Group Head), and 23 co-authors contributed to this 2011 volume, published by the AOCS Press of the American Oil Chemists' Society.

QP702 9780470874196

**Polysaccharide building blocks; a sustainable approach to renewable biomaterials.**

Title main entry. Ed. by Youssef Habibi and Lucian A. Lucia.

*John Wiley & Sons*, ©2012 415 p. \$135.00

Chemists from many countries review the science and engineering of polysaccharide-based renewable biomaterials, which are playing an important role in the emerging biomaterials and bioenergy sciences. Among their topics are cellulosic aerogels, interactions of chitosan with metals for water purification, electrical conductivity and polysaccharides, starch-based sustainable materials, and the potential of xylans as biomaterial resources.

QP752 9780983079118

**Edible oleogels; structure and health implications.**

Title main entry. Ed. by Alejandro G. Marangoni and Nissim Garti.

*AOCS Press*, ©2011 342 p. \$174.00

Consuming large amounts of saturated and *trans* fats is a well-documented and publicized health risk for obesity and type II- diabetes. In recent years, *JAOCs* (the *Journal of the American Oil Chemists' Society*) has been featuring research on a novel class of oleogels (aka: organogels) to eliminate these unhealthy fats from our diets by structuring molecules in oils to behave like solid shortenings. Marangoni (food and soft materials science, U. of Guelph, Canada) and Garti (chemistry and applied chemistry, Hebrew U. of Jerusalem) introduce 14 chapters by international scientists who review aspects of this strategy. These include advances in the understanding of self-assembly in non-aqueous systems, and new mesoscale and nanoscale structures, e.g., nanofibers and crystalline particles. The C2011 volume is published by the AOCS Press of the American Oil Chemists' Society.

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**MEDICINE (PUBLIC ASPECTS)**

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RA653 9781439857656

**Pandemic planning.**

Title main entry. Ed. by J. Eric Dietz and David R. Black.

*CRC Press*, ©2012 295 p. \$79.95

Dietz and Black, both affiliated with the Homeland Security Institute at Purdue University, gather contributors in diverse fields, such as public health, counterterrorism, cyber security, international advocacy, and epidemiology, to offer readers an understanding of the threat of pandemic illness. The book emphasizes the importance of preparedness and planning at the community, state, and regional levels, with guidelines and recommendations provided on conducting and evaluating specific planning

exercises. Contributors summarize current threats of pandemics and how they're related to homeland security, describe the use of computer simulation models for planning, and outline marketing principles for promoting preparedness.

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## TECHNOLOGY (GENERAL)

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T11 9781466602373

### **Technical writing, presentational skills, and online communication; professional tools and insights.**

Greenlaw, Raymond.

*Information Science Reference*, ©2012 225 p. \$175.00

Greenlaw (computer science, US Naval Academy) offers general advice on writing a manuscript, discusses the ethical standards put forth in the ACM code of ethics and professional conduct, and defines four rules for professional communication. Independent chapters address the idiosyncrasies posed by online writing forums, the structure of a technical paper, the preparation of oral presentations, academic resumes, reports, and the LATEX typesetting system.

T65 9780470467268

### **An introduction to network modeling and simulation for the practicing engineer.**

Burbank, Jack et al. (ComSoc guides to communications technologies)

*Wiley-IEEE Press*, ©2011 203 p. \$69.95 (pa)

This book is a reference and guide written to help engineers and students identify and fully use the best tools for network modeling and simulation (M&S). While the book concentrates on wireless network M&S, the authors' recommendations are applicable to network M&S overall. They provide guidance on the advantages and disadvantages of M&S and a discussion of typically used M&S tools. Some specific topics include: M&S for RF propagation, medium access control M&S, higher layer protocols, hardware-in-the-loop simulations, and other aspects. Authors are Burbank (chief scientist, The Johns Hopkins U. Applied Physics Laboratory), Kasch (leader, high-assurance networking section, Johns Hopkins Applied Physics Laboratory), and Ward (leader, wireless networking section, Johns Hopkins Applied Physics Laboratory).

T174 9783037853641

### **Micro-nano technology XIII; proceedings.**

Chinese Society of Micro-Nano Technology Conference (13th: 2011: Changchow, China) Ed. by Xiaohao Wang. (Key engineering materials; v.503)

*Trans Tech Publications*, ©2012 457 p. \$276.00 (pa)

The 81 papers cover the micro/nano transducer/actuator/robot, microfluidic devices and systems, micro/nano fabrication and measurement technologies, microfluidics and nano fluids, nano material research/nanotube/nanowire devices, MEMS/NEMS and applications, nanometer

biological/nano medicine, and packaging technology. Among specific topics are micro-machined electrochemical seismic sensors with interdigital electrodes, a simple method for depositing DNA on the mica, an analytical model of a fluxgate system, analyzing broken wires during gold wire bonding process, and an integrated micro-sensor system to gather meteorological information.

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## ENGINEERING (GENERAL, CIVIL)

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TA168 9781439881408

### **Systems engineering and architecting; creating formal requirements.**

Bellagamba, Laurence.

*CRC Press*, ©2012 406 p. \$139.95

This book for systems engineers and architects describes a set of formal requirements (presented in Mathematica code) for systems engineering, which can be used to model system or architecture behavior, make rational decisions, establish natural language requirements, and improve systems engineering and architecting processes and products. By using the formal requirements as presented, the book can be used as a text for an introductory course in systems engineering and architecting. The book also can be used for a graduate course that focuses on improving the given formal requirements and developing new ones for other tasks. Familiarity with Mathematica is assumed; for those without this prerequisite, there is an appendix introducing Mathematica. A companion website supplies the formal requirements. Bellagamba was formerly affiliated with Rockwell International and Northrop Grumman.

TA169 9781118007433

### **Effective FMEAs; achieving safe, reliable, and economical products and processes using failure mode and effects analysis.**

Carlson, Carl S. (Wiley series in quality and reliability engineering)

*John Wiley & Sons*, ©2012 435 p. \$120.00

This is an instructional applications viewpoint of the different types of Failure Mode and Effects Analysis used to anticipate and prevent problems with the end result of lowered costs and trouble free, reliable and safe products and processes. Carlson (Mechanical Engineering, U. of Michigan) uses his considerable knowledge and experience as a co-chair of the industry team that developed the FMEA standard to provide a comprehensive text outlining basics of the concept, how to apply effective FMEAs to reduce common errors, ingredients for excellent FMEA facilitation and best practices for using the FMEA process. Includes examples, detailed case studies, study problems and tips to provide a better understanding of the model and how best to apply it. Types of FMEAs addressed include system, design, process, maintenance, software and many others. Chapters also address fault tree analysis, design review based on failure mode, reliability-centered maintenance, hazard analysis and FMECA (adding a criticality analysis

to to the core FMEA framework).

TA174 9783037853290

**Innovating processes.**

Title main entry. Ed. by Moussa Karama. (Advanced materials research; v.423) *Trans Tech Publications*, ©2012 220 p. \$138.00 (pa)

This book gathers 18 invited, peer-reviewed papers on the development of new engineering design methods and the science of design methods and design practice. Major themes are uncertainty and risk management in engineering design, simulation of design processes, multidisciplinary optimization, and education for engineering design. Some specific topics include manufacturing defects and tool geometry optimization for multi-material stack drilling, a numerical model to simulate the drop test of a printed circuit board, and dynamic behavior analysis for a six-axis industrial machining robot. Other topics are mechanical modeling of hemp fiber behavior using digital imaging treatment, orthotropic model plates under shear bending, and pareto-optimal solutions for a truss problem. The book includes b&w photos and images. There is no subject index, and information on the editor is not available.

TA401 9783037853740

**Advanced research on material engineering and its application; proceedings.**

Int'l Conference on Information Science, Automation & Material System (2d: 2012: Changsha, China) Ed. by Helen Zhang and David Jin. (Advanced materials research; v.485) *Trans Tech Publications*, ©2012 630 p. \$207.00 (pa)

About 150 papers explore material science in the context of energy and dynamic systems, pressure control systems and mechanics, and biochemistry and energy engineering. Among specific topics are an efficient gradual release homomorphic timed commitment, modeling and controlling the leaching rate in the nickel stir leaching process of sulfuric acid, clean degree evaluation of coal resources, influencing parameters analysis of solar energy regenerator performance, and the simulation-based optimization of overhang dimensions with architectural materials.

TA401 9783037853658

**Advanced structural and functional materials for protection; proceedings.**

Int'l Symposium on Advanced Structural and Functional Materials for Protection (2011: Singapore) Ed. by Ma Jan and Santhiagu Ezhilvalavan. (Solid state phenomena; v.185) *Trans Tech Publications*, ©2012 140 p. \$138.00 (pa)

Selected from 120 presentations, the 37 papers consider materials for protecting civilians and soldiers against vehicle collision, blast, fragmentation, and unconventional attack; they also discuss multi-functional materials for enhancing civilian and soldier performance in extreme conditions. The topics include

the atomic-layer deposition of thin inorganic coatings into renewable packaging materials, developing woven enhanced silk fabric for ballistic protection, novel piezoelectric tactile sensor materials with improved properties, enhancing the char resistance of expandable graphite-based intrumescent fire retardant coatings by using multi-wall carbon nano tubes for structural steel, developing new sol-gel surface treatments formulation for the bonded repair of aircraft, and the laminated microstructure and toughness mechanism of abalone shell.

TA401 9783037853511

**Management, manufacturing and materials engineering; proceedings; 2v.**

International Conference on Management, Manufacturing and Materials Engineering (2011: Zhengzhou, China) Ed. by Liu Pei. (Advanced materials research; vs.452-453) *Trans Tech Publications*, ©2012 1546 p. \$276.00 (pa)

Volume one of the two-volume set from the December 2011 conference reports new material applications in manufacturing and advances in composite materials, system modeling, automation control, and materials science and engineering. The second volume explores inorganic materials, high temperature structural materials, engineering management, optimization analysis, and mechanical properties. Three papers from the Silesian University of Technology model the design of a shock absorber and a spring valve system. Other topics of the 300 plus papers include the influence of moisture content and bulk density on the thermal diffusivity of green teas, a solar light pipe system installed in a gymnasium, a biomechanical robot for medical operations, and stochastic demand vehicle routing. B&w images are provided.

TA401 9783037853313

**Multi-scales behaviour of materials.**

Title main entry. Ed. by Moussa Karama. (Applied mechanics and materials; v.146) *Trans Tech Publications*, ©2012 230 p. \$138.00 (pa)

This collection of peer reviewed articles on materials science and modeling showcases current scholarship in a wide variety of development and testing research areas. Topics discussed include micro-scale modeling of carbon-fiber reinforced thermoplastic materials, behavior of lightweight concretes, impact and sliding wear resistance of Hadfield and Rail steel, safety and reliability of carbon nanotubes in nanoactuator applications, and the design and finite element modal analysis of composite wind turbine blades. Articles include keywords, abstracts, illustrations, and formulas, and both keyword and author indexes are provided. Contributors are academics and researchers from primarily French institutions.

TA402 9783037853603

**Advanced building materials and structural engineering; proceedings.**

Int'l Conference on Building Materials and Structural Engineering (2012: Wuhan, China) Ed. by B. Xu and H.Y. Li. (Advanced materials research; v.461)

*Trans Tech Publications*, ©2012 885 p. \$276.00 (pa)

This collection of articles on construction materials, representing papers delivered at the International Conference on Building Materials and Structural engineering held in Wuhan, China in March, 2012, showcases current research in wide variety of subject areas relating to cutting edge construction technologies and techniques. Essays are divided into sections covering topics such as advanced material engineering and dynamic systems; building materials, mechanical engineering, and the environment; materials processing technologies and mining engineering; biotechnology, chemical, and materials engineering; and materials science, mechanics and applications. Individual papers include keywords, abstracts, and illustrations. A volume wide author and keyword index is provided. Contributors are academics in engineering and materials science from primarily Chinese institutions.

TA403 9781848213357

**Artificial materials.**

Vanbésien, Olivier.

*ISTE/Wiley*, ©2012 346 p. \$175.00

In the field of electromagnetic waves, says Vanbésien (electronics, Lille U., France), artificial material refers to any fabricated device--metallic, dielectric, or metal-dielectric--that enables a varyingly complex control of wave propagation in a chosen wavelength range. They are approached as either photonic crystals or as metamaterials. He sets out the fundamental concepts, details photonic crystals and/or metamaterials in a regime of band gaps, describes artificial materials in an abnormal refractive regime, and surveys potential applications of the effects illustrated. Among specific topics are transformation optics, routing devices made from photonic crystals, a two-dimensional microwave balanced composite prism, a photonic crystal flat lens at optical wavelength, and antennas.

TA404 9783037853405

**Mechanical engineering, materials and energy; proceedings; 2v.**

Int'l Conference on Mechanical Engineering, Materials and Energy (2011: Dalian, China) Ed. by Grace Chang. (Applied mechanics and materials; vs.148-149)

*Trans Tech Publications*, ©2012 1602 p. \$414.00 (pa)

The 330 selected and peer-reviewed papers cover mechatronics and automation, mechanical manufacturing systems, signal processing, manufacturing technology and processing, material science and technology, energy systems, and materials and energy saving. Among specific

topics are isolating and characterizing a sulfanilic acid-degrading bacteria strain, the finite element study of the windage of suspension insulator string under steady wind and gusts, stem characteristics of litchi and the end-effector of a litchi-picking robot, the optimal cleaning schedule of refinery crude preheat trains subject to fouling and aging, a vehicle routing problem with stochastic demands and simultaneous delivery and pickup, the buckling and vibration of carbon nanotubes embedded in polyethylene polymers, a control strategy for the braking system of a hybrid electronic bus, the effect of rare earth salt on ceramic membranes formed by micro-arc oxidation, and the theoretical analysis of meniscus forces between two spherical nanoparticles at various humidities. The two volumes are paged and indexed together.

TA405 9780470689530

**Experimental mechanics of solids.**

Sciammarella, Cesar A. and Federico M. Sciammarella.

*John Wiley & Sons*, ©2012 743 p. \$240.00

Two mechanical engineers at Northern Illinois University explain in detail the various possible approaches to analyzing systems and materials using experimental mechanics. They include some historical background for each one, so readers know how the methods came to be what they are. Among the topics are electrical strain gages, optical methods using the interference and diffraction of light, photoelasticity, Moiré contouring applications, and holographic interferometry. The information should be interesting and the treatment accessible to graduate students and researchers in structural and materials engineering.

TA410 9783527410248

**Advanced calculations for defects in materials; electronic structure methods.**

Title main entry. Ed. by Audrius Alkauskas et al. *Wiley-VCH*, ©2011 384 p. \$175.00

Physicists, materials scientists, and other contributors describe a number of approaches to detecting and characterizing defects in materials now possible because of greater computing power. Among the topics are the accuracy of quantum Monte Carlo methods for point defects in solids, accurate gap levels and their role in the reliability of other calculated defect properties, predicting polaronic defect states by means of generalized Koopmans density functional calculations, a time-dependent density functional study on the excitation spectrum of point defects in semiconductors, and criteria for selecting which electronic structure method to use.

TA417 9781439855881

**Ultrasonic nondestructive testing of materials; theoretical foundations.**

Langenberg, Karl-Jörg et al.

*CRC Press*, ©2012 754 p. \$179.95

Physicist Langenberg and electrical engineers René Marklein and Klaus Mayer (all U. of Kassel, Germany) provide a bridge between fundamental elaborations of elastic waves in

solids and emerging applications for ultrasonic non-destructive testing. They set out the physics and mathematics of ultrasound propagation in solids, and demonstrate it on standard non-destructive testing problems. Their topics include governing equations of elastodynamics, electromagnetism, elastic plane waves in homogeneous materials, ultrasonic beams and wave packets, and scatterers in homogeneous isotropic non-dissipative infinite spaces.

TA418 9781439870891

**Analytical estimates of structural behavior.**

Dym, Clive L. and Harry E. Williams.

*CRC Press*, ©2012 207 p. \$129.95

The advent of computer-based approaches to structural modeling over the past half century has only accentuated the need for structural engineers to recognize that they are dealing with models of structures rather than the actual structures themselves, contend Dym (engineering design) and Williams (emeritus, engineering, both Harvey Mudd College). They explicitly return the notion of modeling to the analysis of structures by presenting an integrated approach to modeling and estimating structural behavior. The way of thinking about structures and their models that they propose is rooted in classic elementary elasticity, they say, and depends less on advanced mathematical techniques and far more on thinking about the dimensions and magnitudes of the underlying physics. The book could serve as a textbook for a second course in structural analysis for graduates, advanced undergraduates, and practitioners.

TA418 9781420090529

**Nanofabrication handbook.**

Title main entry. Ed. by Stefano Cabrini and Satoshi Kawata.

*CRC Press*, ©2012 518 p. \$129.95

Physicists, chemists, and various kinds of engineers explain both standard and new lithographic techniques for fabricating objects at the nanometer scale, and survey applications. Among the topics are focused ion beam and electron beam deposition, soft X-ray lithography, the synthesis and controlled assembly of colloidal inorganic nanocrystals, self-assembly DNA nanostructures and DNA devices, fabricating nanophotonic structures, and patterning magnetic nanostructures with ions.

TA418 9781439827123

**Nanosensors; physical, chemical, and biological.**

Khanna, Vinod Kumar. (Series in sensors; no. 5)

*CRC Press*, ©2012 637 p. \$129.95

Khanna (electrical and electronic research, Council of Scientific and Industrial Research, India) gathers and critically appraises research findings reflecting the impact of nanotechnology on sensors. He writes in a question-answer format, and acknowledges the interdisciplinary nature of nanotechnology by assuming no advanced knowledge in any particular field.

Among his topics are materials for nanosensors, the nanosensor laboratory, optical nanosensors, nanobiosensors, and future trends.

TA418 9783527328789

**Surface modification of nanotube fillers.**

Title main entry. Ed. by Vikas Mittal. (Polymer nano-, micro- and macrocomposites; v.1)

*Wiley-VCH*, ©2011 316 p. \$155.00

Chemists and engineers of various types review research into methods for modifying the surface of nanotubes that are going to be used as fillers in polymer materials to make them more compatible with the molecules of the particular polymer being filled. Like other fillers, they are used to enhance mechanical, electrical and transport properties of pristine polymers. The topics include modifying carbon nanotubes by layer-by-layer assembly approach, the theoretical analysis of nanotube functionalization and polymer grafting, grafting polymers on nanotubes by atom transfer radical polymerization, and the organic functionalization of nanotubes by dipolar cycloaddition.

TA450 9780470452233

**Structural glasses and supercooled liquids; theory, experiment, and applications.**

Title main entry. Ed. by Peter G. Wolynes and Vassiliy Lubchenko.

*John Wiley & Sons*, ©2012 391 p. \$135.00

Chemists and physicists who specialize in glass present a range of modern theoretical and experimental views of the glass transition and relaxations in glassy systems, phenomena that have perplexed scientists, artisans, and artists since ancient times. The topics include a critical assessment of the random first-order transition theory of glasses, the dielectric spectroscopy of glassy dynamics, glassiness in uniformly frustrated systems, dynamics in the crossover region of supercooled liquids, and glassy dynamics of proteins.

TA455 9780727741752

**Handbook of geosynthetic engineering; geosynthetics and their applications, 2d ed.**

Title main entry. Ed. by Sanjay Kumar Shukla.

*ICE Publishing*, ©2012 409 p. \$190.00

Synthetic materials are now used routinely in civil engineering, but their nature and application are generally not taught in standard courses, especially at the undergraduate level. This handbook is designed to fill that gap, both for students and for practicing civil engineers, by integrating geosynthetics into the basic geographical principles and processes. Among the topics are soil-geosynthetic interaction, shallow foundations, railway tracks, hydraulic tunnels, and sustainability aspects. The first edition was published in 2002 as *Geosynthetics and Their Applications*.

TA455 9783527329649

**Polymers in industry from A-Z; a concise encyclopedia.**

Mascia, Leno.

Wiley-VCH, ©2012 350 p. \$135.00

For all the hundreds of books about polymers, says Mascia (materials, Loughborough U., Britain), there remained a need for a compact encyclopedia that provided both specific and general information about plastic materials relevant to manufacturing and other commercial contexts. His main focus is on the constitution, properties, and processing of polymer-based materials, but he also considers such areas as synthesis and characterization. An overview and a search guide introduce the main alphabetic section. There is no index, but the cross-referencing is extensive.

TA462 9781845699499

**Corrosion protection and control using nanomaterials.**

Title main entry. Ed. by Viswanathan S. Saji and Ronald Cook.

Woodhead Publishing, ©2012 404 p. \$255.00

Saji (advanced materials chemistry, Korea U., South Korea) and Cook, who works in research, assemble 15 chapters that explore the potential use of nanotechnology in corrosion protection and control, for researchers and engineers working with nanomaterials in aerospace, automotive, chemical engineering, and other industries, and academics. Chemists, materials scientists, engineers, and others from the US, Asia, Europe, Australia, and New Zealand detail the fundamentals of corrosion behavior and the manufacture of nanocrystalline materials, the impact of nanotechnology in reducing corrosion cost, and the influence of thermodynamics, kinetics, grain size, and electrochemical influences on the corrosion behavior of nanocrystalline materials, as well as electrodeposited nanostructured materials. They follow with case studies of applications of nanomaterials in corrosion control, such as oxidation protection using nanocrystalline structures at various temperatures, sol-gel and self-healing nanocoatings, and the use of nanoreservoirs and polymer nanocomposites in corrosion control.

TA710 9780415684040

**Advances in discontinuous numerical methods and applications in geomechanics and geoen지니어ing; proceedings. (CD-ROM included)**

Int'l Conference on Advances in Discontinuous Numerical Methods...(10th: 2011: Honolulu, Hawaii) Ed. by Jian Zhao et al.

CRC Press/Balkema, ©2012 428 p. \$189.00

The conference is held every two or three years, and since the first in 1995 has expanded beyond the initial concern with the discontinuous deformation analysis method to encompass the discontinuous numerical methods and coupling techniques with other numerical approaches for mechanics and engineering in the earth sciences. Among the 56 papers selected for the

proceedings are eight keynotes on such topics as rock block stability analysis of slopes and underground power houses, discontinuum-based micro-mechanics modeling methods, and toward a realistic rock mass numerical model. The other themes addressed are the discontinuous deformation analysis method and applications; key block theory, block cutting, and applications; the numerical manifold method and further developments; distinct element method and applications; and the discontinuous modeling of finite element and other methods. There is no subject index.

TA1530 9781420088380

**Fourier modal method and its applications in computational nanophotonics.**

Kim, Hwi et al.

CRC Press, ©2012 313 p. \$179.95

Some of the technological limitations on microelectronics and nanoelectronics are being overcome by integrating nanophotonics into the systems, say Kim (Korea U.); Junghyun Park, with a company in South Korea; and Byoungsoo Lee (Seoul National U.). They provide researchers and graduate students with a detailed mathematical framework for the sound numerical analysis of nanophotonics phenomena, as well as the practical skills and source code required for implementing the Fourier modal method on MATLAB. The Fourier modal method package was developed for educational purposes, they warn, so may sacrifice some factors such as speed, compactness, and memory usage; but once researchers understand the ropes, they can use the source code to optimize in whichever direction they want.

TA1675 9781848213692

**Lasers in manufacturing.**

Title main entry. Ed. by J. Paulo Davim.

ISTE/Wiley, ©2012 299 p. \$145.00

Contributors identified only by name survey a range of ways that lasers are being used in manufacturing. The examples they discuss are laser rapid manufacturing, lasers in metal forming, the laser forming of metal foams, the mathematical modeling of laser drilling, the thermal stress analysis of laser cutting a small diameter hole, modeling and simulating laser welding, and lasers in surface engineering. The anthology could be a supplemental textbook for a senior undergraduate physics or engineering course, a core text for a graduate course specifically on lasers in manufacturing, or a reference for researchers and practitioners.

TA1750 9789814310901

**Optical electronics; self-organized integration and applications.**

Yoshimura, Tetsuzo.

Pan Stanford Publishing, ©2012 376 p. \$149.95

Yoshimura (physics, Tokyo U. of Technology) proposes and describes comprehensive strategies for integrating optics into electronic systems with minimized optics excess. The core technologies, he says, are the self-organized optical waveguide based on the self-organized

lightwave network, the three dimensional optical circuit built by stacking optical waveguide films, the material-saving heterogeneous thin-film device integration process, and the high-speed/small-size light modulators and optical switches. The material should interest researchers in optical electronics. Distributed in North America by CRC Press.

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## MECHANICAL ENGINEERING & MACHINERY

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TJ1058 9781439847701

### **Computational techniques of rotor dynamics with the finite element method.**

Vollan, Arne and Louis Komzsisik.

*CRC Press*, ©2012 282 p. \$139.95

Aeronautical engineers Vollan and Komzsisik have worked in many companies designing rotors that blow wind or that wind turns, and have cooperated on several projects over the past quarter century. From that collaboration, they explain how to apply modern analysis tools such as finite elements to the rotational behavior of flexible bodies, especially those with irregular shapes like propeller and turbine blades. Covering in turn theoretical aspects and engineering aspects, they examine such topics as coupled solution formulations, the finite element analysis of rotating structures, resonances and instabilities, dynamic response analysis, analyzing aircraft propellers, and analyzing wind turbines.

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## ELECTRICAL ENGINEERING, ELECTRONICS, NUCLEAR ENGINEERING

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TK1541 9781439821794

### **Wind energy systems; control engineering design.**

García-Sanz, Mario and Constantine H. Houpis. *CRC Press*, ©2012 603 p. \$99.95

García-Sanz (Case-Western U.) and Houpis (emeritus, Air Force Institute of Technology), who both have extensive expertise in major projects in North America and Europe, describe the latest science and technology in wind turbines within the context of what they term a concurrent engineering approach that coordinates the many variables involved. The text includes a link to a free download for the CAD tool they utilize with quantitative feedback theory (QFT) controller design central to their method. QFT and its related forms, including diagonal MIMO QFT, discrete QFT, and non-diagonal QFT, are described in detail in the first third of the book. Wind turbine control and its objectives and strategies, modeling, blade design, experimental results with direct-drive wind turbine TWT-1.65, and smart wind turbine blades are described in separate chapters. The volume concludes with chapters on offshore and airborne wind energy systems.

TK1541 9781439856147

### **Wind energy systems; solutions for power quality and stabilization.**

Ali, Mohd. Hasan.

*CRC Press*, ©2012 269 p. \$139.95

Ali (U. of Memphis) explores the grid integration problems posed by wind energy conversion systems and presents solutions for minimizing voltage and frequency fluctuations, leveling output power, and enhancing the transient stability of wind power stations. Appropriate for both practicing engineers and students, the book also introduces the components of a typical energy generation system powered by wind and the electric machines, power systems, and power devices commonly used in wind energy generators. The final chapter discusses control strategies for grid and rotor side converters providing power support during grid disturbances. Color photographs and diagrams are provided.

TK3226 9780470889398

### **Smart grid; fundamentals of design and analysis.**

Momoh, James. (IEEE Press series on power engineering; 33)

*Wiley-IEEE Press*, ©2012 216 p. \$89.95

Momoh (electrical and computer engineering, Howard U.) defines a smart grid as a self-healing electric power network equipped with dynamic optimization techniques that use real-time measurements to minimize network losses, maintain voltage levels, increase reliability, and improve asset management. For professionals and students in electrical and power engineering, he provides a working knowledge of fundamentals, design tools, current research, and critical issues in developing and deploying the smart grid. The information and insights have emerged in the many lectures, conferences, and technical and political debates in the US and elsewhere since the most recent dramatic blackout.

TK5103 9780470936870

### **Gigabit-capable passive optical networks.**

Hood, Dave and Elmar Trojer.

*John Wiley & Sons*, ©2012 431 p. \$110.00

Hood and Toyjer, both with a network software company, explain one of the technologies for that part of a telecommunications network that connects directly to subscribing endpoints. They write for experienced telecommunications or data communications professionals whose knowledge base does not yet extend into the domain of passive optical networks in general or gigabit-capable or 10-gigabit-capable networks. Rather than just rephrasing the standards, they explain and compare them. They cover system requirements, the optical layer, the transmission convergence layer, management, services, and other technologies.



TK5103 9781439859896

**Green mobile devices and networks; energy optimization and scavenging techniques.**

Title main entry. Ed. by Hrishikesh Venkataraman and Gabriel-Miro Muntean.

*CRC Press*, ©2012 383 p. \$89.95

The power of batteries is growing at a much slower rate than the power of other elements of mobile devices, and while many scientists are working feverishly to improve batteries, the computer and electronic engineers focus on energy management in mobile devices and networks, with the idea of meeting the batteries somewhere along the road. Looking in turn at optimization and scavenging techniques, they consider such topics as the energy cost of software applications on portable wireless devices, minimum energy multicriteria relay selection in mobile ad hoc networks, energy optimization techniques for wireless sensor networks, toward modeling support for low-power and harvesting wireless sensors for realistic simulation of intelligent energy-aware middleware, and radio frequency energy harvesting and management for wireless sensor networks.

TK5103 9783527408696

**Optical communication with chaotic lasers; applications of nonlinear dynamics and synchronization.**

Uchida, Atsushi. *Wiley-VCH*, ©2012 640 p. \$220.00

Uchida (information and computer sciences, Saitama U., Japan) offers an overview of research into both chaos--nonlinear dynamics--and lasers--photonics--that have engineering applications in optical communication and information technology. The treatment is suitable for graduate students beginning research in interdisciplinary fields, and for researchers and engineers in either chaos or lasers. The topics include the basics of chaos and lasers, analyzing chaotic laser dynamics as demonstrated in a semiconductor laser with optical feedback, synchronization of chaos in lasers, implementing optical communications with chaotic lasers, generating random numbers with chaotic lasers, and controlling chaos in lasers.

TK5103 9781848212381

**Stochastic modeling and analysis of telecom networks.**

Decreusefond, Laurent and Pascal Moyal.

*ISTE/Wiley*, ©2012 387 p. \$175.00

Decreusefond (computer science and networking, Télécom Paris Tech) and Moyal (applied mathematics, Compiègne U. of Technology, France) survey some of the purposes that stochastic models can be put to in telecommunications networks, with quantitative as well as qualitative points of view. Considering in turn discrete-time modeling, continuous-time modeling, and spatial modeling, they cover stochastic recursive sequences, Markov chains, stationary queues, the M/GI/1 queue, the Poisson process, the Markov process, systems with delay, loss systems, and spatial point

processes.

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**ELECTRICAL ENGINEERING, ELECTRONICS, NUCLEAR ENGINEERING**

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TK5103 9781848212381

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TK5105 9781466601888

**Semi-automatic ontology development; processes and resources.**

Title main entry. Ed. by Maria Teresa Pazienza and Armando Stellato.

*Information Science Reference*, ©2012 326 p. \$175.00

The ten chapters in this collection describe systems for automatic knowledge acquisition and ontology development, methods for reusing existing resources to build ontologies and feed semantic repositories, and specialized tools for ontology development. Researchers at Alcatel-Lucent Bell Labs present patterns for automatically transforming XML schema into RDF and OWL, and contributors from the University of Rome propose probabilistic models for learning ontologies. Other topics include a modular approach to discovering seed ontologies from text, a service-oriented data acquisition framework, reference ontologies for efficient linked open data management, and the extraction of multiword terms from Wikipedia.

TK6553 9781608074709

**RFID design principles, 2d ed.**

Lehpamer, Harvey. (Integrated microsystems series)

*Artech House*, ©2012 363 p. \$129.00

Having planned, designed, and deployed wireless and wire-line networks around the world for over 30 years, Lahpamer introduces prospective users and system designers to the basics of radio frequency identification (RFID) technology, including applications, benefits, technical characterizations, security and privacy, and technical and economic challenges of standardization and implementation. The first edition appeared almost four years ago, he says, and the range of applications has grown widely since then. In particular, he

includes medical applications and points out some ethical issues that will have to be faced at some point. Among his topics are short-range communications systems, automatic identification systems, standards development challenges, system design considerations, and sociocultural implications of RFID and their applications.

TK7836 9780470971826

**Lead-free solders; materials reliability for electronics.**

Title main entry. Ed. by K. N. Subramaniam. (Wiley series in materials for electronic optoelectric applications)

*John Wiley & Sons*, ©2012 498 p. \$195.00

For 20 years now, environmental concerns have driven the effort to replace leaded solder in microelectronics. Chemical and materials engineers here report on the progress so far, emphasizing the reliability of the new solders. The basic themes are phase diagrams and alloying concepts; microalloying to improve reliability; and chemical, mechanical, whisker-growth, electro-migration, thermo-migration, and miniaturization issues affecting reliability. Among specific topics are phase diagrams and their application in lead-free soldering, developing and characterizing nano-composite solder, microstructural and thermomechanical behavior in lead-free solders, and electro-migration in lead-free solder joints in electronic packaging.

TK7871 9783527326464

**Handbook of wafer bonding.**

Title main entry. Ed. by Peter Ramm et al.

*Wiley-VCH*, ©2012 395 p. \$210.00

Electrical engineers offer a reference on wafer bonding to stack components of electronic devices into a third dimension to reduce the size of the device or provide a more desirable shape. They look at the technologies of adhesive and anodic bonding, direct wafer bonding, metal bonding, and hybrid metal/dielectric bonding. They also survey major areas of application. Among the specific topics are polymer adhesive wafer bonding, plasma-activated bonding, wafer-level solid-liquid interdiffusion bonding, temporary bonding to enable three-dimensional integration and packaging, and a thin wafer support system for processing above 250° C and cold de-bonding.

TK7874 9780857095114

**Introduction to the physics of nanoelectronics.**

Tan, Seng Ghee and Mansoor B.A. Jalil. (Woodhead Publishing in electronic and optical materials; no. 25)

*Woodhead Publishing*, ©2012 287 p. \$230.00

Tan (Agency for Science, Technology, and Research; Singapore) and Jalil (National U. of Singapore) seek to clarify the term and the field of nanoelectronics by approaching it from the direction of modern applied physics, believing that nanoelectronics should be about discovering and implementing new physics in electronic

devices that are approaching the nanometer scale. They cover physics and mathematics for nanoscale systems, nanoscale physics and electronics, electron dynamics and spin dynamics in nanoelectronic devices, spintronics and spin Hall effects in nanoelectronics, graphene and carbon nanostructures for nanoelectronics, and topology dynamics and gauge potential in nanoelectronics.

TK7876 9783037852736

**Advanced materials in microwaves and optics; proceedings.**

International Conference on Advanced Materials in Microwaves and Optics (2011: Bangkok, Thailand) Ed. by David Wang. (Key engineering materials; v.500)

*Trans Tech Publications*, ©2012 859 p. \$276.00 (pa)

One hundred forty-two papers presented at the September 2011 conference explore technologies based on microwave frequency electromagnetic waves, particularly images and algorithms for remote sensing. Three research papers from the China University of Mining and Technology in Beijing improve the positioning accuracy of portables GPS receivers, classify airborne Lidar scan data by echo, and compare methods for detecting forest resource changes. Two papers from Henan University of Technology propose a co-registration algorithm for spotlight SAR interferometry and a RELAX algorithm for spotlight SAR imaging. Other topics include pattern recognition of carbonate rocks in RS images, the synthesis of nanocrystalline anatase by a microwave hydrothermal method, the optical and thermal properties of Asian dust over the ocean, thordon bearings lubricated with seawater, and QoS evaluation for web services composition.

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**MOTOR VEHICLES, AERONAUTICS, ASTRONAUTICS**

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TL507 9781600868948

**Tactical and strategic missile guidance, 6th ed.**

Zarchan, Paul. (Progress in astronautics and aeronautics; v.239)

*Amer. Inst. of Aeronautics & Astronautics*, ©2012 1026 p. \$134.95

Intended for experts and novices alike, this dense volume explains the principles of both tactical and strategic missile guidance in a common language and notation, with numerous examples illustrating the guidance laws. The opening section introduces the numerical methods behind proportional navigation homing guidance systems, command guidance systems, booster sizing, flight control design, and ballistic target simulation. MATLAB code is provided. The sixth edition adds six chapters on advanced adjoint applications, differential game guidance, boost-phase filtering options, and control sizing for boost-phase intercept.

TL574 9781118181072

**Turbulent drag reduction by surfactant additives.**

Li, Feng-Chen et al.

*John Wiley & Sons*, ©2012 257 p. \$195.00

Engineers from China and Japan review and compile recent research findings on reducing drag in turbulent fluid flow by adding surfactants, a topic of interest not only to basic scientists, but also to utilities, petroleum companies, and other industries that involve fluids moving. They cover drag reduction and heat transfer reduction characteristics of drag-reducing surfactant solution flow, turbulence structures in drag-reducing surfactant solution flow, the numerical simulation of surfactant drag reduction, microstructures and rheological properties of surfactant solution, and application techniques for reducing drag by adding surfactants.

TL589 9781848213234

**Flight formation control.**

Title main entry. Ed. by José A. Guerrero and Rogelio Lozano.

*ISTE/Wiley*, ©2012 328 p. \$145.00

Electronic and mechanical engineers, mostly in France and Mexico, explore requirements, challenges, and solutions for formation flying by autonomous or semi-autonomous aircraft or spacecraft. Their topics include theoretical preliminaries, the adaptive and robust controlled synchronization of networked robotics on strongly connected graphs, flight formation control strategies for mini unmanned aerial vehicles, optimal guidance for rotocraft platoon formation flying in wind fields, and optimizing a scannable pattern for bi-dimensional antenna arrays to provide maximum performance.

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**CHEMICAL TECHNOLOGY**

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TP156 9780857090157

**Laser surface modification of alloys for corrosion and erosion resistance.**

Title main entry. Ed. by Chi Tat Kwok. (Woodhead Publishing in materials)

*Woodhead Publishing*, ©2012 384 p. \$255.00

Lasers have been used to treat the surfaces of metal objects for some three decades, but information about the approach has been scattered across the technical literature of many fields. Chemical, mechanical, industrial, and other engineers compile results, insights, theories, and trends from their various fields on using laser treatment to reduce corrosion, erosion, and cracking. The topics include laser surface melting to repair stress corrosion cracking in weld metal, pulsed laser surface treatment of multilayer gold-nickel-copper coatings to improve the corrosion resistance of components in electronics, liquid impingement erosion resistance, modifying the surface of steel to resist slurry erosion in power plants, and laser surface remelting to improve the erosion-corrosion resistance of nickel-chromium-aluminum-yttrium plasma spray coatings.

TP159 9781439863404

**Metal oxide nanostructures as gas sensing devices.**

Eranna, G. (Series in sensors)

*CRC Press*, ©2012 316 p. \$99.95

Eranna (sensor and nanotechnology, Central Electronics Engineering Research Institute, Pilani, India) develops an integrated miniature gas sensor that is compatible with modern semiconductor fabrication facilities so that a small, compact, low-power device can be created that will be useful in analyzing air ambiance with handheld systems. There are presently no specific sensing elements for specific gaseous species, he says, but studies show metal oxide to be sensitive to a group of species, and nanostructures can add their sensitivity to their capabilities. Among his topics are miniaturized solid-state gas sensors, gas-sensing materials and devices, advantages of nanomaterials, nanostructured metal oxides and gas-sensing devices, and active devices based on nanostructures.

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**MILITARY & NAVAL SCIENCE**

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U310 9780470874295

**Engineering principles of combat modeling and distributed simulation.**

Title main entry. Ed. by Andreas Tolk.

*John Wiley & Sons*, ©2012 888 p. \$135.00

Modelers and simulators 40 years back had not been educated to do what they did. They blazed ahead as pioneers. Now the field has matured, and the 32 contributed chapters presented here set forth the foundations and discuss various specific aspects of combat modeling and distributed simulation. Half the papers are on advanced topics, among them: mathematical applications, high level architecture and base object modeling, Test and Training Enabling Architecture (TENA), using GIS data, modeling tactical data links, and new challenges (human, social, cultural, and behavioral modeling). This is a comprehensive state-of-the-art compendium for researchers and developers involved with military modeling as well as other applications of modeling. Tolk is affiliated with Old Dominion U. and has been involved with the field in numerous capacities.

UG485 9781608075232

**Electronic warfare target location methods, 2d ed.**

Poisel, Richard A.

*Artech House*, ©2012 422 p. \$139.00

Writing for technical personnel in engineering or other scientific disciplines who are new to the field of electronic warfare, experienced engineers, and those taking courses on electronic warfare emitter geolocation, Poisel, who was a research engineer at the US Army Research, Development and Engineering Command, Intelligence and Information Directorate, details methods and techniques for geolocating noncooperative targets of interest that are emitting radiofrequency signals. He discusses

the concepts behind triangulation, and quadratic position fixing methods including time difference of arrival, time of arrival, differential Doppler, and range difference methods. He does not cover array-beamforming and the theory of phase interferometry. This edition has new chapters on estimating the fundamental parameters that allow the position fixes to be calculated, the MUSIC (multiple single classification) algorithm and its characteristics, and expanded discussion of single site location technology.

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## **PUBLISHING, LIBRARY SCIENCE, BIBLIOGRAPHY**

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Z681 9781856047203

### **Evaluating and measuring the value, use and impact of digital collections.**

Title main entry. Ed. by Lorna M. Hughes. *Facet Publishing*, ©2012 181 p. \$115.00 (pa) Researchers and practitioners in the library and information sciences address how to measure the three qualities of digital collections in the context of an expanding mass of digital content with tremendous potential. Among their topics are the digital library, the digital archive, measuring the impact and use for scholarly information-seeking behavior, using information and communication technology methods and tools in arts and humanities research, and improving the sustainability of publicly funded digital resources. In many ways, the essays are a follow-up and companion to *Digitizing Collections: strategic issues for the information manager* (Hughes, 2004). Distributed in the US by Neal-Schuman.

Z711 9781555707712

### **Leading the reference renaissance; today's ideas for tomorrow's cutting-edge services.**

Title main entry. Ed. by Marie L. Radford. *Neal-Schuman*, ©2012 374 p. \$80.00 (pa) The essays collected here, including analysis, literature reviews, and success stories, highlight revolutionary changes in technology and basic conceptualizations of what reference services should be. In Part 1, visionary thinkers reflect on the user experience and the future. In Part 2, contributors examine virtual reference and instruction, evolving service models and staff development, and assessment. Part 3 looks at implementation issues such as extending outreach and collaborative solutions, while Part 4 explores virtual tools. Some specific topics include virtual reference use in older adults, emerging roles for the reference librarian, student-led virtual reference services, roving reference in an academic library, and embracing Wikipedia. Radford teaches at Rutgers, The State University of New Jersey.

ZA4201 9781780526362

### **Web search engine research.**

Title main entry. Ed. by Dirk Lewandowski. (Library and information science) *Emerald Group Publishing*, ©2012 12:00:00 AM. 322 p. \$124.95

This collection of eleven articles on Internet search engine technology showcases current research into the methodologies of search engine mechanics, social and psychological factors in search engine use and trust, and ranking and algorithm science. Topics discussed include comparisons of social search engines, localized web search, evaluating web search retrieval effectiveness, diversity aware search, search engine interfaces and credibility assessments, and test in "truth" claims in search results. Chapters include abstracts, illustrations, and sample equations and algorithms. Contributors are academics in computers science as well as industry professional from leading Internet technology firms. Distributed in North America by Turpin Distribution.