Computed Tomography Fundamentals System Technology Image

COMPUTED TOMOGRAPHY: PHYSICS AND TECHNOLOGY In the newly updated second edition of Computed Tomography: Physics and Technology A Self Assessment Guide, distinguished computed tomography (CT) educator Euclid Seeram delivers a completely revised and expanded covering all relevant technological advances, including the use of artificial intelligence, in the field of CT. In the book, readers will find a focused emphasis on physics and technology — an area where students of this discipline have traditionally struggled. The questions are preser certification examinations of the American Registry of Radiologic Technologists (ARRT), the Canadian Association of Medical Radiation Technologists (CAMRT), and other professional medical imaging organizations around the world. The author has also included true-false question learning outcomes to aid students in their study of the subject. Readers will also find brief notes on: An introduction to computed tomography, including an overview of the field and a historical perspective Digital image processing and the physics of computed tomography Data reconstruction fundamentals Deep learning image reconstruction, the major equipment components of a computed tomography scanner, and image post-processing and visualization Multislice CT: Principles and Technology Image quality considerations CT Dosimetry and dose opti radiological technology and diagnostic radiography students and practitioners, Computed Tomography: Physics and Technology A Self Assessment Guide, will also earn a place in the libraries of biomedical engineering students and radiology residents in training.

This revised and updated second edition – now with two new chapters - is the only book to give a comprehensive overview of computer algorithms for image reconstruction. It covers the fundamentals of computerized tomography, including all the computational and mathematic reconstruction and image display. Among the new topics covered are: spiral CT, fully 3D positron emission tomography, the linogram mode of backprojection, and state of the art 3D imaging results. It also includes two new chapters on comparative statistical evaluation of the 2 approaches to image reconstruction.

Computed Tomography gives a detailed overview of various aspects of computed tomography. It discusses X-ray CT tomography from a historical point of view, the design and physical operating principles of computed tomography apparatus, the algorithms of image reconstructi tomography scanners. Algorithms of image reconstruction from projections, a crucial problem in medical imaging, are considered in depth. The author gives descriptions of the reconstruction methods related to tomography scanners with a parallel X-ray beam, trough solutions w of spiral scanners. Computed Tomography contains a dedicated chapter for those readers who are interested in computer simulations based on studies of reconstruction algorithms. The information included in this chapter will enable readers to create a simulation environment i obtained in all basic projection systems. This monograph is a valuable study on computed tomography that will be of interest to advanced students and researchers in the fields of biomedical engineering, medical electronics, computer science and medicine.

The book offers a comprehensive and user-oriented description of the theoretical and technical system fundamentals of computed tomography (CT) for a wide readership, from conventional single-slice acquisitions to volume acquisition with multi-slice and cone-beam spiral CT. I relevant for image quality and all performance features significant for clinical application. Readers will thus be informed how to use a CT system to an optimum depending on the different diagnostic requirements. This includes a detailed discussion about the dose required and al dose in CT. All considerations pay special attention to spiral CT and to new developments towards advanced multi-slice and cone-beam CT. For the third edition most of the contents have been updated and latest topics like dual source CT, dual energy CT, flat detector CT and in ROM again offers copies of all figures in the book and attractive case studies, including many examples from the most recent 64-slice acquisitions, and interactive exercises for image viewing and manipulation. This book is intended for all those who work daily, regularly or even radiographers, engineers, technicians and physicists. A glossary describes all the important technical terms in alphabetical order. The enclosed DVD again offers attractive case studies, including many examples from the most recent 64-slice acquisitions, and interactive exercises intended for all those who work daily, regularly or even only occasionally with CT: physicians, radiographers, engineers, technicians and physicists. A glossary describes all the important technical terms in alphabetical order.

Image Reconstruction from Projections
Industrial Tomography
The Fundamentals of PET and SPECT
Physics and Technology. A Self Assessment Guide
Algorithms, Insight, and Just Enough Theory
Computed Body Tomography with MRI Correlation

Publisher's Note: Products purchased from 3rd Party sellers are not guaranteed by the Publisher for quality, authenticity, or access to any online entitlements included with the product. Covering only what CT technologists need to know, this all-in-one solution helps students develop the knowledge and decision-making skills they need for clinical practice while preparing them for the ARRT registry exam. Organized around the three major ARRT content categories (physics and instrumentation, patient care, and imaging procedures), the fully updated 2nd Edition takes an easy-to-understand approach that combines real-world scenarios, and proven pedagogy to help students master the content of the course. Cutting edge information for all oral and maxillofacial surgeons on computed tomography and guided surgery! Topics include comparison of CT and cone beam technologies, stereolithographic modeling and surgical guide concepts, virtual technologies in dentoalveolar evaluation and surgery, computer guided planning and placement of dental implants, utilization in the treatment of facial trauma, digital technologies in pathology and reconstruction, 3D technologies in craniofacial and orthognathic surgery, evaluation and fabrication of custom cosmetic facial implants, and extraoral craniofacial applications.

The book provides a comprehensive compilation of fundamentals, technical solutions and applications for medical imaging systems. It is intended as a handbook for students in biomedical engineering, for medical physicists, and for engineers working on medical technologies, as well as for lecturers at universities and engineering schools. For qualified personnel at hospitals, and physicians working with these instruments it serves as a basic source of information. This also applies for service engineers and marketing specialists. The book starts with the representation of the physical basics of image processing, implying some knowledge of Fourier transforms. After that, experienced authors describe technical solutions and applications for imaging systems in medical diagnostics. The applications comprise the fields of X-ray diagnostics, computed tomography, nuclear medical diagnostics, magnetic resonance imaging, sonography, molecular imaging and hybrid systems. Considering the increasing importance of software based solutions, emphasis is also laid on the imaging software platform and hospital information systems.

Provides an overview of the evolution of CT, the mathematical and physical aspects of the technology, and the fundamentals of image reconstruction using algorithms. Image display is examined from traditional methods through the most recent advancments. Key performance indices, theories behind the measuremet methodologies, and different measurement phantoms in image quality are discussed. The CT scanner is broken down into components to provide the reader with an understanding of their function, their latest advances, and their impact on the CT system. General descriptions and different categories of artifacts, their causes, and their corrections are considered at length.

Lag Correction in Amorphous Silicon Flat-Panel X-Ray Computed Tomography
Fundamentals of Computerized Tomography
Computed Tomography & Magnetic Resonance Imaging Of The Whole Body E-Book
Kalender - Computed Tomography - Fundamentals,System Technology, Image Quality, Applications 4e
Oral and Maxillofacial Radiology
Webb's Physics of Medical Imaging, Second Edition

This book describes fundamental computational methods for image reconstruction in computed tomography (CT) with a focus on a pedagogical presentation of these methods and their underlying concepts. Insights into the advantages, limitations, and theoretical and computational aspects of the methods are included, giving a balanced presentation that allows readers to understand and implement CT reconstruction algorithms. Unique in its emphasis on the interplay between modeling, computing, and algorithm development, Computed Tomography: Algorithms, Insight, and Just Enough Theory develops the mathematical and computational aspects of three main classes of reconstruction methods: classical filtered back-projection, algebraic iterative methods, and variational methods based on nonlinear numerical optimization algorithms. It spotlights the link between CT and numerical methods, which is rarely discussed in current literature, and describes the effects of incomplete data using both microlocal analysis and singular value decomposition (SVD). This book sets the stage for further exploration of CT algorithms. Readers will be able to grasp the underlying mathematical models to motivate and derive the basic principles of CT reconstruction and will gain basic understanding of fundamental computational challenges of CT, such as the influence of noisy and incomplete data, as well as the reconstruction capabilities and the convergence of the iterative algorithms. Exercises using MATLAB are included, allowing readers to experiment with the algorithms and making the book suitable for teaching and self-study. Computed Tomography: Algorithms, Insight, and Just Enough Theory is primarily aimed at students, researchers, and practitioners interested in the computational aspects of X-ray CT and is also relevant for anyone working with other forms of tomography, such as neutron and electron tomography, that share the same mathematical formulation. With its basis in lecture notes developed for a PhD course, it is appropriate as a textbook for courses on computational methods for X-ray CT and computational methods for inverse problems. Authoritative, clinically oriented, and unique in the field, Computed Body Tomography with MRI Correlation, 5th Edition is your one-stop reference for current information on CT and MRI in all aspects of adult and pediatric congenital and acquired disorders. This comprehensive text uses an easy-to-navigate format to deliver complete, well-illustrated coverage of the most current CT and MRI techniques for thorax, abdomen, pelvis and musculoskeletal systems in both adult and pediatric populations. The fully revised 5th Edition is a complete reference for residents, fellows, and attending radiologists, as well as clinicians in other specialties who are interested in CT and MRI evaluation of both common and less common disorders encountered in daily practice.

Computed tomography of the heart has become a highly accurate diagnostic modality that is attracting increasing attention. This extensively illustrated book aims to assist the reader in integrating cardiac CT into daily clinical practice, while also reviewing its current technical status and applications. Clear guidance is provided on the performance and interpretation of imaging using the latest technology, which offers greater coverage, better spatial resolution, and faster imaging. The specific features of scanners from all four main vendors, including those that have only recently become available, are presented. Among the wide range of applications and issues to be discussed are coronary artery bypass grafts, stents, plaques, and anomalies, cardiac valves, congenital and acquired heart disease, and radiation exposure. Upcoming clinical uses of cardiac CT, such as plaque imaging and functional assessment, are also explored.

"This book provides a comprehensive and user-friendly description of the theoretical and technical essentials of computed tomography (CT), an imaging technique used extensively by the medical community." --Book Jacket.
Principles, Techniques and Clinical Applications
Cardiac CT
Industrial X-Ray Computed Tomography
Clinical Applications
Molecular Imaging I
Practical Radiography

X-ray computed tomography has been used for several decades as a tool for measuring the three-dimensional geometry of the internal organs in medicine. However, in recent years, we have seen a move in manufacturing industries for the use of X-ray computed tomography; first to give qualitative information about the internal geometry and defects in a component, and more recently, as a fully-quantitative technique for dimensional and materials analysis. This trend is primarily due to the ability of X-ray computed tomography to give a high-density and multi-scale representation of both the external and internal geometry of a component, in a non-destructive, non-contact and relatively fast way. But, due to the complexity of X-ray computed tomography, there are remaining metrological issues to solve and the specification standards are still under development. This book will act as a one-stop-shop resource for students and users of X-ray computed tomography in both academia and industry. It presents the fundamental principles of the technique, detailed descriptions of the various components (hardware and software), current developments in calibration and performance verification and a wealth of example applications. The book will also highlight where there is still work to do, in the perspective that X-ray computed tomography will be an essential part of Industry 4.0.

Computed Tomography (CT), and in particular multi-detector-row computed tomography (MDCT), is a powerful non-invasive imaging tool with a number of advantages over the others non- invasive imaging techniques. CT has evolved into an indispensable imaging method in clinical routine. It was the first method to non-invasively acquire images of the inside of the human body that were not biased by superimposition of distinct anatomical structures. The first generation of CT scanners developed in the 1970s and numerous innovations have improved the utility and application field of the CT, such as the introduction of helical systems that allowed the development of the "volumetric CT" concept. In this book we want to explore the applications of CT from medical imaging to other fields like physics, archeology and computer aided diagnosis. Recently interesting technical, anthropomorphic, forensic and archeological as well as paleontological applications of computed tomography have been developed. These applications further strengthen the method as a generic diagnostic tool for non- destructive material testing and three-dimensional visualization beyond its medical use.

Since the publication of the best-selling, highly acclaimed first edition, the technology and clinical applications of medical imaging have changed significantly. Gathering these developments into one volume, Webb's Physics of Medical Imaging, Second Edition presents a thorough update of the basic physics, modern technology and many examples of clinical application across all the modalities of medical imaging. New to the Second Edition Extensive updates to all original chapters Coverage of state-of-the-art detector technology and computer processing used in medical imaging 11 new contributors in addition to the original team of authors Two new chapters on medical image processing and multimodality imaging More than 50 percent new examples and over 80 percent new figures Glossary of abbreviations, color insert and contents lists at the beginning of each chapter Keeping the material accessible to graduate students, this well-illustrated book reviews the basic physics underpinning imaging in medicine. It covers the major techniques of x-radiology, computerised tomography, nuclear medicine, ultrasound and magnetic resonance imaging, in addition to infrared, electrical impedance and optical imaging. The text also describes the mathematics of medical imaging, image processing, image perception, computational requirements and multimodality imaging.

This book is specifically designed to meet the needs of practicing radiologists by offering a practical, unified approach to PET-CT. It details how to effectively apply PET-CT in patient management. Written by radiologists who fully appreciate and understand both PET and CT, the book details an integrated understanding of PET-CT as a combined modality. Clinical topics include PET-CT of thoracic malignancies, melanoma, and breast cancer. In addition, the book reinforces fundamental concepts, such as the role of imaging diagnosis in disease management.
Exam Review
X-Ray Computed Tomography in Biomedical Engineering
Approaches, Applications, and Operations
Micro-computed Tomography (micro-CT) in Medicine and Engineering
Computed Tomography for Technologists
Emission Tomography

This open access book gives a complete and comprehensive introduction to the fields of medical imaging systems, as designed for a broad range of applications. The authors of the book first explain the foundations of system theory and image processing, before highlighting several modalities in a dedicated chapter. The initial focus is on modalities that are closely related to traditional camera systems such as endoscopy and microscopy. This is followed by more complex image formation processes: magnetic resonance imaging, X-ray projection imaging, computed tomography, X-ray phase-contrast imaging, nuclear imaging, ultrasound, and optical coherence tomography.

This book provides radiological technicians, radiologists, technicians, developers and sales engineers with a unique display of the methods and applications used in radiography. Building on the physical basis and the quality and effects of X-rays, the book describes X-ray systems for diagnostics and interventions, the technique behind a radiographic image, image quality, patient data management including data archiving and communication with PACS in the hospital as well as between a physician's practice and hospitals. All descriptions are in accordance with the technical and diagnostic requirements to be met by modern, frequently digital radiographic as well as image processing methods and systems.

The aim of this textbook of molecular imaging is to provide an up to date review of this rapidly growing field and to discuss basic methodological aspects necessary for the interpretation of experimental and clinical results. Emphasis is placed on the interplay of imaging technology and probe development, since the physical properties of the imaging approach need to be closely linked with the biologic application of the probe (i.e. nanoparticles and microbubbles). Various chemical strategies are discussed and related to the biologic application. Reporter-gene imaging is being addressed not only in experimental protocols, but also first clinical applications are discussed. Finally, strategies of imaging to characterize apoptosis and angiogenesis are described and discussed in the context of possible clinical translation.

Interpretation Basics of Cone Beam Computed Tomography is an easy-to-use guide to Cone Beam CT technology for general dental practitioners and dental students. It covers normal anatomy, common anatomical variants, and incidental findings that practitioners must be familiar with when interpreting CBCT scans. In addition to functioning as an identification guide, the book presents and discusses sample reports illustrating how to use this information in day-to-day clinical practice. Organized by anatomical regions, the book is easy to navigate and features multiple images of examples discussed. It also includes a valuable section on legal issues surrounding this new technology, essential for informed and appropriate use.

Fundamentals, Technical Solutions and Applications for Systems Applying Ionizing Radiation, Nuclear Magnetic Resonance and Ultrasound
Computed Tomography of the Cardiovascular System
Systems and Applications
Clinical PET-CT in Radiology
Digital Technologies in Craniomaxillofacial Surgery
From Photon Statistics to Modern Cone-Beam CT

Since its introduction to dentistry, cone beam computedtomography (CBCT) has undergone a rapid evolution and considerableintegration into orthodontics. However, despite the increasingpopularity of CBCT and progress in applying it to clinicalorthodontics, the profession has lacked a cohesive, comprehensiveand objective reference that provides clinicians with thebackground needed to utilize this technology optimally for treatingtheir patients. Cone Beam Computed Tomography inorthodontics provides timely, impartial, and state-of-the-artinformation on the indications and protocols for CBCT imaging inorthodontics, clinical insights gained from these images, andinnovations driven by these insights. As such, it is the mostcurrent and authoritative textbook on CBCT in orthodontics.Additionally, two DVDs include more than 15 hours of videopresentations on related subjects from the 39th Annual MoyersSymposium and 38th Annual International Conference on CraniofacialResearch. Cone Beam Computed Tomography in Orthodontics is organizedto progress sequentially through specific topics so as to build theknowledgebase logically in this important and rapidly evolvingfield. Part I provides the foundational information on CBCTtechnology, including radiation exposure and risks, and futureevolutions in computed tomography. Part II presents the Principlesand Protocols for CBCT Imaging in Orthodontics, focusing ondeveloping evidence-based criteria for CBCT imaging, themedico-legal implications of CBCT to the professional and theprotocols and integration of this technology in orthodonticpractice. Part III provides critical information on CBCT-basedDiagnosis and Treatment Planning that includes how to interpretCBCT scans, identify incidental pathologies and the possible otheruses of this technology. Part IV covers practical aspects ofCBCT's Clinical Applications and Treatment Outcomes thatencompasses a range of topics, including root morphology andposition, treatment of impacted teeth, virtual surgical treatmentplanning and outcomes, and more.
This volume provides an overview of X-ray technology and the historical development of modern CT systems. The main focus of the book is a detailed derivation of reconstruction algorithms in 2D and modern 3D cone-beam systems. A thorough analysis of CT artifacts and a discussion of practical issues such as dose considerations give further insight into current CT systems. Although written mainly for graduate students, practitioners will also benefit from this book.
Over 5,200 high quality CT, MR, and hybrid technology images in one definitive reference. For the radiologist who needs information on the latest cutting-edge techniques in rapidly changing imaging technologies, such as CT, MRI, and PET/CT, and for the resident who needs a comprehensive resource that gives a broad overview of CT and MRI capabilities. Brand-new team of new international associate editors provides a unique global perspective on the use of CT and MRI across the world. Completely

revised in a new, more succinct presentation without redundancies for faster access to critical content. Vastly expanded section on new MRI and CT technology keeps you current with continuously evolving innovations.

Abdominal Imaging, a title in the Expert Radiology Series, edited by Drs. Dushyant Sahani and Anthony Samir, is a comprehensive reference that encompasses both GI and GU radiology. It provides richly illustrated, advanced guidance to help you overcome the full range of diagnostic, therapeutic, and interventional challenges in abdominal imaging and combines an image-rich, easy-to-use format with the greater depth that experienced practitioners need. Select the best imaging approaches and effectively interpret your findings by comparing them to thousands of images that represent every modality and every type of abdominal imaging. Find detailed, expert guidance on all diagnostic, therapeutic, and interventional aspects of abdominal imaging in one authoritative source, including challenging topics such as Oncologic Assessment of Tumor Response and How to Scan a Difficult Patient. Efficiently locate the information you need with a highly templated, well-organized, at-a-glance organization.

Computed Tomography - E-Book

Computed Tomography for Technologists: Exam Review

A Diagnostic Approach

Principles, Design, Artifacts, and Recent Advances

Indications, Insights, and Innovations

X-ray computed tomography (CT) continues to experience rapid growth, both in basic technology and new clinical applications. Seven years after its first edition, Computed Tomography: Principles, Design, Artifacts, and Recent Advancements, Second Edition, provides an overview of the evolution of CT, the mathematical and physical aspects of the technology, and the fundamentals of image reconstruction algorithms. Image display is examined from traditional methods used through the most recent advancements. Key performance indices, theories behind the measurement methodologies, and different measurement phantoms in image quality are discussed. The CT scanner is broken down into components to provide the reader with an understanding of their function, their latest advances, and their impact on the CT system. General descriptions and different categories of artifacts, their causes, and their corrections are considered at length. Given the high visibility and public awareness of the impact of x-ray radiation, the second edition features a new chapter on x-ray dose and presents different dose reduction techniques ranging from patient handling, optimal data acquisition, image reconstruction, and post-process. Based on the advancements over the past five years, the second edition added new sections on cone beam reconstruction algorithms, nonconventional helical acquisition and reconstruction, new reconstruction approaches, and dual-energy CT. Finally, new to this edition is a set of problems for each chapter, providing opportunities to enhance reader comprehension and practice the application of covered material.

This third edition provides a concise and generously illustrated survey of the complete field of medical imaging and image computing, explaining the mathematical and physical principles and giving the reader a clear understanding of how images are obtained and interpreted. Medical imaging and image computing are rapidly evolving fields, and this edition has been updated with the latest developments in the field, as well as new images and animations. An introductory chapter on digital image processing is followed by chapters on the imaging modalities: radiography, CT, MRI, nuclear medicine and ultrasound. Each chapter covers the basic physics and interaction with tissue, the image reconstruction process, image quality aspects, modern equipment, clinical applications, and biological effects and safety issues. Subsequent chapters review image computing and visualization for diagnosis and treatment. Engineers, physicists and clinicians at all levels will find this new edition an invaluable aid in understanding the principles of imaging and their clinical applications.

Computed tomography of the heart and cardiovascular system continues to show an impressive and tremendously successful development. Technical improvements translate into new applications and enhanced diagnostic accuracy and the new diagnostic opportunities may potentially be beneficial for many individuals with known or suspected cardiovascular dis

Publisher's Note: Products purchased from 3rd Party sellers are not guaranteed by the Publisher for quality, authenticity, or access to any online entitlements included with the product. Computed Tomography for Technologists: Exam Review, Second Edition, is intended to be used as a companion to Computed Tomography for Technologists: A Comprehensive Text, Second Edition, and as a review of computed tomography on its own. This is an excellent resource for students preparing to take the advanced level certification exam offered by The American Registry of Radiologic Technologists (ARRT).

Cone Beam Computed Tomography in Orthodontics

Digital Technologies in Oral and Maxillofacial Surgery, An Issue of Atlas of the Oral and Maxillofacial Surgery Clinics

Abdominal Imaging E-Book

Imaging Systems for Medical Diagnostics

Integrated Imaging in Oncology

Fundamentals, System Technology, Image Quality, Applications

Industrial Tomography: Systems and Applications, Second Edition thoroughly explores the important techniques of industrial tomography, also discusses image reconstruction, systems, and applications. This book presents complex processes, including the way three-dimensional imaging is used to create multiple cross-sections, and how computer software helps monitor flows, filtering, mixing, drying processes, and chemical reactions inside vessels and pipelines. This book is suitable for materials scientists and engineers and applied physicists working in the photonics and optoelectronics industry or in the applications industries. Provides a comprehensive discussion on the different formats of tomography, including advances in visualization and data fusion Includes an excellent overview of image reconstruction using a wide range of applications Presents a comprehensive discussion of tomography systems and their applications in a wide variety of industrial processes

To the dentist or maxillofacial practitioner, radiology is an essential diagnostic discipline and a valuable tool for treatment planning. Now more than ever, dentists are often the first to encounter lesions of the face and jaws and are frequently held liable for recognizing pathologies and other sites of concern. Oral and Maxillofacial Radiology: A Diagnostic Approach provides clinicians of varied disciplines and skill levels a practical and systematic approach to diagnosing lesions affecting the face and jaws. Firmly grounded in evidence-based research, the book presents a clear understanding of the clinical impact of each lesion within a prospective diagnosis. Oral and Maxillofacial Radiology is logically organized, beginning with the basics of radiological diagnosis before discussing each of the advanced imaging modalities in turn. Modalities discussed include helical and cone-beam computed tomography, magnetic resonance imaging, positron emission tomography, and ultrasonography. Later chapters cover radiological pathologies of the jaw, and also those of the head and neck immediately outside the oral and maxillofacial region. Written by a recognized expert in the field, Oral and Maxillofacial Radiology contains a multitude of clinical images, practical examples, and flowcharts to facilitate differential diagnosis. Key Features: Accessible and user-friendly Features flowcharts detailing step-by-step diagnosis Solid evidence-base, thoroughly referenced throughout Well illustrated with over 600 clinical images

Build the foundation necessary for the practice of CT scanning with Computed Tomography: Physical Principles, Clinical Applications, and Quality Control, 4th Edition. Written to meet the varied requirements of radiography students and practitioners, this two-color text provides comprehensive coverage of the physical principles of CT and its clinical applications. Its clear, straightforward approach is designed to improve your understanding of sectional anatomic images as they relate to CT — and facilitate communication between CT technologists and other medical personnel. Comprehensively covers CT at just the right depth for technologists – going beyond superficial treatment to accommodate all the major advances in CT. One complete CT resource covers what you need to know! The latest information on advances in CT imaging, including: advances in volume CT scanning; CT fluoroscopy; multi-slice applications like 3-D imaging, CT angiography, and virtual reality imaging (endoscopy) – all with excellent coverage of state-of-the-art principles, instrumentation, clinical applications, and quality control. More than 600 photos and line drawings help students understand and visualize concepts. Chapter outlines show you what is most important in every chapter. Strong ancillary package on Evolve facilitates instructor preparation and provides a full complement of support for teaching and learning with the text NEW! Highlights recent technical developments in CT, such as: the iterative reconstruction; detector updates; x-ray tube innovations; radiation dose optimization; hardware and software developments; and the introduction of a new scanner from Toshiba. NEW! Learning Objectives and Key Terms at the beginning of every chapter and a Glossary at the end of the book help you organize and focus on key information. NEW! End-of-Chapter Questions provide opportunity for review and greater challenge. NEW! An added second color aids in helping you read and retain pertinent information

This book focuses on applications of micro CT, CBCT and CT in medicine and engineering, comprehensively explaining the basic principles of these techniques in detail, and describing their increasing use in the imaging field. It particularly highlights the scanning procedure, which represents the most crucial step in micro CT, and discusses in detail the reconstruction process and the artifacts related to the scanning processes, as well as the imaging software used in analysis. Written by international experts, the book illustrates the application of micro CT in different areas, such as dentistry, medicine, tissue engineering, aerospace engineering, geology, material engineering, civil engineering and additive manufacturing. Covering different areas of application, the book is of interest not only to specialists in the respective fields, but also to broader audience of professionals working in the fields of imaging and analysis, as well as to students of the different disciplines.

Medical Imaging Systems

An Introductory Guide

Computed Tomography for Technologists: A Comprehensive Text

Maxillofacial Cone Beam Computed Tomography

Computed Tomography

A Primer for Radiographers

Leveraging the organization and focus on exam preparation found in the comprehensive text, this Exam Review will help any student to successfully complete the ARRT General Radiography and Computed Tomography exams. The book includes a bulleted format review of content, Registry-style questions with answers and rationales, and a mock exam following the ARRT format. The companion website offers an online testing simulation engine.

This book acts as a primer for radiographers upon performing computed tomography (CT) examinations. The focus resides in radiation physics, radiobiology, anatomy, imaging protocols and image evaluation. It seeks to provide readers insight into the practical and innovative approaches within CT, backed up with key literature and examples in practice. Recent innovations and the importance of new technology to acquire enhanced quality remain a focal point. These are essential in understanding the importance of dose optimization, patient anatomy and common pathology observed. Patient care will remain central in this book, supported with a dedicated chapter discussing effective communication, patient education, informed consent, coupled with the assessment of laboratory results and vital signs. The editors draw from recent publications and clinical expertise, supported with the growing trend of technological advances utilized within the CT environment. Critically, this volume focuses on the role of CT for an array of audiences but, more specifically, undergraduate and postgraduate radiographers worldwide.

PET and SPECT are two of today's most important medical-imaging methods, providing images that reveal subtle information about physiological processes in humans and animals. Emission Tomography: The Fundamentals of PET and SPECT explains the physics and engineering principles of these important functional-imaging methods. The technology of emission tomography is covered in detail, including historical origins, scientific and mathematical foundations, imaging systems and their components, image reconstruction and analysis, simulation techniques, and clinical and laboratory applications. The book describes the state of the art of emission tomography, including all facets of conventional SPECT and PET, as well as contemporary topics such as iterative image reconstruction, small-animal imaging, and PET/CT systems. This book is intended as a textbook and reference resource for graduate students, researchers, medical physicists, biomedical engineers, and professional engineers and physicists in the medical-imaging industry. Thorough tutorials of fundamental and advanced topics are presented by dozens of the leading researchers in PET and SPECT. SPECT has long been a mainstay of clinical imaging, and PET is now one of the world's fastest growing medical imaging techniques, owing to its dramatic contributions to cancer imaging and other applications. Emission Tomography: The Fundamentals of PET and SPECT is an essential resource for understanding the technology of SPECT and PET, the most widely used forms of molecular imaging. *Contains thorough tutorial treatments, coupled with coverage of advanced topics *Three of the four holders of the prestigious Institute of Electrical and Electronics Engineers Medical Imaging Scientist Award are chapter contributors *Include color artwork

Computed TomographyFundamentals, System Technology, Image Quality, ApplicationsJohn Wiley & Sons

Physical Principles, Clinical Applications, and Quality Control

Expert Radiology Series

Fundamentals of Medical Imaging

Interpretation Basics of Cone Beam Computed Tomography

The book provides a comprehensive description of the fundamental operational principles, technical details of acquiring and specific clinical applications of dental and maxillofacial cone beam computed tomography (CBCT). It covers all clinical considerations necessary for optimal performance in a dental setting. In addition overall and region specific correlative imaging anatomy of the maxillofacial region is described in detail with emphasis on relevant disease. Finally imaging interpretation of CBCT images is presented related to specific clinical applications. This book is the definitive resource for all who refer, perform, interpret or use dental and maxillofacial CBCT including dental clinicians and specialists, radiographers, ENT physicians, head and neck, and oral and maxillofacial radiologists.

This book offers a comprehensive and topical depiction of advances in CT imaging. CT has become a leading medical imaging modality, thanks to its superb spatial and temporal resolution to depict anatomical details. New advances have further extended the technology to provide physiological information, enabling a wide and expanding range of clinical applications. The text covers the latest advancements in CT technology and clinical applications for a variety of CT types and imaging methods. The content is presented in seven parts to offer a structure across a board coverage of CT: CT Systems, CT Performance, CT Practice, Spectral CT, Quantitative CT, Functional CT, and Special Purpose CT. Each contain chapters written by leading experts in the field, covering CT hardware and software innovations, CT operation, CT performance characterization, functional and quantitative applications, and CT systems devised for specific anatomical applications. This book is an ideal resource for practitioners of CT applications in medicine, including physicians, trainees, engineers, and scientists.

Digital technologies are changing the way that surgeons operate. They are revolutionizing the ability of surgeons to visualize, plan, and create rapid prototyped models and patient- specific implants for the broad disciplines of ENT, plastic, oral and maxillofacial surgeons. This book provides information on the latest digital technologies available for craniomaxillofacial surgery, discussing how this technology allows for preplanned procedures with improved and superior outcomes. Rather than improvise during surgery, surgery and its procedures can be preconceptualized with superior outcomes and decreased patient morbidity.