This book highlights the latest developments in acute and delayed neurovascular injury studies including delayed cerebral vasospasm, early brain injury, micro-circulation compromise, spreading cortical depolarization, neuroinflammation, and long-term cognitive dysfunctions after subarachnoid hemorrhage. About 32 chapters cover original presentations from the 14th international conference on neurovascular research held in Barcelona in October 2017. Neurosurgeons, neurologists, and clinical neuroscientists discuss clinical observations, new pilot treatments, clinical trials, academic and industrial interactions, including surgical and endovascular approaches, brain injury monitoring, new developments in brain imaging, ICU management, early brain injury scales and management, counter cortical depolarization management and anti-inflammation management. In addition, animal models used to study acute and delayed neurovascular events, the basic mechanisms of vascular, neuronal, and CSF physiology, new experimental treatment strategies, new frontiers in the treatment of neurovascular injuries, and new research directions are discussed.

This book constitutes the refereed proceedings of the 8th International Workshop on Machine Learning in Medical Imaging, MLMI 2017, held in conjunction with MICCAI 2017, in Quebec City, QC, Canada, in September 2017. The 44 full papers presented in this volume were carefully reviewed and selected from 63 submissions. The main aim of this workshop is to help advance scientific research within the broad field of machine learning in medical imaging. The workshop focuses on major trends and challenges in this area, and presents works aimed to identify new cutting-edge techniques and their use in medical imaging.

Respiratory motion causes an important uncertainty in radiotherapy planning of the thorax and upper abdomen. The main objective of radiation therapy is to eradicate or shrink tumor cells without damaging the surrounding tissue by delivering a high radiation dose to the tumor region and a dose as low as possible to healthy organ tissues. Meeting this demand remains a challenge especially in case of lung tumors due to breathing-induced tumor and organ motion where motion estimation can measure up to several centimeters. Therefore, modeling of respiratory motion has become increasingly important in radiation therapy. With 4D imaging techniques spatiotemporal image sequences can be acquired to investigate dynamic processes in the patient’s body. Furthermore, image registration enables the estimation of the breathing-induced motion and the description of the temporal change in position and shape of the structures of interest by establishing the correspondence between images acquired at different phases of the breathing cycle. In radiation therapy these motion estimations are used to define accurate treatment margins, e.g. to calculate dose distributions and to develop prediction models for gated or robotic radiotherapy. In this book, the increasing role of image registration and motion estimation algorithms for the interpretation of complex 4D medical image sequences is illustrated. Different 4D CT image acquisition techniques and conceptually different motion estimation algorithms are presented. The clinical relevance is demonstrated by means of example applications which are related to the radiation therapy of thoracic and abdominal tumors. The state of the art and perspectives are shown by an insight into the current field of research.

This book contains the full papers presented at the MICCAI 2013 workshop Computational Methods and Clinical Applications for Spine Imaging. The workshop brought together researchers representing several fields, such as Biomechanics, Engineering, Medicine, Mathematics, Physics and Statistics. The works included in this book present and discuss new trends in those fields, using several methods and techniques in order to address more efficiently different and timely applications involving signal and image acquisition, image processing and analysis, image segmentation, image registration and fusion, computer simulation, image based modelling, simulation and surgical planning, image guided robot assisted surgical and image based diagnosis.

More than 40 articles provide an extensive coverage of clinical and basic science advances over the last three years of research on subarachnoid hemorrhage-induced brain injuries. Early brain injury, the new frontier of subarachnoid hemorrhage research, which may be a key contributor to the high mortality and morbidity, promotes collaborative efforts from neurosurgery, neurology, neuro-ICU into other interrelated fields and basic neurosciences. For the first time, subarachnoid hemorrhage research is almost equally divided by early brain injury and cerebral vasospasm, mechanic investigations and therapeutic approaches, demonstrating a translational feature of the future direction.

86 short papers originating from the 13th International Symposium on Intracranial Pressure and Brain Monitoring held in July 2007 in San Francisco present experimental as well as clinical research data on invasive and non-invasive intracranial pressure and brain biochemistry monitoring. The papers have undergone a peer-reviewing and are organized in eight sections: brain injury: ICP management and cerebral physiology; hydrocephalus and cerebrospinal fluid dynamics; advanced neuromonitoring; biomedical informatics; imaging; ICP: brain compliance, biophysics, and
The age of 75. Aneurysms form a significant portion of these cardiovascular related deaths and are defined as a permanent and irreversible localised dilation of a blood vessel greater than 50% of its original radius.

Cardiovascular disease is the leading cause of morbidity and premature death of modern era medicine. It is estimated that approximately 81 million people in the United States (US) currently have one or more of the many forms of cardiovascular disease, resulting in 1 in every 2.8 deaths, or 900,000 deaths per year. 40% of all deaths in Europe are a result of cardiovascular disease in people under the age of 75. Aneurysms form a significant portion of these cardiovascular related deaths and are defined as a permanent and irreversible localised dilation of a blood vessel greater than 50% of its original radius.

The 4th European Congress of the International Federation for Medical and Biological Federation was held in Antwerp, November 2008. The scientific discussion on the conference and in this conference proceedings include the following issues: Signal & Image Processing ICT Clinical Engineering and Applications Biomechanics and Fluid Biomechanics Biomaterials and Tissue Repair Innovations and Nanotechnology Modeling and Simulation Education and Professional.

This book documents current knowledge on the mechanisms involved in sports injuries to the shoulder and elbow, reviews essential physical examinations, and explains the role of diagnostic imaging. Above all, it describes in detail the treatment modalities that are appropriate to the injuries encountered in throwing and overhead athletes, including chronic repetitive and acute traumatic injuries. Both conservative and surgical treatments are covered; the author's own preferred operative techniques are identified and explained, and helpful treatment algorithms offer guidance in selecting an approach fitting to the circumstances. In addition, the inclusion of instructive case reviews will assist readers in achieving a full understanding of the implementation of treatment protocols. Methods of rehabilitation are also described with the aid of demonstration videos, and advice is provided on appropriate timing. The book will be invaluable for all professionals who deal with sports injuries of the shoulder and elbow, including surgeons, physiotherapists, other medical practitioners, and trainers.

This text discusses the basic aspects of multislice CT angiography with chapters on technical principles, basic scan technique for peripheral vascular imaging with multislice CT, image reconstruction with multislice CT, radiation doses, and contrast agent administration. Clinical applications for each major vascular territory are covered in-depth.

This book provides structured up-to-date information on all routine protocols used for multislice (multidetector row) CT. The volume contains a detailed technical section and covers the prevailing investigations of the brain, neck, lungs and chest, abdomen with parenchymal organs and gastrointestinal tract, the musculoskeletal system and CTA as well as dedicated protocols for the heart. Separate chapters address the how-to of CT-guided interventions such as punctures, drainages, and therapeutic approaches. Each protocol is displayed en bloc, enabling rapid appreciation of indications and the necessary scanner settings. The second edition includes contributions by renowned experts in the field, who not only provide their clinical experience on each topic, but also give guidelines for indications, workflow, postprocessing and reconstruction algorithms.

The mortality from ischemic heart disease has decreased in recent years. The better understanding of risk factors associated with development of coronary artery disease has significantly contributed to this decline. Improvements in medical and interventional therapy have reduced the complications associated with acute myocardial infarction as well as revascularization. After the introduction of imaging modalities, the noninvasive characterization of regional function, perfusion and metabolism allowed for more sophisticated tissue characterization to identify reversible dysfunction with high diagnostic and prognostic accuracy. We now can legitimately claim that computed tomography angiography (CTA) of the coronary arteries is available. In the evaluation of patients with suspected coronary artery disease, many guidelines today consider CTA an alternative to stress testing. However the nuclear technique most frequently used by cardiologists is myocardial perfusion imaging (MPI). The combination of a nuclear camera with CTA allows for the attainment of coronary anatomic, cardiac function and MPI from one piece of equipment. Assessing cardiac viability is now fairly routine with these enhancements to cardiac imaging. Traditional coronary angiography presents a variety of limitations related to image acquisition, content, interpretation, and patient safety. Barriers to such improvements include the paucity of clinical outcomes studies related to new imaging technology, the need for physician and staff member training, and the costs associated with acquiring and effectively using these advances in coronary angiography. This issue is full of important information that every cardiologist needs to now.

Takes technical process of CT scanning and breaks it down to digestible components. Provides technical detail essential to understanding the modality.

Present Your Research to the World! The World Congress 2009 on Medical Physics and Biomedical Engineering – the triennial scientific meeting of the IUPESM - is the world's leading forum for presenting the results of current scientific work in health-related physics and technologies to an international audience. With more than 2,800 presentations it will be the biggest conference in the fields of Medical Physics and Biomedical Engineering in 2009! Medical physics, biomedical engineering and bioengineering have been driving forces of innovation and progress in medicine and healthcare over the past two decades. As new key technologies arise with significant potential to open new options in diagnostics and therapeutics, it is a multidisciplinary task to evaluate their benefit for medicine and healthcare with respect to the quality of performance and therapeutic output. Covering key aspects such as information and communication technologies, micro- and nanosystems, optics and biotechnology, the congress will serve as an inter- and multidisciplinary platform that brings together people from basic research, R&D, industry and medical application to discuss these issues. As a major event for science, medicine and technology the congress provides a comprehensive overview and in-depth, first-hand information on new developments, advanced technologies and current and future applications. With this Final Program we would like to give you an overview of the dimension of the congress and invite you to join us in Munich! Olaf Düssel Congress President Wolfgang C.

These proceeding cover new trends presented at the IV Congress of the International Society of Reconstructive Neurosurgery (ISRN), 2015. ISRN is an "open" multidisciplinary society that deals with advances in spine and peripheral-nerve reconstructive surgery, central nervous system revascularization (surgical, radio interventional), neuromodulation, bioengineering and transplantation, which are the latest tools used to promote reconstruction, restoration and rehabilitation.

Cardiovascular disease is the leading cause of morbidity and premature death of modern era medicine. It is estimated that approximately 81 million people in the United States (US) currently have one or more of the many forms of cardiovascular disease, resulting in 1 in every 2.8 deaths, or 900,000 deaths per year. 40% of all deaths in Europe are a result of cardiovascular disease in people under the age of 75. Aneurysms form a significant portion of these cardiovascular related deaths and are defined as a permanent and irreversible localised dilation of a blood vessel greater than 50% of its original radius.
normal diameter. Although aneurysms can form in any blood vessel, the more lethal aneurysms develop in the cranial arteries, and in the thoracic aorta and abdominal aorta. Frequently aneurysms are undetected and if left untreated may eventually expand until rupture with very high levels of morbidity and mortality. The biomechanics and mechanobiology of aneurysmal diseases are not fully understood and this monograph aims to provide new insights into aneurysm aetiology and behavior based on the most recent biomechanics research related to this important topic. The contributors to this volume bring together a unique blend of expertise in experimental, computational and tissue biomechanics relating to aneurysm behavior and enable the reader to gain a fresh understanding of key factors influencing aneurysm behavior and treatment. Biological risk factors such as tobacco smoking, sex, age, hypertension, family history and mechanobiological risk factors such as aneurysm geometry and shape as well as mechanical properties of the diseased tissues are considered in detail as are many of the diagnostic and treatment options.

*Chronic total occlusions continue to represent one of the greatest challenges to interventional cardiologists.* - Cardiovascular Research Foundation - Chronic Total Occlusions or CTOs can be found in 30% of patients with coronary artery disease. Despite advances, CTOs remain one of the most frequently identified lesions in interventional cardiology yet least likely to be successfully treated. The prevalence of the disorder is vexing. The threat to your patients is significant. The condition is complex. And, treatment remains a challenge. Learn how to approach CTOs from internationally-recognized physician-educators. Turn to Chronic Total Occlusions: A Guide to Recanalization, 2e for expert insight into the world of CTOs and clear, practical guidance you can apply directly and immediately in your cath lab. Offering the most comprehensive information available, this completely updated second edition provides you with full-color images from the diagnostic modalities that are essential in identifying CTOs. Data on indications and efficacy from the most recent clinical trials. Practical guidance on the selection and use of the latest wires and devices. Even more tips and tricks from leading operators from the world's busiest centers. Clinical cases to illustrate some of the more complex scenarios and common complications. And more! Chronic Total Occlusions: A Guide to Recanalization, 2e is the guide you can count on to improve the CTO success rate at your facility. Order your copy today!

With contributions by numerous experts

New Techniques in Cardiothoracic Imaging emphasizes emerging methods in computed tomography, magnetic resonance imaging, positron-emission tomography, and similar technology. Effective use of these tools can facilitate the identification, analysis, and treatment of diseases and disorders commonly encountered in daily clinical practice. The contributing authors are experts of international standing.

This book considers in depth all the factors that influence the radiation dose and the risk associated with MDCT in children and adults. Only a small proportion of referring clinicians, radiologists, and technologists are aware of both the radiation risks and their underlying mechanisms. The book proposes detailed guidelines for optimization of the radiation dose when using MDCT. It is written by experts of international standing.

Coronary artery disease (CAD) and its consequences are most important morbidity and mortality reasons in the developed and developing countries. To prevent hard end-points, early definitive diagnosis and optimum therapy play significant role. Novel advanced diagnostic tests which are biomarkers of inflammation, cell adhesion, cell activation and imaging techniques provide to get the best result in the detection and characterization of calcified and uncalcified atherosclerotic plaques. In spite of last developments in the imaging methods, coronary catheterization is still frequently performed. Following the first cardiac catheterization performed in 1844, date by date historical developments and the mechanics of cardiac catheterization techniques, risks associated with coronary angiography, and also, prevention and treatments of possible complications have been presented in this book. Other important issue is radiation exposure of patients and staff during coronary angiography and scintigraphy. Radiation dose reduction techniques, general radiation protection principles have been discussed in related chapters.

Fundamentals of Medical Imaging, second edition, is an invaluable technical introduction to each imaging modality, explaining the mathematical and physical principles and giving a clear understanding of how images are obtained and interpreted. Individual chapters cover each imaging modality – radiography, CT, MRI, nuclear medicine and ultrasound – reviewing the physics of the signal and its interaction with tissue, the image formation or reconstruction process, a discussion of image quality and equipment, clinical applications and biological effects and safety issues. Subsequent chapters review image analysis and visualization for diagnosis, treatment and surgery. New to this edition: [] Appendix of questions and answers [] New chapter on 3D image visualization [] Advanced mathematical formulae in separate text boxes [] Ancillary website containing 3D animations www.cambridge.org/istensetens [] Full colour illustrations throughout Engineers, clinicians, mathematicians and physicists will find this an invaluable aid in understanding the physical principles of imaging and their clinical applications.

This book presents and describes imaging technologies that can be used to study chemical processes and structural interactions in dynamic systems, principally in biomedical systems. The imaging technologies, largely biomedical imaging technologies such as MRT, fluorescence mapping, nanoscale mapping, nanoESCA, and CARS microscopy, have been selected according to their application range and to the chemical information content of their data. These technologies allow for the analysis and evaluation of delicate biological samples, which must not be disturbed during the process.
Ultimately, this may mean fewer animal lab tests and clinical trials.

This book explores the physics of CT dosimetry and provides practical guidance on best practice for medical researchers and practitioners. A rigorous description of the basic physics of CT dosimetry is presented and illustrates flaws of the current methodology. It also contains helpful (and rigorous) shortcuts to reduce the measurement workload for medical physicists. The mathematical rigor is accompanied by easily-understood physical explanations and numerous illustrative figures. Authored by a recognised expert in the field and award-winning teacher, this book offers derivations for tube current modulation and variable pitch as well as stationary table techniques. It explores abnormalities present in dose-tracking software based on CTDI and presents methods to correct them.

This book discusses the state-of-the-art developments in multi-slice CT for cardiac imaging as well as those that can be anticipated in the future. It is a comprehensive work covering all aspects of this technology from the technical fundamentals to clinical indications and protocol recommendations. This second edition draws on the most recent clinical experience obtained with 16- and 64-slice CT scanners by world-leading experts. The book also has chapters on area-detector CT and the brand new dual-source CT.

This comprehensive book focuses on multimodality imaging technology, including overviews of the instruments and methods followed by practical case studies that highlight use in the detection and treatment of cardiovascular diseases. Chapters cover PET-CT, SPECT-CT, SPECT-MRI, PET-MRI, PET-optical imaging, SPECT-optical imaging, photoacoustic imaging, and hybrid intravascular imaging. It also addresses the important issues of multimodality imaging probes and image quantification. From radiologists to cardiologists, radiologists as well as medical imaging and biomedical engineering will learn essentials of the field. Readers will be shown how the field has advanced quantitative analysis of molecularly targeted imaging through improvements in the reliability and reproducibility of imaging data. Moreover, they will be presented with quantification algorithms and case illustrations, including coverage of such topics as multimodality image fusion and kinetic modeling. Yi-Hwa Liu, PhD is Senior Research Scientist in Cardiovascular Medicine at Yale University School of Medicine and Technical Director of Nuclear Cardiology at Yale New Haven Hospital. He is also an Associate Professor (Adjunct) of Biomedical Imaging and Radiological Sciences at National Yang-Ming University, Taipei, Taiwan, and Professor (Adjunct) of Biomedical Engineering at Chung Yuan Christian University, Taoyuan, Taiwan. He is an elected senior member of Institute of Electrical and Electronic Engineers (IEEE) and a full member of Sigma Xi of The Scientific Research Society of North America.

Albert J. Sinusas, M.D., FACC, FAHA is Professor of Medicine (Section of Cardiovascular Medicine) and Radiology and Biomedical Imaging, at Yale University School of Medicine, and Director of the Yale Translational Research Imaging Center (Y-TRIC), and Director of Advanced Cardiovascular Imaging at Yale New Haven Hospital. He is a recipient of the Society of Nuclear Medicine's Hermann Blumgart Award.

The Biomed 2011 brought together academicians and practitioners in engineering and medicine in this ever progressing field. This volume presents the proceedings of this international conference which was held in conjunction with the 8th Asian Pacific Conference on Medical and Biological Engineering (APCOMBE 2011) on the 20th to the 23rd of June 2011 at Berjaya Times Square Hotel, Kuala Lumpur. The topics covered in the conference proceedings include: Artificial organs, bioengineering education, bioinformatics, biomaterials, biomechanics, biomedical imaging, biomedical instrumentation, BioMEMS, clinical engineering, prosthetics.

Written by the chief physicist at Johns Hopkins University Hospital, this easy-to-read short textbook explains the physics behind multi-detector CT technology, particularly newer, more complex technology. The focus is on principles of physics, effects of scan parameters on image quality, and optimum radiation dosage. The book includes numerous key points summaries and questions to assist in exam preparation.

Since the first edition of this book was published in 2004, computed tomography has seen groundbreaking technical innovations that have transformed the field of thoracic imaging and opened novel possibilities for the detection of thoracic pathologies. This book highlights cutting-edge thoracic applications of CT imaging in the context of these technical innovations and discusses the latest opportunities, with critical appraisal of challenges and controversies. All topics are covered by renowned international experts. Chapters from the original edition have been thoroughly updated to reflect the state of the art in technology and scientific evidence, and new contributions included on recent developments such as dual-energy CT and CT imaging in patients with acute chest pain. The book is abundantly illustrated with high-quality images and illustrations.

Medical imaging has transformed the ways in which various conditions, injuries, and diseases are identified, monitored, and treated. As various types of digital visual representations continue to advance and improve, new opportunities for their use in medical practice will likewise evolve. Medical Imaging: Concepts, Methodologies, Tools, and Applications presents a compendium of research on digital imaging technologies in a variety of healthcare settings. This multi-volume work contains practical examples of implementation, emerging trends, case studies, and technological innovations essential for using imaging technologies for making medical decisions. This comprehensive book is an essential resource for medical practitioners, digital imaging technologists, researchers, and medical students.

This volume presents the proceedings of the International Conference on Medical and Biological Engineering held from 16 to 18 March 2017 in Sarajevo, Bosnia and Herzegovina. Focusing on the theme of 'Pursuing innovation. Shaping the future', it highlights the latest advancements in Biomedical Engineering and also presents the latest findings, innovative solutions and emerging challenges in this field. Topics include: Biomedical Signal Processing - Biomedical Imaging and Image Processing - Biosensors and Bioinstrumentation - Bio-Micro/Nano Technologies - Biomat erials - Biomaterials - Biomechanics, Robotics and Minimally Invasive Surgery - Cardiovascular, Respiratory and Endocrine Systems Engineering - Neural and Rehabilitation Engineering - Molecular, Cellular and Tissue Engineering - Bioinformatics and Computational Biology - Clinical Engineering and Health Technology Assessment - Health Informatics, E-Health and Telemedicine - Biomedical Engineering Education - Pharmaceutical Engineering.

Over the past three decades, the exploding number of new technologies and applications introduced in medical practice, often powered by advances in biosignal processing and biomedical imaging, created an amazing account of new possibilities for diagnosis and therapy, but also raised major questions of appropriateness and safety. The accelerated development in this field, alongside with the
This book collects the state-of-art and new trends in image analysis and biomechanics. It covers a wide field of scientific and cultural topics, ranging from remodeling of bone tissue under the mechanical stimulus up to optimizing the performance of sports equipment, through the patient-specific modeling in orthopedics, microtomography and its application in oral and implant research, computational modeling in the field of hip prostheses, image based model development and analysis of the human knee joint, kinematics of the hip joint, micro-scale analysis of compositional and mechanical properties of dentin, automated techniques for cervical cell image analysis, and biomedical imaging and computational modeling in cardiovascular disease. The book will be of interest to researchers, Ph D students, and graduate students with multidisciplinary interests related to image analysis and understanding, medical imaging, biomechanics, simulation and modeling, experimental analysis.

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.

Section I Principles and challenges of MDCT / Introduction-I.1 MDCT: Technical principles and future trends-I.2 Contrast medium administration and scan timing for MDCT Section II Abdominal imaging / Introduction-II.1 MDCT: Secondary malignancies and benign liver lesions-II.2 Primary liver malignancies-II.3 MDCT of the pancreas-II.4 Abdominal imaging Use of high concentration contrast media Section III Cardiac and vascular imaging / Introduction-III.1 Use of high concentration contrast media in CT angiography: Principles and rationale-III.2 Cardiac and vascular imaging Cardiology indications-III.3 Aorta, peripheral and renal vessels-III.4 MDCT for diagnosis of pulmonary embolism. Have we reached our goal? Section IV Future prospects in MDCT imaging / Introduction-IV.1 Interventional MDCT-IV.2 Functional CT imaging in stroke and oncology-IV.3 From acquisition to report: managing the information overload-IV.4 Recent update on contrast media safety

Transit Development in Rock Mechanics Recognition, Thinking and Innovation contains 150 papers presented at the 3rd ISRM International Young Scholars Symposium on Rock Mechanics (8-10 November 2014, Xi an, China). The volume focusses on the transitional development in rock mechanics research from surface to underground mining and from shallow to a 36041ef85208b733b5301334f2117bc9