

Diffusion Tensor Imaging A Practical Handbook

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Computational Diffusion MRI - Suheyla Cetin-Karayumak 2021-09-25
This book constitutes the proceedings of the International Workshop on Computational Diffusion MRI, CDMRI 2021, which was held on October 1, 2021, in conjunction with MICCAI 2021. The conference was planned to take place in Strasbourg, France, but was held virtually due to the COVID-19 pandemic. The 13 full papers included were carefully reviewed and selected for inclusion in the book. The proceedings also contain a paper about the design and scope of the MICCAI Diffusion-Simulated Connectivity Challenge (DiSCo) which was held at CDMRI 2021. The papers were organized in topical sections as follows: acquisition; microstructure modelling; tractography and connectivity; applications and visualization; DiSCo challenge - invited contribution.

The Cognitive Neuroscience of Attention - Joseph B. Hopfinger 2020-12-17

Attention refers to our ability to selectively process the vast array of stimuli impinging upon our senses at every moment. The mental processes of attention are critical for allowing us to maintain focus and complete tasks efficiently, even within distracting environments. The brain mechanisms of attention have been studied for decades, yet much still remains unknown, and consensus on core issues remains elusive. A unique aspect of this book are chapters that highlight recent debates on critical issues in attention research. Each of these chapters includes a comprehensive discussion paper that is followed by peer commentaries and an authors' responses. These debates include whether attention can modulate activity of even the earliest cortical processing region and whether changes in white matter are critical for plasticity-related effects of attention training. In addition to these discussion chapters, the book presents cutting-edge research on some of the newest theories of attentional control and selective attention, including the influence of practice, epigenetics, reward, social interaction, and distractor suppression. These studies employ advanced cognitive neuroscience methods such as neurostimulation, functional neuroimaging pattern analysis, and the evaluation of oscillatory brain activity to shed light on the brain mechanisms underlying attention. The chapters in this book were originally published as articles in various issues of the journal *Cognitive Neuroscience*.

Imaging of Brain Tumors with Histological Correlations - Antonios Drevelegas 2013-04-17

This volume provides a thorough treatment of the diagnosis of brain tumors by correlating radiographic image features to the underlying pathology. Theoretical considerations and illustrations depicting common and uncommon imaging characteristics of various brain tumors are presented. All modern imaging modalities are used to complete a diagnostic overview of brain tumors with emphasis on recent advances in diagnostic neuroradiology. The book has been designed as a clinical tool for radiologists and other clinicians interested in the current diagnostic approach to brain tumors.

Autism Imaging and Devices - Manuel F. Casanova 2017-01-06

This book covers state-of-the-art medical image analysis approaches currently pursued in autism research. Chapters cover recent advances in diagnosis using structural neuroimaging. All aspects of imaging are included, such as electrophysiology (EEG, ERP, QEEG, and MEG), postmortem techniques, and advantages and difficulties of depositing/acquiring images in larger databases. The book incorporates 2D, 3D, and 4D imaging and advances scientific research within the broad field of autism imaging.

Introduction to Neuroimaging Analysis - Mark Jenkinson 2018

This accessible primer gives an introduction to the wide array of MRI-based neuroimaging methods that are used in research. It provides an overview of the fundamentals of what different MRI modalities measure, what artifacts commonly occur, the essentials of the analysis, and common 'pipelines'

Diffusion MRI - Heidi Johansen-Berg 2013-11-04

Diffusion MRI remains the most comprehensive reference for understanding this rapidly evolving and powerful technology and is an essential handbook for designing, analyzing, and interpreting diffusion MR experiments. Diffusion imaging provides a unique window on human brain anatomy. This non-invasive technique continues to grow in popularity as a way to study brain pathways that could never before be investigated in vivo. This book covers the fundamental theory of diffusion imaging, discusses its most promising applications to basic and clinical neuroscience, and introduces cutting-edge methodological developments that will shape the field in coming years. Written by leading experts in the field, it places the exciting new results emerging from diffusion imaging in the context of classical anatomical techniques to show where diffusion studies might offer unique insights and where potential limitations lie. Fully revised and updated edition of the first comprehensive reference on a powerful technique in brain imaging
Covers all aspects of a diffusion MRI study from acquisition through analysis to interpretation, and from fundamental theory to cutting-edge developments
New chapters covering connectomics, advanced diffusion acquisition, artifact removal, and applications to the neonatal brain
Provides practical advice on running an experiment
Includes discussion of applications in psychiatry, neurology, neurosurgery, and basic neuroscience
Full color throughout

Diffusion Tensor Imaging - Wim Van Hecke 2015-12-15

This book provides an overview of the practical aspects of diffusion tensor imaging (DTI), from understanding the basis of the technique through selection of the right protocols, trouble-shooting data quality, and analyzing DTI data optimally. DTI is a non-invasive magnetic resonance imaging (MRI) technique for visualizing and quantifying tissue microstructure based on diffusion. The book discusses the theoretical background underlying DTI and advanced techniques based on higher-order models and multi-shell diffusion imaging. It covers the practical implementation of DTI; derivation of information from DTI data; and a range of clinical applications, including neurosurgical planning and the assessment of brain tumors. Its practical utility is enhanced by decision schemes and a fully annotated DTI brain atlas, including color fractional anisotropy maps and 3D tractography reconstructions of major white matter fiber bundles. Featuring contributions from leading specialists in the field of DTI, *Diffusion Tensor Imaging: A Practical Handbook* is a valuable resource for radiologists, neuroradiologists, MRI technicians and clinicians.

Clinical Functional MRI - Christoph Stippich 2015-02-27

The second, revised edition of this successful textbook provides an up-to-date description of the use of preoperative fMRI in patients with brain tumors and epilepsies. State of the art fMRI procedures are presented, with detailed consideration of practical aspects, imaging and data processing, normal and pathological findings, and diagnostic possibilities and limitations. Relevant information on brain physiology, functional neuroanatomy, imaging technique, and methodology is provided by recognized experts in these fields. Compared with the first edition, chapters have been updated to reflect the latest developments and in particular the current use of diffusion tensor imaging (DTI) and resting-state fMRI. Entirely new chapters are included on resting-state presurgical fMRI and the role of DTI and tractography in brain tumor surgery. Further chapters address multimodality functional neuroimaging, brain plasticity, and pitfalls, tips, and tricks.

Medical Image Computing and Computer Assisted Intervention - MICCAI 2020 - Anne L. Martel 2020-10-02

The seven-volume set LNCS 12261, 12262, 12263, 12264, 12265, 12266, and 12267 constitutes the refereed proceedings of the 23rd International Conference on Medical Image Computing and Computer-Assisted Intervention, MICCAI 2020, held in Lima, Peru, in October 2020. The conference was held virtually due to the COVID-19 pandemic. The 542 revised full papers presented were carefully reviewed and selected from

1809 submissions in a double-blind review process. The papers are organized in the following topical sections: Part I: machine learning methodologies Part II: image reconstruction; prediction and diagnosis; cross-domain methods and reconstruction; domain adaptation; machine learning applications; generative adversarial networks Part III: CAI applications; image registration; instrumentation and surgical phase detection; navigation and visualization; ultrasound imaging; video image analysis Part IV: segmentation; shape models and landmark detection Part V: biological, optical, microscopic imaging; cell segmentation and stain normalization; histopathology image analysis; ophthalmology Part VI: angiography and vessel analysis; breast imaging; colonoscopy; dermatology; fetal imaging; heart and lung imaging; musculoskeletal imaging Part VI: brain development and atlases; DWI and tractography; functional brain networks; neuroimaging; positron emission tomography

Handbook of MRI Technique - Catherine Westbrook 2021-10-07
HANDBOOK OF MRI TECHNIQUE FIFTH EDITION Distinguished educator Catherine Westbrook delivers a comprehensive and intuitive resource for radiologic technologists in this newly revised Fifth Edition of the Handbook of MRI Technique. With a heavy emphasis on protocol optimisation and patient care, the book guides the uninitiated through scanning techniques and assists more experienced technologists with image quality improvement. The new edition includes up-to-date scanning techniques and an additional chapter on paediatric imaging. The latest regulations on MRI safety are referenced and there are expanded sections on slice prescription criteria. The book also includes the contributions of several clinical experts, walking readers through key theoretical concepts, discussing practical tips on cardiac gating, equipment use, patient care, MRI safety, and contrast media. Step-by-step instruction is provided on scanning each anatomical area, complete with patient positioning and image quality optimisation techniques. The book includes: A thorough introduction to the concepts of parameters and trade-offs, as well as pulse sequences, flow phenomena, and artefacts Comprehensive explorations of cardiac gating and respiratory compensation techniques, patient care and safety, contrast agents, and slice prescription criteria Practical discussions of a wide variety of examination areas, including the head and neck, spine, chest, abdomen, pelvis, the upper and lower limbs, and paediatric imaging A companion website with self-assessment questions and image flashcards Perfect for radiography students and newly qualified practitioners, as well as practitioners preparing for MRI-based certification and examination, the Handbook of MRI Technique will also prove to be an invaluable addition to the libraries of students in biomedical engineering technology and radiology residents.

Z Score Neurofeedback - Robert W. Thatcher 2014-09-20

Neurofeedback is utilized by over 10,000 clinicians worldwide with new techniques and uses being found regularly. Z Score Neurofeedback is a new technique using a normative database to identify and target a specific individual's area of dysregulation allowing for faster and more effective treatment. The book describes how to perform z Score Neurofeedback, as well as research indicating its effectiveness for a variety of disorders including pain, depression, anxiety, substance abuse, PTSD, ADHD, TBI, headache, frontal lobe disorders, or for cognitive enhancement. Suitable for clinicians as well as researchers this book is a one stop shop for those looking to understand and use this new technique. Contains protocols to implement Z score neurofeedback Reviews research on disorders for which this is effective treatment Describes advanced techniques and applications

Diffusion MRI - Derek K Jones 2010-11-11

Professor Derek Jones, a world authority on diffusion MRI, has assembled most of the world's leading scientists and clinicians developing and applying diffusion MRI to produce an authorship list that reads like a "Who's Who" of the field and an essential resource for those working with diffusion MRI. Destined to be a modern classic, this definitive and richly illustrated work covers all aspects of diffusion MRI from basic theory to clinical application. Oxford Clinical Neuroscience is a comprehensive, cross-searchable collection of resources offering quick and easy access to eleven of Oxford University Press's prestigious neuroscience texts. Joining Oxford Medicine Online these resources offer students, specialists and clinical researchers the best quality content in an easy-to-access format.

Introduction to Human Neuroimaging - Hans Op de Beeck 2019-05-16

An accessible primer for courses on human neuroimaging methods, with example research studies, color figures, and practice questions.

Nonparametric Statistics on Manifolds and Their Applications to Object Data Analysis - Victor Patrangenaru 2015-09-18

A New Way of Analyzing Object Data from a Nonparametric Viewpoint Nonparametric Statistics on Manifolds and Their Applications to Object Data Analysis provides one of the first thorough treatments of the theory and methodology for analyzing data on manifolds. It also presents in-depth applications to practical problems arising in a variety of fields, including statistics, medical imaging, computer vision, pattern recognition, and bioinformatics. The book begins with a survey of illustrative examples of object data before moving to a review of concepts from mathematical statistics, differential geometry, and topology. The authors next describe theory and methods for working on various manifolds, giving a historical perspective of concepts from mathematics and statistics. They then present problems from a wide variety of areas, including diffusion tensor imaging, similarity shape analysis, directional data analysis, and projective shape analysis for machine vision. The book concludes with a discussion of current related research and graduate-level teaching topics as well as considerations related to computational statistics. Researchers in diverse fields must combine statistical methodology with concepts from projective geometry, differential geometry, and topology to analyze data objects arising from non-Euclidean object spaces. An expert-driven guide to this approach, this book covers the general nonparametric theory for analyzing data on manifolds, methods for working with specific spaces, and extensive applications to practical research problems. These problems show how object data analysis opens a formidable door to the realm of big data analysis.

Diffusion Tensor Imaging - Wim Van Hecke 2015-12-14

This book provides an overview of the practical aspects of diffusion tensor imaging (DTI), from understanding the basis of the technique through selection of the right protocols, trouble-shooting data quality, and analyzing DTI data optimally. DTI is a non-invasive magnetic resonance imaging (MRI) technique for visualizing and quantifying tissue microstructure based on diffusion. The book discusses the theoretical background underlying DTI and advanced techniques based on higher-order models and multi-shell diffusion imaging. It covers the practical implementation of DTI; derivation of information from DTI data; and a range of clinical applications, including neurosurgical planning and the assessment of brain tumors. Its practical utility is enhanced by decision schemes and a fully annotated DTI brain atlas, including color fractional anisotropy maps and 3D tractography reconstructions of major white matter fiber bundles. Featuring contributions from leading specialists in the field of DTI, *Diffusion Tensor Imaging: A Practical Handbook* is a valuable resource for radiologists, neuroradiologists, MRI technicians and clinicians.

Kryger's Principles and Practice of Sleep Medicine - E-Book - Meir H. Kryger 2021-12-16

Offering today's most authoritative, comprehensive coverage of sleep disorders, Kryger's Principles and Practice of Sleep Medicine, 7th Edition, is a must-have resource for sleep medicine specialists, fellows, trainees, and technicians, as well as pulmonologists, neurologists, and other clinicians who see patients with sleep-related issues. It provides a solid understanding of underlying basic science as well as complete coverage of emerging advances in management and treatment for a widely diverse patient population. Evidence-based content, hundreds of full-color illustrations, and a wealth of additional resources online help you make well-informed clinical decisions and offer your patients the best possible care. Contains new chapters on sleep in intersex and transgender individuals; sleep telemedicine and remote PAP adherence monitoring; and sleep and the menstrual cycle, as well as increased coverage of treatment and management of pediatric patients. Includes expanded sections on pharmacology, sleep in individuals with other medical disorders, and methodology. Discusses updated treatments for sleep apnea and advancements in CPAP therapy. Offers access to 95 video clips online, including expert interviews and sleep study footage of various sleep disorders. Meets the needs of practicing clinicians as well as those preparing for the sleep medicine fellowship examination or recertification exams, with more than 950 self-assessment questions, answers, and rationales online. Enhanced eBook version included with purchase. Your enhanced eBook allows you to access all of the text, figures, and references from the book on a variety of devices.

The Oxford Handbook of Synesthesia - Julia Simner 2018-10-23

Synesthesia is a fascinating phenomenon which has captured the imagination of scientists and artists alike. This title brings together a broad body of knowledge about this condition into one definitive state-of-the-art handbook.

Diffusion Weighted and Diffusion Tensor Imaging: A Clinical Guide -

Claudia Leite 2016-01-16

Diffusion-weighted imaging (DWI) is an integral part of routine neuroimaging, used nearly universally in brain MRIs, and more recently for the spine, spinal cord, and head and neck. DWI provides clinically relevant information on conditions including stroke, infection, and neoplasms. Diffusion tensor imaging (DTI) is a powerful, newer technique with the potential for multiple protocols, including the diagnosis of mild traumatic brain injury and psychiatric disorders. Written by leading authorities in neuroradiology and radiology, *Diffusion Weighted and Diffusion Tensor Imaging: A Clinical Guide* provides key points and summaries on the concepts and applications required for proper implementation and interpretation of DWI and DTI. Key Features: More than 600 high-quality illustrations Protocols and applications from early childhood to older adulthood Methods to differentiate normal versus pathological states Brain edema pathophysiology and use of DWI to distinguish between cytotoxic and vasogenic edema Utilization of DWI and DTI to diagnose trauma, white matter disease, tumors, cerebrovascular disease, and head, neck, and spine disorders This concise handbook is an invaluable resource for neuroradiologists and radiologists, as well as fellows and residents in these disciplines. With the expanding use of these procedures, neuroscientists, neurologists, neurosurgeons, and psychiatrists will also find it indispensable.

Handbook of MRI Pulse Sequences - Matt A. Bernstein 2004-09-21

Magnetic Resonance Imaging (MRI) is among the most important medical imaging techniques available today. There is an installed base of approximately 15,000 MRI scanners worldwide. Each of these scanners is capable of running many different "pulse sequences", which are governed by physics and engineering principles, and implemented by software programs that control the MRI hardware. To utilize an MRI scanner to the fullest extent, a conceptual understanding of its pulse sequences is crucial. *Handbook of MRI Pulse Sequences* offers a complete guide that can help the scientists, engineers, clinicians, and technologists in the field of MRI understand and better employ their scanner. Explains pulse sequences, their components, and the associated image reconstruction methods commonly used in MRI Provides self-contained sections for individual techniques Can be used as a quick reference guide or as a resource for deeper study Includes both non-mathematical and mathematical descriptions Contains numerous figures, tables, references, and worked example problems

Principles and Practice of Sleep Medicine E-Book - Meir H. Kryger 2015-12-29

For nearly 30 years, Dr. Meir Kryger's must-have guide to sleep medicine has been the gold standard in this fast-changing field. This essential, full-color reference includes more than 20 unique sections and over 170 chapters covering every aspect of sleep disorders, giving you the authoritative guidance you need to offer your patients the best possible care. Evidence-based content helps you make the most well-informed clinical decisions. An ideal resource for preparing for the sleep medicine fellowship examination. New content on sleep apnea, neurological disorders, legal aspects of sleep medicine, dental sleep medicine genetics, circadian disorders, geriatrics, women's health, cardiovascular diseases, and occupational sleep medicine, keeps you fully up to date. Updates to scientific discoveries and clinical approaches ensure that you remain current with new knowledge that is advancing the diagnosis and management of sleep disorders.

Youmans and Winn Neurological Surgery - H. Richard Winn 2022-01-21

Widely regarded as the definitive reference in the field, *Youmans and Winn Neurological Surgery* offers unparalleled, multimedia coverage of the entirety of this complex specialty. Fully updated to reflect recent advances in the basic and clinical neurosciences, the 8th Edition covers everything you need to know about functional and restorative neurosurgery, deep brain stimulation, stem cell biology, radiological and nuclear imaging, and neuro-oncology, as well as minimally invasive surgeries in spine and peripheral nerve surgery, and endoscopic and other approaches for cranial procedures and cerebrovascular diseases. In four comprehensive volumes, Dr. H. Richard Winn and his expert team of editors and authors provide updated content, a significantly expanded video library, and hundreds of new video lectures that help you master new procedures, new technologies, and essential anatomic knowledge in neurosurgery. Discusses current topics such as diffusion tensor imaging, brain and spine robotic surgery, augmented reality as an aid in neurosurgery, AI and big data in neurosurgery, and neuroimaging in stereotactic functional neurosurgery. 55 new chapters provide cutting-edge information on Surgical Anatomy of the Spine, Precision Medicine

in Neurosurgery, The Geriatric Patient, Neuroanesthesia During Pregnancy, Laser Interstitial Thermal Therapy for Epilepsy, Fetal Surgery for Myelomeningocele, Rehabilitation of Acute Spinal Cord Injury, Surgical Considerations for Patients with Polytrauma, Endovascular Approaches to Intracranial Aneurysms, and much more. Hundreds of all-new video lectures clarify key concepts in techniques, cases, and surgical management and evaluation. Notable lecture videos include multiple videos on Thalamotomy for Focal Hand Dystonia and a video to accompany a new chapter on the Basic Science of Brain Metastases. An extensive video library contains stunning anatomy videos and videos demonstrating intraoperative procedures with more than 800 videos in all. Each clinical section contains chapters on technology specific to a clinical area. Each section contains a chapter providing an overview from experienced Section Editors, including a report on ongoing controversies within that subspecialty.

Imaging Anatomy of the Human Brain - Neil M. Borden, MD 2015-08-25

An Atlas for the 21st Century The most precise, cutting-edge images of normal cerebral anatomy available today are the centerpiece of this spectacular atlas for clinicians, trainees, and students in the neurologically-based medical and non-medical specialties. Truly an atlas for the 21st century, this comprehensive visual reference presents a detailed overview of cerebral anatomy acquired through the use of multiple imaging modalities including advanced techniques that allow visualization of structures not possible with conventional MRI or CT. Beautiful color illustrations using 3-D modeling techniques based upon 3D MR volume data sets further enhances understanding of cerebral anatomy and spatial relationships. The anatomy in these color illustrations mirror the black and white anatomic MR images presented in this atlas. Written by two neuroradiologists and an anatomist who are also prominent educators, along with more than a dozen contributors, the atlas begins with a brief introduction to the development, organization, and function of the human brain. What follows is more than 1,000 meticulously presented and labelled images acquired with the full complement of standard and advanced modalities currently used to visualize the human brain and adjacent structures including MRI, CT, diffusion tensor imaging (DTI) with tractography, functional MRI, CTA, CTV, MRA, MRV, conventional 2-D catheter angiography, 3-D rotational catheter angiography, MR spectroscopy, and ultrasound of the neonatal brain. The vast array of data that these modes of imaging provide offers a wider window into the brain and allows the reader a unique way to integrate the complex anatomy presented. Ultimately the improved understanding you can acquire using this atlas can enhance clinical understanding and have a positive impact on patient care. Additionally, various anatomic structures can be viewed from modality to modality and from multiple planes. This state-of-the-art atlas provides a single source reference, which allows the interested reader ease of use, cross-referencing, and the ability to visualize high-resolution images with detailed labeling. It will serve as an authoritative learning tool in the classroom, and as an invaluable practical resource at the workstation or in the office or clinic. Key Features: Provides detailed views of anatomic structures within and around the human brain utilizing over 1,000 high quality images across a broad range of imaging modalities Contains extensively labeled images of all regions of the brain and adjacent areas that can be compared and contrasted across modalities Includes specially created color illustrations using computer 3-D modeling techniques to aid in identifying structures and understanding relationships Goes beyond a typical brain atlas with detailed imaging of skull base, calvaria, facial skeleton, temporal bones, paranasal sinuses, and orbits Serves as an authoritative learning tool for students and trainees and practical reference for clinicians in multiple specialties

Atlas of Clinical Cases on Brain Tumor Imaging - Yelda Özsunar 2020-04-28

This book presents and analyzes clinical cases of brain tumors and follows the classification provided by the WHO in 2016. After introductory chapters reviewing the international literature on the topic, the advances made in all imaging modalities (especially Magnetic Resonance and Computed Tomography) are examined. All radiological findings are supplemented with a wealth of images and brief explanations. The clinical information is given as part of the case discussion, as are the characteristics and differential diagnosis of the tumors. Radiologic-pathologic correlations round out the description of each clinical case. Intended as a quick and illustrative reference guide for radiology residents and medical students, this atlas represents the most up-to-date, practice-oriented reference book in the field of Brain Tumor Imaging.

Advanced Diffusion Encoding Methods in MRI - Daniel Topgaard
2020-08-17

The medical MRI community is by far the largest user of diffusion NMR techniques and this book captures the current surge of methods and provides a primary source to aid adoption in this field. There is a trend to adapting the more advanced diffusion encoding sequences developed by NMR researchers within the fields of porous media, chemical engineering, and colloid science to medical research. Recently published papers indicate great potential for improved diagnosis of the numerous pathological conditions associated with changes of tissue microstructure that are invisible to conventional diffusion MRI. This book disseminates these recent developments to the wider community of MRI researchers and clinicians. The chapters cover the theoretical basis, hardware and pulse sequences, data analysis and validation, and recent applications aimed at promoting further growth in the field. This is a fast moving field and chapters are written by key MRI scientists that have contributed to the successful translation of the advanced diffusion NMR methods to the context of medical MRI, from global locations.

Principles and Advanced Methods in Medical Imaging and Image Analysis -

The Oxford Handbook of Functional Brain Imaging in Neuropsychology and Cognitive Neurosciences - Andrew C. Papanicolaou 2017

The Oxford Handbook of Functional Brain Imaging in Neuropsychology and Cognitive Neurosciences describes in a readily accessible manner the several functional neuroimaging methods and critically appraises their applications that today account for a large part of the contemporary cognitive neuroscience and neuropsychology literature. The complexity and the novelty of these methods often cloud appreciation of the methods' contributions and future promise. The Handbook begins with an overview of the basic concepts of functional brain imaging common to all methods, and proceeds with a description of each of them, namely magnetoencephalography (MEG), functional magnetic resonance imaging (fMRI), positron emission tomography (PET), diffusion tensor imaging (DTI), and transcranial magnetic stimulation (TMS). Its second part covers the various research applications of functional neuroimaging on issues like the function of the default mode network; the possibility and the utility of imaging of consciousness; the search for mnemonic traces of concepts; human will and decision-making; motor cognition; language; the mechanisms of affective states and pain; the presurgical mapping of the brain; and others. As such, the volume reviews the methods and their contributions to current research and comments on the degree to which they have enhanced our understanding of the relation between neurophysiological activity and sensory, motor, and cognitive functions. Moreover, it carefully considers realistic contributions of functional neuroimaging to future endeavors in cognitive neuroscience, medicine, and neuropsychology.

Quantitative MRI of the Brain - Mara Cercignani 2018-01-12

Building on the success of the first edition of this book, the winner of the 2004 British Medical Association Radiology Medical Book Competition, *Quantitative MRI of the Brain: Principles of Physical Measurement* gives a unique view on how to use an MRI machine in a new way. Used as a scientific instrument it can make measurements of a myriad of physical and biological quantities in the human brain and body. For each small tissue voxel, non-invasive information monitors how tissue changes with disease and responds to treatment. The book opens with a detailed exposition of the principles of good practice in quantification, including fundamental concepts, quality assurance, MR data collection and analysis and improved study statistical power through minimised instrumental variation. There follow chapters on 14 specific groups of quantities: proton density, T1, T2, T2*, diffusion, advanced diffusion, magnetisation transfer, CEST, 1H and multi-nuclear spectroscopy, DCE-MRI, quantitative fMRI, arterial spin-labelling and image analysis, and finally a chapter on the future of quantification. The physical principles behind each quantity are stated, followed by its biological significance. Practical techniques for measurement are given, along with pitfalls and examples of clinical applications. This second edition of this indispensable 'how to' manual of quantitative MR shows the MRI physicist and research clinician how to implement these techniques on an MRI scanner to understand more about the biological processes in the patient and physiological changes in healthy controls. Although focussed on the brain, most techniques are applicable to characterising tissue in the whole body. This book is essential reading for anyone who wants to use the gamut of modern quantitative MRI methods to measure the effects of disease, its progression, and its response to treatment.

Features: The first edition was awarded the book prize for Radiology by the British Medical Association in 2004. Written by an authority in the field: Professor Tofts has an international reputation for quantification in MRI. Gives specific 'how to' information for implementation of MRI measurement sequence techniques.

Practical Guide to Canine and Feline Neurology - Curtis W. Dewey
2015-11-09

Now in full color, *Practical Guide to Canine and Feline Neurology*, Third Edition provides a fully updated new edition of the most complete resource on managing neurology cases in small animal practice, with video clips on a companion website. •Provides comprehensive information for diagnosing and treating neurological conditions •Printed in full color for the first time, with 400 new or improved images throughout •Offers new chapters on differential diagnosis, magnetic resonance imaging, and movement disorders •Retains the logical structure and easy-to-follow outline format of the previous editions •Includes access to video clips of specific disorders and a how-to video demonstrating the neurologic assessment online and a link to a digital canine brain atlas at www.wiley.com/go/dewey/neurology Now in full color, *Practical Guide to Canine and Feline Neurology*, Third Edition provides a fully updated new edition of the most complete resource on managing neurology cases in small animal practice, with video clips on a companion website. •Provides comprehensive information for diagnosing and treating neurological conditions •Printed in full color for the first time, with 400 new or improved images throughout •Offers new chapters on differential diagnosis, magnetic resonance imaging, and movement disorders •Retains the logical structure and easy-to-follow outline format of the previous editions •Includes access to video clips of specific disorders and a how-to video demonstrating the neurologic assessment online and a link to a digital canine brain atlas at www.wiley.com/go/dewey/neurology

Imaging of the Brain E-Book - Thomas P. Naidich 2012-10-31

Imaging of the Brain provides the advanced expertise you need to overcome the toughest diagnostic challenges in neuroradiology. Combining the rich visual guidance of an atlas with the comprehensive, in-depth coverage of a definitive reference, this significant new work in the Expert Radiology series covers every aspect of brain imaging, equipping you to make optimal use of the latest diagnostic modalities.

Neuroimaging in Developmental Clinical Neuroscience - Judith M. Rumsey 2009-02-19

Modern neuroimaging offers tremendous opportunities for gaining insights into normative development and a wide array of developmental neuropsychiatric disorders. Focusing on ontogeny, this text covers basic processes involved in both healthy and atypical maturation, and also addresses the range of neuroimaging techniques most widely used for studying children. This book will enable you to understand normative structural and functional brain maturation and the mechanisms underlying basic developmental processes; become familiar with current knowledge and hypotheses concerning the neural bases of developmental neuropsychiatric disorders; and learn about neuroimaging techniques, including their unique strengths and limitations. Coverage includes normal developmental processes, atypical processing in developmental neuropsychiatric disorders, ethical issues, neuroimaging techniques and their integration with psychopharmacologic and molecular genetic research approaches, and future directions. This comprehensive volume is an essential resource for neurologists, neuropsychologists, psychiatrists, pediatricians, and radiologists concerned with normal development and developmental neuropsychiatric disorders.

Practical Guide to Transcranial Direct Current Stimulation - Helena Knotkova 2019-01-23

This book provides a comprehensive overview on Transcranial Direct Current Stimulation (tDCS) and the clinical applications of this promising technique. Separated into three parts, the book begins with basic principles, mechanisms and approaches of tDCS. This is followed by a step-by-step practicum, methodological considerations and ethics and professional conduct pertaining to this novel technique. Chapters are authored by renowned experts who also direct and plan tDCS educational events worldwide. Bridging the existing gap in instructional materials for tDCS while addressing growing interest in education in this field, professionals within a broad range of medical disciplines will find this text to be an invaluable guide.

Anisotropy Across Fields and Scales - Evren Özarslan 2021

This open access book focuses on processing, modeling, and visualization

of anisotropy information, which are often addressed by employing sophisticated mathematical constructs such as tensors and other higher-order descriptors. It also discusses adaptations of such constructs to problems encountered in seemingly dissimilar areas of medical imaging, physical sciences, and engineering. Featuring original research contributions as well as insightful reviews for scientists interested in handling anisotropy information, it covers topics such as pertinent geometric and algebraic properties of tensors and tensor fields, challenges faced in processing and visualizing different types of data, statistical techniques for data processing, and specific applications like mapping white-matter fiber tracts in the brain. The book helps readers grasp the current challenges in the field and provides information on the techniques devised to address them. Further, it facilitates the transfer of knowledge between different disciplines in order to advance the research frontiers in these areas. This multidisciplinary book presents, in part, the outcomes of the seventh in a series of Dagstuhl seminars devoted to visualization and processing of tensor fields and higher-order descriptors, which was held in Dagstuhl, Germany, on October 28-November 2, 2018.

A Practical Guide to Transcranial Magnetic Stimulation Neurophysiology and Treatment Studies - Robert Chen 2022

Transcranial magnetic stimulation (TMS) is a widely used non-invasive brain stimulation technique. It represents an exciting new frontier in neuroscience research and can be used to examine neural processes, providing insights into pathophysiology and treating a variety of neuropsychiatric illnesses. *A Practical Guide to Transcranial Magnetic Stimulation Neurophysiology and Treatment Studies* presents an overview of the use of TMS as both an investigational tool and as treatment for neurological and psychiatric disorders. The chapters include an overview of the history and basic principles of TMS and repetitive TMS (rTMS), the different types of TMS coils, different stimulation approaches, the use of neuronavigation, and safety considerations. The utility of single and paired TMS techniques to measure cortical inhibition, facilitation, connectivity and reactivity in motor and non-motor brain areas, the different methods of using TMS to induce brain plasticity, and use of TMS in cognitive studies are explored. It also covers TMS and rTMS combined with electroencephalography (EEG) in neurophysiological studies. The authors provide a summary of the clinical applications of TMS in neurological and psychiatric disorders including depression, schizophrenia, stroke, Parkinson disease, and pain. This up-to-date volume provides a compendious review of the use of TMS and rTMS that will help guide the utility of this methodology in both clinical and research settings. This practical guide will be a useful resource for those new to the field, as well as experienced users, for both research and clinical settings.

Brain Imaging Methods Editor's Pick 2021 - Vince D. Calhoun
2021-07-01

Epilepsy Surgery and Intrinsic Brain Tumor Surgery - Konstantinos Fountas 2018-10-03

This book provides a comprehensive and practical guide for the safe and efficient management of patients with intrinsic brain tumors and medically intractable epilepsy. It presents in an easily understandable way the preoperative evaluation of these patients, starting from the clinical interpretation of conventional anatomical MR imaging and analyses the clinical significance of newer MR based imaging techniques such as diffusion and perfusion imaging. It demonstrates with clarity the role of MR spectroscopy and fractional anisotropy and diffusion tensor imaging in the preoperative assessment of these patients and how this data can be incorporated into the surgical planning. This book is aimed at neurosurgeons, neuroradiologists, neurologists, and epileptologists, and may also be of interest to neuropsychologists, neurophysiologists, radiation oncologists, and medical physicists.

Bradley's Neurology in Clinical Practice E-Book - Joseph Jankovic
2021-03-23

A practical, dynamic resource for practicing neurologists, clinicians and trainees, *Bradley and Daroff's Neurology in Clinical Practice*, Eighth Edition, offers a straightforward style, evidence-based information, and robust interactive content supplemented by treatment algorithms and images to keep you up to date with all that's current in this fast-changing field. This two-volume set is ideal for daily reference, featuring a unique

organization by presenting symptom/sign and by specific disease entities—allowing you to access content in ways that mirror how you practice. More than 150 expert contributors, led by Drs. Joseph Jankovic, John C. Mazziotta, Scott L. Pomeroy, and Nancy J. Newman, provide up-to-date guidance that equips you to effectively diagnose and manage the full range of neurological disorders. Covers all aspects of today's neurology in an easy-to-read, clinically relevant manner. Allows for easy searches through an intuitive organization by both symptom and grouping of diseases. Features new and expanded content on movement disorders, genetic and immunologic disorders, tropical neurology, neuro-ophthalmology and neuro-otology, palliative care, pediatric neurology, and new and emerging therapies. Offers even more detailed videos that depict how neurological disorders manifest, including EEG and seizures, deep brain stimulation for PD and tremor, sleep disorders, movement disorders, ocular oscillations, EMG evaluation, cranial neuropathies, and disorders of upper and lower motor neurons, as well as other neurologic signs.

Atlas of Human Brain Connections - Marco Catani 2012-06-14

One of the major challenges of modern neuroscience is to define the complex pattern of neural connections that underlie cognition and behaviour. This atlas capitalises on novel diffusion MRI tractography methods to provide a comprehensive overview of connections derived from virtual in vivo tractography dissections of the human brain.

Neuroimaging - 2016-07-12

Neuroimaging, Part Two, a volume in *The Handbook of Clinical Neurology* series, illustrates how neuroimaging is rapidly expanding its reach and applications in clinical neurology. It is an ideal resource for anyone interested in the study of the nervous system, and is useful to both beginners in various related fields and to specialists who want to update or refresh their knowledge base on neuroimaging. This second volume covers imaging of the adult spine and peripheral nervous system, as well as pediatric neuroimaging. In addition, it provides an overview of the differential diagnosis of the most common imaging findings, such as ring enhancement on MRI, and a review of the indications for imaging in the most frequent neurological syndromes. The volume concludes with a review of neuroimaging in experimental animals and how it relates to neuropathology. It brings broad coverage of the topic using many color images to illustrate key points. Contributions from leading global experts are collated, providing the broadest view of neuroimaging as it currently stands. For a number of neurological disorders, imaging is not only critical for diagnosis, but also for monitoring the effect of therapies, with the entire field moving from curing diseases to preventing them. Most of the information contained in this volume reflects the newness of this approach, pointing to the new horizon in the study of neurological disorders. Provides a relevant description of the technologies used in neuroimaging, such as computed tomography, magnetic resonance imaging, positron emission tomography, and several others. Discusses the application of these techniques to the study of brain and spinal cord disease. Explores the indications for the use of these techniques in various syndromes.

Introduction to Diffusion Tensor Imaging - Susumu Mori 2013-08-02

The concepts behind diffusion tensor imaging (DTI) are commonly difficult to grasp, even for magnetic resonance physicists. To make matters worse, a many more complex higher-order methods have been proposed over the last few years to overcome the now well-known deficiencies of DTI. In *Introduction to Diffusion Tensor Imaging: And Higher Order Models*, these concepts are explained through extensive use of illustrations rather than equations to help readers gain a more intuitive understanding of the inner workings of these techniques. Emphasis is placed on the interpretation of DTI images and tractography results, the design of experiments, and the types of application studies that can be undertaken. Diffusion MRI is a very active field of research, and theories and techniques are constantly evolving. To make sense of this constantly shifting landscape, there is a need for a textbook that explains the concepts behind how these techniques work in a way that is easy and intuitive to understand—*Introduction to Diffusion Tensor Imaging* fills this gap. Extensive use of illustrations to explain the concepts of diffusion tensor imaging and related methods. Easy to understand, even without a background in physics. Includes sections on image interpretation, experimental design, and applications. Up-to-date information on more recent higher-order models, which are increasingly being used for clinical applications.