70 Tesla Mri Brain White Matter Atlas

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Brain Disorders in Critical Illness Robert D. Stevens 2013-09-19 Brain dysfunction is a major clinical problem in intensive care, with potentially debilitating long-term consequences for post-ICU patients of any age. The resulting extended length of stay in the ICU and post-discharge cognitive dysfunction are now recognized as major healthcare burdens. This concise clinical text provides intensivists and neurologists with a practical review of the pathophysiology of brain dysfunction and a thorough account of the diagnostic and therapeutic options available. Initial sections review the epidemiology, outcomes, relevant behavioral neurology and biological mechanisms of brain dysfunction. Subsequent sections evaluate the available diagnostic options and preventative and therapeutic interventions, with a final section on clinical encephalopathy syndromes encountered in the ICU. Each chapter is rich in illustrations, with an executive summary and a helpful glossary of terms. Brain Disorders in Critical Illness is a seminal reference for all physicians and neuroscientists interested in the care and outcome of severely ill patients.

MRI Atlas of Human White Matter Kenichi Oishi 2010-11-12 MRI Atlas of Human White Matter presents an atlas to the human brain on the basis of T 1-weighted imaging and diffusion tensor imaging. A general background on magnetic resonance imaging is provided, as well as the basics of diffusion tensor imaging. An overview of the principles and limitations in using this methodology in fiber tracking is included. This book describes the core white-matter structures, as well as the superficial white matter, the deep gray matter, and the cortex. It also presents a three-dimensional reconstruction and atlas of the brain white-matter tracts. The Montreal Neurological Institute coordinates, which are the most widely used, are adopted in this book as the primary coordinate system. The Talairach coordinate system is used as the secondary coordinate system. Based on magnetic resonance imaging and diffusion tensor imaging, the book offers a full segmentation of 220 white-matter and gray-matter structures with boundaries. Visualization of brain white matter anatomy via 3D diffusion tensor imaging (DTI) contrasts and enhances relationship of anatomy to function Full segmentation of 170+ brain regions more clearly defines structure boundaries than previous point-and-annotate anatomical labeling, and connectivity is mapped in a way not provided by traditional atlases

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.

Advances in Diagnosis and Treatment of TBI-Induced Neurodegeneration and Cognitive Deficits Guoqiang Xing 2021-09-30
Connectomic Deep Brain Stimulation Andreas Horn 2021-09-10 Connectomic Deep Brain Stimulation (DBS) covers this highly efficacious treatment option for movement disorders such as Parkinson's Disease, Essential Tremor and Dystonia. The book examines its impact on distributed brain networks that span across the human brain in parallel with modern-day neuroimaging concepts and the connectomics of the brain. It asks several questions, including which cortical areas should DBS electrodes be connected in order to generate the highest possible clinical improvement? Which connections should be avoided? Could these connectomic insights be used to better understand the mechanism of action of DBS? How can they be transferred to individual patients, and more. This book is suitable for neuroscientists, neurologists and functional surgeons studying DBS. It provides practical advice on processing strategies and theoretical background, highlighting and reviewing the current state-of-the-art in connectomic surgery. Written to provide a "hands-on" approach for neuroscience graduate students, as well as medical personnel from the fields of neurology and neurosurgery Includes preprocessing strategies (such as co-registration, normalization, lead localization, VTA estimation and fiber-tracking approaches) Presents references (key articles, books and protocols) for additional detailed study Provides data analysis boxes in each chapter to help with data interpretation

MAPPING: MAnagement and Processing of Images for Population ImagiNG Michel Dojat 2017-09-04 Several recent papers underline methodological points that limit the validity of published results in imaging studies in the life sciences and especially the neurosciences (Carp, 2012; Ingre, 2012; Button et al., 2013; Ioannidis, 2014). At least three main points are identified that lead to biased conclusions in research findings: endemic low statistical power and, selective outcome and selective analysis reporting. Because of this, and in view of the lack of replication studies, false discoveries or solutions persist. To overcome the poor reliability of research findings, several actions should be promoted including conducting large cohort studies, data sharing and data reanalysis. The construction of large-scale online databases should be facilitated, as they may contribute to the definition of a "collective mind" (Fox et al., 2014) facilitating open collaborative work or "crowd science" (Franzoni and Sauermann, 2014). Although technology alone cannot change scientists' practices (Wicherts et al., 2011; Wallis et al., 2013, Poldrack and Gorgolewski 2014; Roche et al. 2014), technical solutions should be identified which support a more "open science" approach. Also, the analysis of the data plays an important role. For the analysis of large datasets, image processing pipelines should be constructed based on the best algorithms available and their performance should be objectively compared to diffuse the more relevant solutions. Also, provenance of processed data should be ensured (MacKenzie-Graham et al., 2008). In population imaging this would mean providing effective tools for data sharing and analysis without increasing the burden on researchers. This subject is the main objective of this research topic (RT), cross-listed between the specialty section "Computer Image Analysis" of Frontiers in ICT and Frontiers in Neuroinformatics. Firstly, it gathers works on innovative solutions for the management of large imaging datasets possibly distributed in various centers. The paper of Danso et al. describes their experience with the integration of neuroimaging data coming from several stroke imaging research projects. They detail how the initial NeuroGrid core metadata schema was gradually extended for capturing all information required for future metaanalysis while ensuring semantic interoperability for future integration with other biomedical ontologies. With a similar preoccupation of interoperability, Shanoir relies on the OntoNeuroLog ontology (Temal et al., 2008; Gibaud et al., 2011; Batrancourt et al., 2015), a semantic model that formally described entities and relations in medical imaging, neuropsychological and behavioral assessment domains. The mechanism of "Study Card" allows to seamlessly populate metadata aligned with the ontology, avoiding fastidious manual entrance and the automatic control of the conformity of imported data with a predefined study protocol. The ambitious objective with the BIOMIST platform is to provide an environment managing the entire cycle of neuroimaging data from acquisition to analysis ensuring full provenance information of any derived data. Interestingly, it is conceived based on the product lifecycle management approach used in industry for managing products (here neuroimaging data) from inception to manufacturing. Shanoir and BIOMIST share in part the same OntoNeuroLog ontology facilitating their interoperability. ArchiMed is a data management system locally integrated for 5 years in a clinical environment. Not restricted to Neuroimaging, ArchiMed deals with multi-modal and multi-organs imaging data with specific considerations for data long-term conservation and confidentiality in accordance with the French legislation. Shanoir and ArchiMed are integrated into FLI-IAM1, the national French IT infrastructure for in vivo imaging.

Magnetic Resonance Imaging of the Brain and Spine Scott W. Atlas 2016-08-03 For more than 25 years, Magnetic Resonance Imaging of the Brain and Spine has been the leading textbook on imaging diagnosis of brain and spine disorders. The Fifth Edition continues this tradition of excellence with thorough coverage of recent trends and changes in the clinical diagnosis and treatment of CNS diseases, and how those changes relate to MRI findings. It remains a comprehensive, state-of-the-art reference for all who have an interest in neuroradiology – trainees to experts in the field, basic science researchers, and clinicians.

Trajectories of Brain Abnormalities in Early Schizophrenia Antonio Vita 2021-10-20

Neurologic Correlates of Motor Function in Cerebral Palsy: Opportunities for Targeted Treatment Jessica Rose 2021-01-06
Neuropsychopharmacology Kenneth L. Davis 2002 Thoroughly updated and completely reorganized for a sharper clinical focus, the Fifth Edition of this world-renowned classic synthesizes the latest advances in basic neurobiology, biological psychiatry, and clinical neuropsychopharmacology. The book establishes a critical bridge connecting new discoveries in molecular and cellular biology, genetics, and neuroimaging with the etiology, diagnosis, and treatment of all neuropsychiatric disorders. Nine sections focus on specific groups of disorders, covering clinical course, genetics, neurobiology, neuroimaging, and current and emerging therapeutics. Four sections cover neurotransmitter and signal transduction, emerging methods in molecular biology and genetics, emerging imaging technologies and their psychiatric applications, and drug discovery and evaluation. Compatibility: BlackBerry(R) OS 4.1 or Higher / iPhone/iPod Touch 2.0 or Higher /Palm OS 3.5 or higher / Palm Pre Classic / Symbian S60, 3rd edition (Nokia) / Windows Mobile(TM) Pocket PC (all versions) / Windows Mobile Smartphone / Windows 98SE/2000/ME/XP/Vista/Tablet PC

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.

Novel Tools for the Study of Structural and Functional Networks in the Brain Luis M. Colon-Perez 2018-04-27 Throughout the history of neuroscience, technological advances are the drivers behind many major advances in our understanding of the nervous system. Investigations of the structure and function of the brain take place on multiple scales, including macroscale at the level of brain regions, mesoscale at the level of neuronal populations, and microscale at the level of single neurons and neuron to neuron interactions. Integration of knowledge over these scales requires novel techniques and interpretations. In this research topic, we highlight nine articles that integrate structural and functional approaches to study brain networks.

Fanaroff and Martin's Neonatal-Perinatal Medicine E-Book Richard J. Martin 2014-08-20 Tackle your toughest challenges and improve the quality of life and long-term outcomes of your patients with authoritative guidance from Fanaroff and Martin s Neonatal-Perinatal Medicine. Drs. Richard J. Martin, Avroy A. Fanaroff, and Michele C. Walsh and a contributing team of leading experts in the field deliver a multi-disciplinary approach to the management and evidence-based treatment of problems in the mother, fetus and neonate. New chapters, expanded and updated coverage, increased worldwide perspectives, and many new contributors keep you current on the late preterm infant, the fetal origins of adult disease, neonatal anemia, genetic disorders, and more. "...a valuable reference book and a pleasure to read." Reviewed by BACCH Newsletter, Mar 2015 Consult this title on your favorite e-reader, conduct rapid searches, and adjust font sizes for optimal readability. Be certain with expert, dependable, accurate answers for every stage of your career from the most comprehensive, multi-disciplinary text in the field! See nuance and detail in full-color illustrations that depict disorders in the clinical setting and explain complex information. Obtain more global perspectives and best practices with contributions from international leaders in the field of neonatal-perinatal medicine. Get comprehensive guidance on treating patients through a dual focus on neonatology and perinatology. Spot genetic problems early and advise parents of concerns, with a completely new section on this topic. Make informed clinical choices for each patient, from diagnosis and treatment selection through post-treatment strategies and management of complications, with new evidence-based criteria throughout. Stay at the forefront of your field thanks to new and completely revised chapters covering topics such as: Principles and Practice l Immune and Non-immune Hydrops Fetalis l Amniotic Fluid Volume l Enhancing Safe Prescribing in the Neonatal Intensive Care Unit l Role of Imaging in Neurodevelopmental Outcomes of High-Risk Neonates l Patent Ductus Arteriosus l Gastroesophageal Reflux and Gastroesophageal Reflux Diseases in the Neonate. Find and grasp the information you need easily and rapidly with indexing that provides quick access to specific guidance.

An Introduction to Model-Based Cognitive Neuroscience Birte U. Forstmann 2015-04-20 Two recent innovations, the emergence of formal cognitive models and the addition of cognitive neuroscience data to the traditional behavioral data, have resulted in the birth of a new, interdisciplinary field of study: model-based cognitive neuroscience. Despite the increasing scientific interest in model-based cognitive neuroscience, few active researchers and even fewer students have a good knowledge of the two constituent disciplines. The main goal of this edited collection is to promote the integration of cognitive modeling and cognitive neuroscience. Experts in the field will provide tutorial-style chapters that explain particular techniques and highlight their usefulness through concrete examples and numerous case studies. The book will also include a thorough list of references pointing the reader towards additional literature and online resources.

Functional Neuroradiology Scott H. Faro 2011-09-08 Functional Neuroradiology: Principles and Clinical Applications, is a follow-up to Faro and Mohamed's groundbreaking work, Functional (BOLD)MRI: Basic Principles and Clinical Applications. This new 49 chapter textbook is comprehensive and offers a complete introduction to the state-of-the-art functional imaging in Neuroradiology, including the physical principles and clinical applications of Diffusion, Perfusion, Permeability, MR spectroscopy, Positron Emission Tomography, BOLD fMRI and Diffusion Tensor Imaging. With chapters written by internationally distinguished neuroradiologists, neurologists, psychiatrists, cognitive neuroscientists, and physicists, Functional Neuroradiology is divided into 9 major sections, including: Physical principles of all key functional techniques, Lesion characterization using Diffusion, Perfusion, Permeability, MR spectroscopy, and Positron Emission Tomography, an overview of BOLD fMRI physical principles and key concepts, including scanning methodologies, experimental research design, data analysis, and functional connectivity, Eloquent Cortex and White matter localization using BOLD fMRI and Diffusion Tensor Imaging, Clinical applications of BOLD fMRI in Neurosurgery, Neurology, Psychiatry, Neuropsychology, and Neuropharmacology, Multi-modality functional Neuroradiology, Beyond Proton Imaging, Functional spine and CSF imaging, a full-color Neuroanatomical Brain atlas of eloquent cortex and key white matter tracts and BOLD fMRI paradigms. By offering readers a complete overview of functional imaging modalities and techniques currently used in patient diagnosis and management, as well as emerging technology, Functional Neuroradiology is a vital information source for physicians and cognitive neuroscientists involved in daily practice and research.

Cerebral Small Vessel Diseases: From Vessel Alterations to Cortical Parenchymal Injury Andreas Charidimou 2020-03-12
Dementias Charles Duyckaerts 2008-06-09 This volume provides a comprehensive understanding of the biology of dementias, including information on advancements in the way these disorders are perceived and studied. From earlier assumptions that cognitive deficits were simply age related, this handbook progresses into complex discussions of the diseases that affect the cortex of the human brain. Clinicians will find extensive diagnostic and research perspectives on a variety of interesting topics, including neuropathology, physiopathology, biology, clinics, and imaging information on all, or most, of the dementing disorders currently known. In addition, chapters devoted to legal and ethical issues give practitioners and health care workers an informative view on complex dementias and the way these disorders affect patients and families. Clinicians in all levels of expertise will find useful and synthetic information. * Comprehensive information on advancements in the study and diagnosis of dementias * Complex discussions of the diseases that affect the cortex of the human brain * Extensive diagnostic and

research perspectives on topics including, but not limited to, neuropathology, physiopathology, and groundbreaking imaging techniques * A reference guide that is appropriate for clinicians in all levels of expertise, from researchers to basic health care providers
Clinical MR Neuroimaging Jonathan H. Gillard 2009-11-26 Covers each physiological MR methodology and their applications to all major neurological diseases.
7.0 Tesla MRI Brain White Matter Atlas Zang-Hee Cho 2014-12-08 The introduction of techniques that permit visualization of the human nervous system is one of the foremost advances in neuroscience and brain-related research. Among the most recent significant developments in this respect are ultra-high field MRI and the image post-processing technique known as track density imaging (TDI). It is these techniques (including super-resolution TDI) which represent the two major components of 7.0 Tesla MRI – Brain White Matter Atlas. This second edition of the atlas has been revised and updated to fully reflect current application of these technological advancements in order to visualize the nervous system and the brain with the finest resolution and sensitivity. Exquisitely detailed color images offer neuroscientists, neurologists, and neurosurgeons a superb resource that will be of value both for the purpose of research and for the treatment of common brain diseases such as Alzheimer's disease and multiple sclerosis.
Cortical white matter: Beyond the pale
Gray's Anatomy E-Book Susan Standring 2015-08-07 In 1858, Drs. Henry Gray and Henry Vandyke Carter created a book for their surgical colleagues that established an enduring standard among anatomical texts. After more than 150 years of continuous publication, Gray's Anatomy remains the definitive, comprehensive reference on the subject, offering ready access to the information you need to ensure safe, effective practice. This 41st edition has been meticulously revised and updated throughout, reflecting the very latest understanding of clinical anatomy from field leaders around the world. The book's traditional lavish art programme and clear text have been further honed and enhanced, while major advances in imaging techniques and the new insights they bring are fully captured in new state-of-the-art X-ray, CT, MR, and ultrasonic images. Presents the most detailed and dependable coverage of anatomy available anywhere. Regional organization collects all relevant material on each body area together in one place, making access to core information easier for clinical readers. Anatomical information is matched with key clinical information where relevant. Numerous clinical discussions emphasize considerations that may affect medical care. Each chapter has been edited by experts in their field, ensuring access to the very latest evidence-based information on that topic. More than 1,000 completely new photographs, including an extensive electronic collection of the latest X-ray, CT, MR, and histological images. Carefully selected electronic enhancements include additional text, tables, illustrations, labelled imaging and videos – as well as 24 specially invited 'Commentaries' on new and emerging topics related to anatomy.
New Developments in Understanding Brain and Cerebromicrovascular Aging: Toward Prevention of Vascular Cognitive Impairment and Alzheimer's Disease Stefano Tarantini 2022-07-05
7.0 Tesla MRI Brain Atlas Zang-Hee Cho 2010-03-20 Recent advances in MRI, especially those in the area of ultra high field (UHF) MRI, have attracted significant attention in the field of brain imaging for neuroscience research, as well as for clinical applications. In 7.0 Tesla MRI Brain Atlas: In Vivo Atlas with Cryomacrotome Correlation, Zang-Hee Cho and his colleagues at the Neuroscience Research Institute, Gachon University of Medicine and Science set new standards in neuro-anatomy. This unprecedented atlas presents the future of MR imaging of the brain. Taken at 7.0 Tesla, the images are of a live subject with correlating cryomacrotome photographs. Exquisitely produced in an oversized format to allow careful examination of the brain in real scale, each image is precisely annotated and detailed. The images in the Atlas reveal a wealth of details of the main stem and midbrain structures that were once thought impossible to visualize in-vivo. Ground breaking and thought provoking, 7.0 Tesla MRI Brain Atlas is sure to provide answers and inspiration for further studies, and is a valuable resource for medical libraries, neuroradiologists and neuroscientists.
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.
Translational Research in Traumatic Brain Injury Daniel Laskowitz 2016-04-21 Traumatic brain injury (TBI) remains a significant source of death and permanent disability, contributing to nearly one-third of all injury related deaths in the United States and exacting a profound personal and economic toll. Despite the increased resources that have recently been brought to bear to improve our understanding of TBI, the development of new diagnostic and therapeutic approaches has been disappointingly slow. Translational Research in Traumatic Brain Injury attempts to integrate expertise from across specialties to address knowledge gaps in the field of TBI. Its chapters cover a wide scope of TBI research in five broad areas: Epidemiology Pathophysiology Diagnosis Current treatment strategies and sequelae Future therapies Specific topics discussed include the societal impact of TBI in both the civilian and military populations, neurobiology and molecular mechanisms of axonal and neuronal injury, biomarkers of traumatic brain injury and their relationship to pathology, neuroplasticity after TBI, neuroprotective and neurorestorative therapy, advanced neuroimaging of mild TBI, neurocognitive and psychiatric symptoms following mild TBI, sports-related TBI, epilepsy and PTSD following TBI, and more. The book integrates the perspectives of experts across disciplines to assist in the translation of new ideas to clinical practice and ultimately to improve the care of the brain injured patient.
Computational Diffusion MRI Noemi Gyori
Diffusion-Weighted MR Imaging of the Brain, Head and Neck, and Spine Toshio Moritani 2021-05-30 This richly illustrated book, now in an updated and extended third edition, systematically covers the use of diffusion-weighted (DW) MR imaging in all major areas of neuroradiology, including imaging of the head and neck and the spine as well as the brain. The authors guide the reader from the basic principles of DW imaging through to the use of cutting-edge diffusion sequences such as diffusion tensor (DTI) and kurtosis (DKI), fiber tractography, high b value, intravoxel incoherent motion (IVIM), neurite orientation dispersion and density imaging (NODDI), and oscillating gradient spin echo (OGSE). Pathology, pathophysiology, and patient management and treatment are all thoroughly discussed. Since the early descriptions by LeBihan and colleagues of the ability to image and measure the micromovement of water molecules in the brain, diffusion imaging and its derivatives have contributed ever more significantly to the evaluation of multiple disease processes. In comprehensively describing the state of the art in the field, this book will be of high value not only for those who deal routinely with neuro-MR imaging but also for readers who wish to establish a sound basis for understanding diffusion images in the hope of extending these principles into more exotic areas of neuroimaging.
Atlas of the Human Brain Juergen K. Mai 2015-12-02 The fourth edition of Atlas of the Human Brain presents the anatomy of the brain at macroscopic and microscopic levels, featuring different aspects of brain morphology and topography. This greatly enlarged new edition provides the most detailed and accurate delineations of brain structure available. It includes features which assist in the new fields of neuroscience – functional imaging, resting state imaging and tractography. Atlas of the Human Brain is an essential guide to those working with human brain imaging or attempting to relate their observations on experimental animals to humans. Totally new in this edition is the inclusion of Nissl plates with delineation of cortical areas (Brodmann's areas), the first time that these areas have been presented in serial histological sections. The contents of the Atlas of the brain in MNI stereotaxic space has been extensively expanded from 143 pages, showing 69 levels through the hemisphere, to 314 pages representing 99 levels In addition to the fiber-stained (myelin) plates, we now provide fifty new (Nissl) plates covering cytoarchitecture. These are interdigitated within the existing myelin plates of the stereotaxic atlas All photographic plates now represent the complete hemisphere All photographs of the cell- and fiber-stained sections have been transformed to fit the MNI-space Major fiber tracts are identified in the fiber-stained sections In the Nissl plates cortical delineations (Brodmann's areas) are provided for the first time The number of diagrams increased to 99. They were now generated from the 3D reconstruction of the hemisphere registered to the MNI- stereotaxic space. They can be used for immediate comparison between our atlas and experimental and clinical imaging results Parts of cortical areas are displayed at high magnification on the facing page of full page Nissl sections. Images selected highlight those areas which are thought to correspond with those published by von Economo and Koskinas (1925) A novel way of depicting cortical areal pattern is used: The cortical cytoarchitectonic ribbon is unfolded and presented linearly. This linear representation of the cortex enables the comparison of different interpretations of cortical areas and allows mapping of activation sites Low magnification diagrams in the horizontal (axial) and sagittal planes are included, calculated from the 3D model of the atlas brain
An Atlas of Neonatal Brain Sonography Paul Govaert 2010-08-23 This Atlas covers the entire spectrum of brain disease as studied with ultrasound, illustrated throughout with superb-quality images. It is aimed at neonatologists and radiologists confronted with everyday clinical questions on the neonatal ward. Most newborn brain disorders can be identified with ultrasound; this book will therefore be particularly useful in settings with limited MRI facilities. Prenatal ultrasound specialists will also find it valuable as a postnatal reference in their field of interest. Suggestions for differential diagnosis accompany all the sonographic findings, guiding the clinician in proceeding from an abnormal image to a diagnosis. This second edition of the Atlas has been brought up to date to include the many advances in technique and interpretation that have been made in the past decade. The images have been replaced with new ones of higher quality, and all the line artwork has been standardised and improved. From reviews of the first edition: "This is the most challenging and comprehensive book on this theme, and is an essential reference for clinicians to make a correct diagnosis." —Satoshi Takada, Brain and Development "This can be little doubt that this title represents the definitive work on neonatal cranial ultrasound. The authors have had extensive experience in the use of ultrasound scanning the neonatal brain for almost as long as ultrasound has been used to investigate intracranial pathology on the neonatal unit. Their combined experience is most impressive." —Malcolm Leven, Archives of Disease in Childhood
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.
Stereotactic and Functional Neurosurgery Nader Pouratian 2020-02-28 This text presents a comprehensive and state-of-the-art approach to stereotactic and functional neurosurgery. Overarching sections include achieving stereotactic precision, defining trajectories and targets, the biophysics of stereotactic therapies, diseases and targets, and the future of functional neurosurgery. Each section is designed to be inclusive of all relevant topics, serving as an unbiased resource to new clinicians in this field or established clinicians that are aiming to better understand complementary methods. Importantly, each section and the associated chapters can be used by basic and translational scientists as well as engineers and industry to better understand and deliver innovation to the field. Chapters within each section methodically analyze traditional and recently emerging concepts and techniques; address underlying principles with examples drawn from specific diseases and applications; and cover patient selection, target selection, available stereotactic methods, nuanced surgical methods, and clinical evidence across treatment options. Written by experts in each area, Stereotactic and Functional Neurosurgery is a definitive guide to the latest developments in stereotactic targeting, electrode implantation, surgical treatment of neurological and psychiatric disorders, the renaissance of stereotactic lesions, and the frontier of restorative neurosurgery for a variety of disorders that have no other therapeutic options.
Biomechanics of the Brain Karol Miller 2019-08-08 This new edition presents an authoritative account of the current state of brain biomechanics research for engineers, scientists and medical professionals. Since the first edition in 2011, this topic has unquestionably entered into the mainstream of biomechanical research. The book brings together leading scientists in the diverse fields of anatomy, neuroimaging, image-guided neurosurgery, brain injury, solid and fluid mechanics, mathematical modelling and computer simulation to paint an inclusive picture of the rapidly evolving field. Covering topics from brain anatomy and imaging to sophisticated methods of modeling brain injury and neurosurgery (including the most recent applications of biomechanics to treat epilepsy), to the cutting edge methods in analyzing cerebrospinal fluid and blood flow, this book is the comprehensive reference in the field. Experienced researchers as well as students will find this book useful.
Biomedical Visualisation Paul M. Rea 2020-01-01 This edited volume explores the use of technology to enable us to visualise the life sciences in a more meaningful and engaging way. It will enable those interested in visualisation techniques to gain a better understanding of the applications that can be used in visualisation, imaging and analysis, education, engagement and training. The reader will be able to explore the utilisation of technologies from a number of fields to enable an engaging and meaningful visual representation of the biomedical sciences, with a focus in this volume related to anatomy, and clinically applied scenarios. The first four chapters highlight the diverse uses of CT and MRI scanning. These chapters demonstrate the uses of modern scanning techniques currently in use both clinically and in research and include vascular modelling, uses of the stereoscopic model, MRI in neurovascular and neurodegenerative diseases, and how they can also be used in a forensic setting in identification. The remaining six chapters truly demonstrate the diversity technology has in education, training and patient engagement. Multimodal technologies are discussed and include art and history collections, photogrammetry and games engines, augmented reality and review of the current literature for patient rehabilitation and education of the health professions. These chapters really do provide "something for everyone" whether you are a student, faculty member, or part of our curious global population interested in technology and healthcare.
Brain Mapping Hugues Duffau 2011-11-13 The goal of this book is to make a link between fundamental research in the field of cognitive neurosciences, which now benefits from a better knowledge of the neural foundations of cerebral processing, and its clinical application, especially in neurosurgery – itself able to provide new insights into brain organization. The anatomical bases are presented, advances and limitations of the different methods of functional cerebral mapping are discussed, updated models of sensorimotor, visuospatial, language, memory, emotional, and executive functions are explained in detail. In the light of these data, new strategies of surgical management of cerebral lesions are proposed, with an optimization of the benefit–risk ratio of surgery. Finally, perspectives about brain connectivity and plasticity are discussed on the basis of translational studies involving serial functional neuroimaging, intraoperative cortico-subcortical electrical mapping, and biomathematical modeling of interactions between parallel distributed neural networks.
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.

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Vascular Dementia Robert H. Paul 2007-11-17 A multidisciplinary survey of our current understanding of the biological and clinical aspects of vascular disease. The authors describe its basic mechanisms, its clinical characteristics, its pharmacological management, and the use of neuroimaging methods to investigate it. The complex relationship between VaD and AD is also fully explored with chapters on how these processes interact and how one disease may lower the threshold for clinical expression of the other.

Anisotropy Across Fields and Scales Evren Özarslan 2021 This open access book focuses on processing, modeling, and visualization of anisotropy information...--

Models and Simulations of the Electric Field in Deep Brain Stimulation Fabiola Alonso 2018-09-10 Deep brain stimulation (DBS) is an established surgical therapy for movement disorders such as Parkinson's disease (PD) and essential tremor (ET). A thin electrode is implanted in a predefined area of the brain with the use of stereotactic neurosurgery. In the last few years new DBS electrodes and systems have been developed with possibilities for using more parameters for control of the stimulation volume. In this thesis, simulations using the finite element method (FEM) have been developed and used for investigation of the electric field (EF) extension around different types of DBS lead designs (symmetric, steering) and stimulation modes (voltage, current). The electrode surrounding was represented either with a homogeneous model or a patient-specific model based on individual preoperative magnetic resonance imaging (MRI). The EF was visualized and compared for different lead designs and operating modes. In Paper I, the EF was quantitatively investigated around two lead designs (3389 and 6148) simulated to operate in voltage and current mode under acute and chronic time points following implantation.Simulations showed a major impact on the EF extension between postoperative time points which may explain the clinical decisions to change the stimulation amplitude weeks after implantation. In Paper II, the simulations were expanded to include two leads having steering function (6180, Surestim1) and patient-specific FEM simulations in the zona incerta. It was found that both the heterogeneity of the tissue and the operating mode, influence the EF distribution and that equivalent contact configurations of the leads result in similar EF. The steering mode presented larger volumes in current mode when using equivalent amplitudes. Simulations comparing DBS and intraoperative stimulation test using a microelectrode recording (MER) system (Paper III), showed that several parallel MER leads and the presence of the non-active DBS contacts influence the EF distribution and that the DBS EF volume can cover, but also extend to, other anatomical areas. Paper IV introduces a method for an objective exploitation of intraoperative stimulation test data in order to identify the optimal implant position in the thalamus of the chronic DBS lead. Patient-specific EF simulations were related to the anatomy with the help of brain atlases and the clinical effects which were quantified by accelerometers. The first results indicate that the good clinical effect in ET is due to several structures around the ventral intermediate nucleus of the thalamus.

Developing Successful Neuroprotective Treatments for TBI: Translational Approaches, Novel Directions, Opportunities and Challenges Stefania Mondello 2020-02-03

Computational Modelling of the Brain Michele Giugliano 2022-06-11 This volume offers an up-to-date overview of essential concepts and modern approaches to computational modelling, including the use of experimental techniques related to or directly inspired by them. The book introduces, at increasing levels of complexity and with the non-specialist in mind, state-of-the-art topics ranging from single-cell and molecular descriptions to circuits and networks. Four major themes are covered, including subcellular modelling of ion channels and signalling pathways at the molecular level, single-cell modelling at different levels of spatial complexity, network modelling from local microcircuits to large-scale simulations of entire brain areas and practical examples. Each chapter presents a systematic overview of a specific topic and provides the reader with the fundamental tools needed to understand the computational modelling of neural dynamics. This book is aimed at experimenters and graduate students with little or no prior knowledge of modelling who are interested in learning about computational models from the single molecule to the inter-areal communication of brain structures. The book will appeal to computational neuroscientists, engineers, physicists and mathematicians interested in contributing to the field of neuroscience. Chapters 6, 10 and 11 are available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.