

# **Medical Imaging: Principles and Practices**



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The discovery of x-ray, as a landmark event, enabled us to see the "invisible," opening a new era in medical diagnostics. More importantly, it offered a unique undestanding around the interaction of electromagnetic signal with human tissue and the utility of its selective absorption, scattering, diffusion, and reflection as a tool for understanding the physiology, evolution of disease, and therapy. With contributions from world-class experts, **Medical Imaging: Principles and Practices** offers a review of key imaging modalities with established clinical utilization and examples of quantitative tools for image analysis, modeling, and interpretation.

The book provides a detailed overview of x-ray imaging and computed tomography, fundamental concepts in signal acquisition and processes, followed by an overview of functional MRI (fMRI) and chemical shift imaging. It also covers topics in Magnetic Resonance Microcopy, the physics of instrumentation and signal collection, and their application in clinical practice. Highlights include a chapter offering a unique perspective on the use of quantitative PET for its applications in drug discovery and development, which is rapidly becoming an indispensible tool for clinical and research applications, and a chapter addressing the key issues around organizing and searching multimodality data sets, an increasingly important yet challenging issue in clinical imaging.

Topics include:

- X-ray imaging and computed tomography
- MRI and magnetic resonance microscopy
- Nuclear imaging
- Ultrasound imaging
- Electrical Impedance Tomography (EIT)
- Emerging technologies for in vivo imaging
- Contrast-enhanced MRI
- MR approaches for osteoarthritis and cardiovascular imaging
- PET quantitative imaging for drug development
- Medical imaging data mining and search

The selection of topics provides readers with an appreciation of the depth and breadth of the field and the

challenges ahead of the technical and clinical community of researchers and practitioners.

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