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Soggetti	Biomedical engineering Spectroscopy Microscopy Signal processing Image processing Speech processing systems Biophysics Biological physics Lasers Photonics Biomedical Engineering and Bioengineering Spectroscopy and Microscopy Biomedical Engineering/Biotechnology Signal, Image and Speech Processing Biological and Medical Physics, Biophysics Optics, Lasers, Photonics, Optical Devices
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Nota di contenuto	Introduction -- Optical Coherence Tomography for Brain Imaging -- Light-sheet microscopy for whole brain imaging -- The Airyscan detector from ZEISS: Confocal Microscopy Evolution for the Neurosciences -- Recording Ca ⁺⁺ Transients in Neurons by TCSPC FLIM -- In vivo imaging of all cortical layers and hippocampal CA1 pyramidal cells by two-photon excitation microscopy -- Patterned two-

photon illumination for high-speed functional imaging of brain networks in vivo -- Holographic functional calcium imaging of neuronal circuit activity -- Advanced miniature microscopy for Brain Imaging -- Stimulated Raman scattering microscopy for brain imaging: basic principle, measurements and applications -- Super resolving approaches suitable for brain imaging applications -- Super resolution STED and STORM/PALM microscopy for brain imaging -- Expansion microscopy for brain imaging -- Adaptive Optics in Multiphoton Microscopy -- Chemical processing of brain tissues for large-volume, high-resolution optical imaging.

Sommario/riassunto

This book highlights the rapidly developing field of advanced optical methods for structural and functional brain imaging. As is known, the brain is the most poorly understood organ of a living body. It is indeed the most complex structure in the known universe and, thus, mapping of the brain has become one of the most exciting frontlines of contemporary research. Starting from the fundamentals of the brain, neurons and synapses, this book presents a streamlined and focused coverage of the core principles, theoretical and experimental approaches, and state-of-the-art applications of most of the currently used imaging methods in brain research. It presents contributions from international leaders on different photonics-based brain imaging modalities and techniques. Included are comprehensive descriptions of many of the technology driven spectacular advances made over the past few years that have allowed novel insights of the structural and functional details of neurons. The book is targeted at researchers, engineers and scientists who are working in the field of brain imaging, neuroscience and connectomics. Although this book is not intended to serve as a textbook, it will appeal to undergraduate students engaged in the specialization of brain imaging.
