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Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Part 1 Principles of Membrane Potential-Imaging -- Historical Overview and General Methods of Membrane Potential-Imaging -- Design and Use of Organic Voltage-Sensitive Dyes -- Part 2 Membrane Potential Signals with Single Cell Resolution -- Imaging Sub millisecond Membrane Potential Changes from Individual Regions of Single Axons, Dendrites and Spines -- Combining Membrane Potential Imaging with Other Optical Techniques -- Monitoring Spiking Activity of Many Individual Neurons in Invertebrate Ganglia -- Part 3 Monitoring Activity of Networks and Large Neuronal Populations -- Monitoring Integrated Activity of Individual Neurons Using FRET-Based Voltage-Sensitive Dyes -- Monitoring Population Membrane Potential Signals from Neocortex -- Voltage Imaging in the Study of Hippocampal Circuit Function and Plasticity -- Monitoring Population Membrane Potential Signals During Development of The Vertebrate Nervous System -- Imaging the Dynamics Of Mammalian Neocortical Population Activity In-Vivo -- Imaging the Dynamics of Neocortical Population Activity in Behaving and Freely Moving Mammals -- Part 4 Monitoring Membrane Potential in the Heart -- History of Cardiac Optical Imaging -- Imaging of Ventricular Fibrillation and Defibrillation: The Virtual Electrode

Hypothesis -- Optical Mapping of Ventricular Fibrillation Dynamics -- Bio photonics Modelling of Cardiac Optical Imaging -- Towards Depth-Resolved Optical Imaging of Cardiac Electrical Activity -- Part 5 New Approaches – Potentials and Limitations -- Two-Photon Excitation of Fluorescent Voltage-Sensitive Dyes: Monitoring Membrane Potential in the Infrared -- Random-Access Multi photon Microscopy for Fast Three-Dimensional Imaging -- High Spatial Resolution Microscopy Using Holographic Illumination -- Second Harmonic Imaging of Membrane Potential -- Genetically Encoded Protein Sensors of Membrane Potential.

Sommario/riassunto

This volume discusses membrane potential imaging in the nervous system and in the heart and modern optical recording technology. Additionally, it covers organic and genetically-encoded voltage-sensitive dyes; membrane potential imaging from individual neurons, brain slices, and brains in vivo; optical imaging of cardiac tissue and arrhythmias; bio-photonics modelling . This is an expanded and fully-updated second edition, reflecting all the recent advances in this field. Twenty chapters, all authored by leading names in the field, are cohesively structured into four sections. The opening section focuses on the history and principles of membrane potential imaging and lends context to the following sections, which examine applications in single neurons, networks, large neuronal populations, and the heart. Topics discussed include population membrane potential signals in development of the vertebrate nervous system, use of membrane potential imaging from dendrites and axons, and depth-resolved optical imaging of cardiac activation and repolarization. The final section discusses the potential – and limitations – for new developments in the field, including new technology such as non-linear optics, advanced microscope designs, and genetically encoded voltage sensors. Membrane Potential Imaging in the Nervous System and Heart is ideal for neurologists, electrophysiologists, cardiologists, and those who are interested in the applications and the future of membrane potential imaging. .