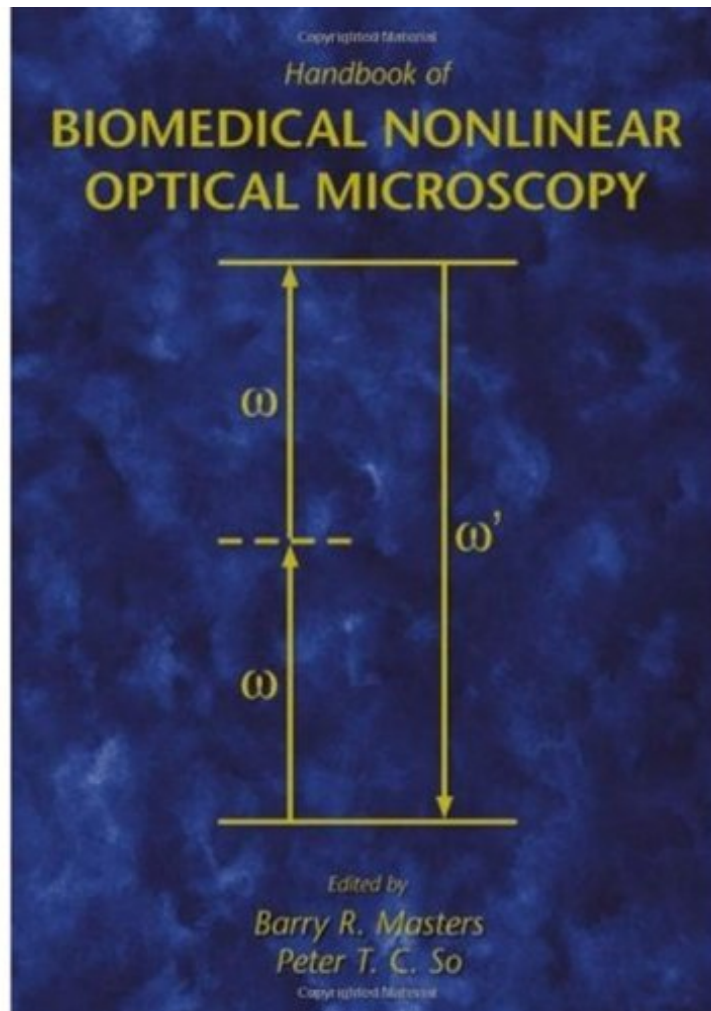


Handbook of Biomedical Nonlinear Optical Microscopy

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The Handbook of Biomedical Nonlinear Optical Microscopy provides comprehensive treatment of the theories, techniques, and biomedical applications of nonlinear optics and microscopy for cell biologists, life scientists, biomedical engineers, and clinicians. The chapters are separated into basic and advanced sections, and provide both textual and graphical illustrations of all key concepts. The more basic sections are aimed at life scientists without

advanced training in physics and mathematics, and tutorials are provided for the more challenging sections. The first part of the Handbook introduces the historical context of nonlinear microscopy. The second part presents the nonlinear optical theory of two- and multiphoton excited fluorescence (TPE, MPE) spectroscopy, second and third harmonic generation (SHG, THG) spectroscopy, and coherent anti-Stokes Raman spectroscopy (CARS). The third part introduces modern microscopic and spectroscopic instrumentation and techniques that are based on nonlinear optics. The fourth part provides key applications of nonlinear microscopy to the biomedical area: neurobiology, immunology, tumor biology, developmental biology, dermatology, and cellular metabolism. There are also chapters on nonlinear molecular probes, cellular damage, and nanoprocessing.

The Handbook of Biomedical Nonlinear Optical Microscopy will be invaluable for anyone who plans to enter this complex and rapidly developing field and it will be a useful reference for experienced researchers as well."-- Journal of Biophotonics"A guide for the field of nonlinear optical spectroscopy and microscopy has emerged with the publication of a conceptually interesting, information-rich, well-written, comprehensive, current, and eminently practical handbook. It deserves a place on the bookshelf of every researcher considering or conducting biomedical optical studies."--William W. Mantulin, Journal of Biomedical Optics"Professors Masters and So have done an excellent job organizing the chapters of this book and choosing the scientists, whose contributions are excellent. The first part is a "must" read. The way the book is written, even if the reader wants to focus only on the applications presented, it is possible to understand the application chapters as stand-alone papers as they are edited to contain clear, detailed text, with the figures and supporting references one expects from a handbook. I strongly recommend this book to scientists with any scientific background who are involved with nonlinear microscopies." -- Dr. Susana A. Sanchez for Microscopy and Microanalysis

About the Author Professor Peter T. C. So is a Professor of Mechanical Engineering and Biological Engineering at the Massachusetts Institute of Technology (MIT), Cambridge, MA. He received a B.S. degree in physics and mathematics in 1986 from the Harvey Mudd College and a Ph.D. degree in physics in 1992 from Princeton University. Professor So joined MIT as a faculty member in 1996. Professor So has published over 75 research papers in refereed journals, over 30 refereed conference proceedings, many book chapters, and numerous scientific abstracts. He is also the co-inventor of five patents related to microscopy and instrumentation. Barry R. Masters is a visiting scientist in the Department of Biological Engineering at the Massachusetts Institute of Technology and a visiting scholar in the Department of the History of Science at Harvard University. He was formerly a professor in anatomy at the Uniformed Services University of the Health Sciences. He is a Fellow of the Optical Society of America (OSA), the International Society for Optical Engineering (SPIE), and the American Association for the Advancement of Science (AAAS). Professor Masters has published 81 refereed research papers and 128 book chapters and articles. He is the editor or author of *Noninvasive Diagnostic Techniques in Ophthalmology*; *Medical Optical Tomography: Functional Imaging and Monitoring*; *Selected Papers on Confocal Microscopy*; *Selected Papers on Optical Low-Coherence Reflectometry and Tomography*; *Selected Papers on Multiphoton Excitation Microscopy*; *Confocal Microscopy and Multiphoton Excitation Microscopy: the Genesis of Live Cell Imaging*; and with Peter So, *Handbook of Biomedical Nonlinear Optical Microscopy*. Professor Masters is a member of the editorial board of *Graefe's Archive for Clinical and Experimental Ophthalmology*. His research interests include the development of *in vivo* microscopy of the human eye and skin, biomedical imaging and spectroscopy, and the fractal analysis of branching vascular patterns.