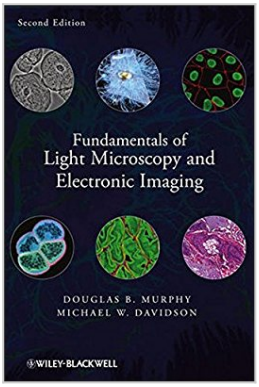

Fundamentals of Light Microscopy and Electronic Imaging

By Douglas B. Murphy, Michael W. Davidson

Fundamentals of Light Microscopy and Electronic Imaging By Douglas B. Murphy, Michael W. Davidson

Fundamentals of Light Microscopy and Electronic Imaging, Second Edition provides a coherent introduction to the principles and applications of the integrated optical microscope system, covering both theoretical and practical considerations. It expands and updates discussions of multi-spectral imaging, intensified digital cameras, signal colocalization, and uses of objectives, and offers guidance in the selection of microscopes and electronic cameras, as well as appropriate auxiliary optical systems and fluorescent tags.

The book is divided into three sections covering optical principles in diffraction and image formation, basic modes of light microscopy, and components of modern electronic imaging systems and image processing operations. Each chapter introduces relevant theory, followed by descriptions of instrument alignment and image interpretation. This revision includes new chapters on live cell imaging, measurement of protein dynamics, deconvolution microscopy, and interference microscopy.

PowerPoint slides of the figures as well as other supplementary materials for instructors are available at a companion website:

www.wiley.com/go/murphy/lightmicroscopy

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Editorial Review

Review

“This should be provided to all beginning graduate students entering microscopy labs. It describes the complicated hardware of the system, while also explaining the physics principles of microscopy on a simplistic level for basic biologists. The authors achieve a perfect balance of theory and methods.” (*Doody’s*, 15 November 2013)

“It should be particularly useful to researchers getting started in the field of microscopy as well as seasoned professionals. Summing Up: Highly recommended. Graduate students, researchers/faculty, and professionals/practitioners.” (*Choice*, 1 October 2013)

“In summary, Fundamentals of Light Microscopy, Second Edition is a recommended starting point for the novice in microscopy and electronic imaging.” (*Journal of Biomedical Optics*, 1 February 2013)

From the Back Cover

"This book will provide individuals without background knowledge in optical physics, electronics, or image processing with many of the basic facts they need to know to understand both the power and limitations of their images."
—*Cell Biology Education* on the First Edition

Fundamentals of Light Microscopy and Electronic Imaging, Second Edition provides a coherent introduction to the principles and applications of the integrated optical microscope system, covering both theoretical and practical considerations. It expands and updates discussions of multi-spectral imaging, intensified digital cameras, signal colocalization, and uses of objectives, and offers guidance in the selection of microscopes and electronic cameras, as well as appropriate auxiliary optical systems and fluorescent tags.

Written in simple, clear language, the book is divided into three sections covering optical principles in diffraction and image formation, basic modes of light microscopy, and components of modern electronic imaging systems and image processing operations. Each chapter introduces relevant theory, followed by descriptions of instrument alignment and image interpretation. Including new sections on live cell imaging, measurement of protein dynamics, deconvolution, multiphoton microscopy, and superresolution microscopy, *Fundamentals of Light Microscopy and Electronic Imaging, Second Edition* features the following chapters:

- Fundamentals of Light Microscopy
- Light and Color
- Illuminators, Filters, and the Isolation of Specific Wavelengths
- Lenses and Geometrical Optics
- Diffraction and Interference in Image Formation
- Diffraction and Spatial Resolution
- Phase Contrast Microscopy and Darkfield Microscopy
- Properties of Polarized Light
- Polarization Microscopy
- Differential Interference Contrast (DIC) Microscopy and Modulation Contrast Microscopy

- Fluorescence Microscopy
- Fluorescence Imaging of Dynamic Molecular Processes
- Confocal Laser Scanning Microscopy
- Two-Photon Excitation Fluorescence Microscopy
- Superresolution Imaging
- Imaging Living Cells with the Microscope
- Fundamentals of Digital Imaging
- Digital Imaging Processing

About the Author

DOUGLAS B. MURPHY supervises core facilities in microscopy and histology at the new HHMI Janelia Farm Research Campus in Ashburn, Virginia. An Adjunct Professor of Cell Biology at Johns Hopkins School of Medicine in Baltimore, Maryland, Dr. Murphy helped establish the School of Medicine Microscope Facility there, which he supervised until 2006.

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