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Fundamentals of Light Microscopy and Electronic Imaging, Second Edition

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Book Reviews

Fundamentals of Light Microscopy and Electronic Imaging, Second Edition

Douglas B. Murphy and Michael W. Davidson, 538 pages + xix, ISBN: 978-0-471-69214-0, Wiley-Blackwell, Hoboken, New Jersey (2013), $149.95, hardcover.

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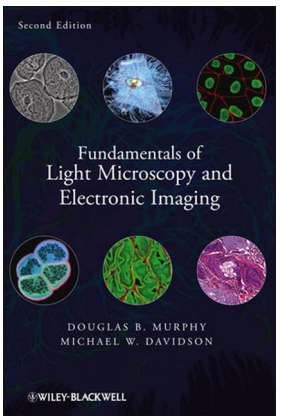

The second edition of *Fundamentals of Light Microscopy and Electronic Imaging* is a collaborative effort of Douglas B. Murphy and Michael W. Davidson. Murphy is known for his establishment of the School of Medicine Microscope Facility at the Johns Hopkins School of Medicine. He directed the facility until 2006 and has superb experience as a teacher of microscopy, optics, and image processing. He was the sole author of the first edition of this text and reference book. Davidson, who is at the National High Magnetic Field Laboratory, The Florida State University, is well known for his development of websites for online learning of microscopy; especially his development of dynamic Java and Flash tutorials to illustrate the principles and the applications. Davidson and his collaborators have produced very useful dynamic Java and Flash tutorials which are highly recommended. Nikon supports the site: www.microscopyu.com. Olympus supports the Microscopy Resource Center at www.olympusmicro.com. I have used both of these education sites, and I highly recommend them to the readers of the *Journal of Biomedical Optics*. The combined work of these two authors results in a recommended textbook and reference that is an excellent starting point for someone new to the field of microscopy. While there is much information contained within the covers, from theory to applications, to demonstrations that the reader can perform in the laboratory, to discussions of limitations, it must be stated that this book is directed to the novice in microscopy and is an entry-level exposition of the fundamentals of the subject, devoid of the mathematics that is usual for optics books. With that disclaimer, I think that this highly acclaimed book is well-suited to the person who is attempting to learn the fundamentals of microscopy and electronic imaging.

Fundamentals of Light Microscopy is a visual delight to read. The use of clear ultrasharp colorful graphics is helpful for the reader to grasp the fundamentals of microscopy. The text is well integrated with the graphics. We can thank Murphy for the inclusion of his highly recommended exercises; they should be performed by each reader to enhance the learning experience.

This book presents a sound introduction to light, optics, microscopes, optical techniques, probes, and the fundamentals of detectors, light sources, digital image processing, and super-resolution imaging. In addition to the descriptive nature of the presentation of the fundamentals, the book is loaded with useful and practical information, such as how to correctly clean optics. While that sounds so simple and trivial, I have witnessed the deleterious effects of faulty procedures to remove dust and dirt from optical elements. I have also seen students who are very familiar with physical optics and quantum optics, but who lack the knowledge of the fundaments that are described in this book.

This practical book is enhanced with a series of appendices: an answer key to the exercises, and sources of materials for the demonstrations and exercises. In addition, there is a useful glossary and an index. The book ends with microscopy web resources, a list of recommended readings, and references. The use of online demonstrations to visualize the fundamentals of optics, microscopy, and electronic imaging are wide-spread, useful, and free. The reader should take advantage of these resources.

In summary, *Fundamentals of Light Microscopy*, *Second Edition* is a recommended starting point for the novice in microscopy and electronic imaging. Once the reader masters the content of this book he or she is ready for more advanced and specialized books; but without the knowledge of the fundamentals the reader would be inadequately prepared to optimally, safely, and correctly use these wonderful light microscopes in research. In addition to the on-line demonstrations, the practical laboratory demonstrations and exercises that are described in the book, and the practical knowledge that the authors share with the reader, there is no substitute for working with a mentor who can demonstrate the correct microscopy procedures which will result in optimal performance of the microscope and the acquisition, evaluation, and analysis of the digital images.