

Most of the references listed here are in the Biosciences library in Lilly Hall of Life Sciences and several have been put on reserve ([see list on page 7](#)). Those marked '⇒' are good places to start. The Biosciences Library call numbers are given at the end of each reference. Unless otherwise specified, assume all citations are located in the Biosciences library. "TSB" means that T. S. Baker has a copy or copies that you may borrow temporarily if you can't find a copy in a Purdue library.

GENERAL TEXTBOOKS AND MONOGRAPHS

WHERE TO START:

- ⇒ **Three-Dimensional Electron Microscopy of Macromolecular Assemblies.** J. Frank. **1996.** Academic Press, San Diego, CA. The most recent, comprehensive text on issues relevant to image processing of biological macromolecules. Most emphasis is on processing of images of single particles without symmetry. (578.45 F851t & TSB)
- ⇒ **Biophysical Electron Microscopy: Basic Concepts and Modern Techniques.** P. W. Hawkes and U. Valdre (eds.). **1990.** Several chapters with one by M. F. Moody (140 pages) devoted to image analysis. (578.45 B524 & TSB)
- ⇒ **Image Analysis, Enhancement and Interpretation.** D. L. Misell. In Practical Methods in Electron Microscopy, Vol. 7, **1978**, A. M. Glauert (ed.). This was the first book to be written about the basics of image analysis discussed in this course. (502.8 P881 & TSB)
- Electron Tomography: Three-Dimensional Imaging with the Transmission Electron Microscope.** J. Frank (ed.). **1992.** Plenum Press, New York. Several contributed chapters relevant to image processing of biological macromolecules. (578.45 EL257 & TSB)
- Computer Techniques for Image Processing in Electron Microscopy.** W. O. Saxton. **1978.** Advances in Electronics and Electron Physics, Suppl. 10. Contains both theoretical and practical discussion of the use of computers to analyze electron micrographs. (621.38 Ad9s no.10 [normally in the Engineering Library] & TSB)

OTHER GENERAL TEXTS: (Alphabetical list)

- Computer Assisted Microscopy: the Measurement and Analysis of Images.** J. C. Russ. **1990.** Plenum Press, New York. Extensive, basic text of acquiring and processing microscopy images. This is the forerunner of Russ' text The Image Processing Handbook (see below) (502.820285 R91c & TSB)
- Computer Image Processing and Recognition.** E. L. Hall. **1979.** Volume from Computer Science and Applied Mathematics. This is an engineering view of computer analysis of pictures. (621.3819598 H141c c.2 [Engineering Library] & TSB)
- Computer Processing of Electron Microscope Images.** P. W. Hawkes (ed.). **1980.** Topics in Current Physics, Vol. 13. Contributed articles on various aspects of the use of computer analysis of electron micrographs. (535.332502854 C739 & TSB)
- Digital Image Processing.** R. C. Gonzalez and P. Wintz. **1987**, 2nd Ed.; **1992.** 3rd Ed. Addison-Wesley Pub. Co., Reading, MA. Electrical engineering perspective of digital image processing. (621.367 G588d [Engineering Library]; TSB has 1987 copy)
- Electron Microscopy at Molecular Dimensions: State of the Art and Strategies for the Future.** W. Baumeister and W. Vogell (eds.). **1980.** Proceedings of an international workshop "Regular 2-D Arrays of Biomacromolecules: Structure Determination and Assembly", Burg Gemen, Munsterland, June 1979. Contains several articles involving the use of image analysis techniques. (578.45 EL25 & TSB)
- Image Analysis in Biology.** D.-P. Häder (ed.). **1992.** CRC Press, Boca Raton, FL. Contains several contributed chapters relevant to image processing of biological macromolecules. (578.4 Im15 & TSB)

Image Analysis: Principles and Practice. 1985. A technical handbook produced by Joyce-Loebl. Short Run Press, Exeter, UK. A basic text on ‘classical’ image analysis techniques with emphasis on industrial applications. (TSB)

Image Restoration and Reconstruction. P. H. T. Bates and M. J. McDonnell. **1986.** Clarendon Press, Oxford. Mainly a theoretical treatment. From the Oxford Engineering Science Series. (621.367 B319i & TSB)

Signal and Image Processing in Microscopy and Microanalysis. P. W. Hawkes (ed.). **1992.** Scanning Microscopy International, Chicago. This has several useful articles, all from the Proceedings of the 10th Pfefferkorn Conference (U. Cambridge, U.K., Sept. 27-30, 1991) . (TSB)

The Image Processing Handbook. J. C. Russ. **1992, 1995,** 2nd Ed. CRC Press, Boca Raton, FL. Extensive, basic text of materials science and engineering perspective of digital image processing. (1992 & 1995: 621.367 R91i Engineering Library & TSB)

PERIODICALS

Technical aspects of image processing and transmission electron microscopy are mainly covered in the following journals:

Journal	Call number (Library)	Vols. and Year(s)
Electron Microscopy Reviews	578.4505 EL25 (BIO)	v.1-5; 1988-1992
Journal of Electron Microscopy	578.1505 J826 (BIO)	v.1-; 1953-
Journal of Electron Microscopy Technique	578.4505 J8265 (BIO)	v.1-19; 1984-1991
Journal of Microscopy	578.06 R81 (BIO)	v.89-; 1969-
Journal of Structural Biology	610.5 J827 (BIO)	v.103-; 1990-
Micron (also Micron and Microscopia Acta)	578.4505 M583 (BIO)	v.10-; 1979-
Microscopy and Research Technique	578.4505 J8265 (BIO)	v.20-; 1992-
Optik	535.05 Op72 (PHYS)	v.10-; 1946-
Ultramicroscopy	578.405 U8 (BIO)	v.1-; 1975-

Journals that contain a significant number of articles of biological interest pertaining to results obtained by electron microscopy and image analysis include:

Biophysical Journal	Journal of Structural Biology
Cell	Journal of Virology
Current Opinion in Structural Biology	Molecular Cell
EMBO Journal	Nature
Experimental Cell Research	Nature Structural Biology
FEBS Letters	Proceedings of the Nat’l Academy of Sciences USA
Journal of Bacteriology	Protoplasma
Journal of Cell Biology	Science
Journal of Cell Science	Seminars in Virology
Journal of General Microbiology	Structure
Journal of General Virology	Virology
Journal of Molecular Biology	

The above list is incomplete in the sense that virtually every discipline in biology has its own journal or journals that include a significant electron microscopy emphasis.

BOOKS ON RESERVE IN BIOSCIENCES LIBRARY (Spring 2000)

AUTHOR(S)	TITLE	CALL #	YEAR
Baumeister, W. & Vogell, W.	Electron Microscopy at Molecular Dimensions: State of the Art and Strategies for the Future. Proceedings of an international workshop " <i>Regular 2-D Arrays of Biomacromolecules: Structure Determination and Assembly</i> ".	578.45 EL25	1980
Frank, J.	Electron Tomography: Three-Dimensional Imaging with the Transmission Electron Microscope	578.45 EL257	1992
Frank, J.	Three-Dimensional Electron Microscopy of Macromolecular Assemblies	578.45 F851t	1996
Glauert, A. M.	Practical Methods in Electron Microscopy, Vol. 7	502.8 P881	1978
Häder, D.-P.	Image Analysis in Biology	578.4 Im15	1992
Hawkes, P. W.	Computer Processing of Electron Microscope Images	535.332502854 C739	1980
Hawkes, P. W. & U. Valdre	Biophysical Electron Microscopy: Basic Concepts and Modern Techniques	578.45 B524	1990
Meek, G. A.	Practical Electron Microscopy for Biologists, 2nd ed.	578.45 M471p	1976
Russ, J. C.	The Image Processing Handbook	621.367 R91i [Engin.]	1995
Saxton, W. O.	Computer Techniques for Image Processing in Electron Microscopy	621.38 Ad9s #10 (Engin.)	1978