



# The New York Microscopical Society

## Ernst Abbe Memorial Award of the New York Microscopical Society

Recipients of this award are acknowledged for their contribution to the field of microscopy. Abbe award winners are a select group of individuals that continue to advance the field of microscopy. These advances enable the integration of microscopical techniques within virtually all fields of applied science. The award is presented at a scientific session held at the 2006 Eastern Analytical Symposium. More information is available at the Society's web site [NYMS.ORG](http://NYMS.ORG); click on the Abbe Award @ EAS link on the side bar.

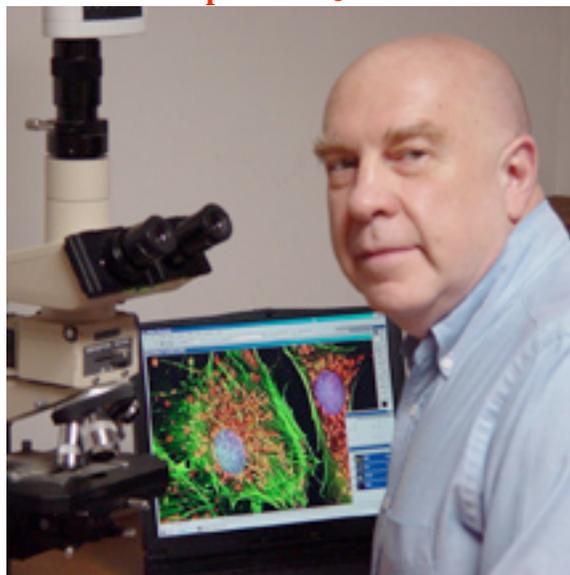


Pete Diazcuk presents Dr. John Russ with the Ernst Abbe Memorial award, November 16, 2006

### Recipients List, 1973-2006

- 2006 John C. Russ, Developer of computer-assisted microscopy and image analysis
- 2005 Brad Amos, Developer of confocal microscopy
- 2004 John A. Reffner, Industrial microscopist and developer of infrared microscopies
- 2003 Gerasimos D. Danilatos, Developer of the environmental scanning electron microscope
- 2002 Mortimer Abramowitz, Educator, council and leader of light microscopy technology
- 2002 Jan Hinsch, Educator, council and leader of light microscopy technology
- 2002 H. Ernst Keller, Educator, council and leader of light microscopy technology
- 2001 Joseph I. Goldstein, Innovative educator in electron microscopy and microbeam analysis
- 2000 Maria Kuhnert-Brandstatter, Innovative developer of solid state characterization of pharmaceuticals
- 1998 Johann S. Ploem, Developer of epi-fluorescence and reflection-contrast microscopy
- 1997 Shinya Inoue, Pioneer in video microscopy and researcher in architectural dynamics of living cells
- 1996 Charles Koester, Developer of rectified optics for polarized light and ophthalmic confocal microscopes
- 1988 F. Donald Bloss, Developer of the spindle stage and leader in microscopy education
- 1985 Robert Hoffman, Inventor of the modulation contrast technique
- 1983 Edwin H. Land, Advanced imaging science and created Polaroid polarizing filters
- 1981 Roger P. Loveland, Advancing photomicrography and industrial microscopy
- 1979 Albert V. Crew, Pioneering development of field emission scanning transmission electron microscope
- 1977 Walter C. McCrone Numerous contributions to polarized light microscopy and education
- 1973 Georges Nomarski, developer of differential interference contrast microscopy

**NYMS Abbe Award  
2006 Recipient Dr. John C. Russ**



On November 16, 2006, John C. Russ received the 2006 Ernst Abbe Memorial Award of the New York Microscopical Society for achievements made in the field of microscopy.

Electronic sensors these days look at everything from Mars to microscopic objects. The awards committee at NYMS was determined to honor this year a microscopist whose life work reflected the fusion of microscope optics and electronic sensors. Our recipient, Dr. John Russ, has been involved in this development from its infancy. His books on Image Processing are classics on the shelves of countless microscopists.

For five decades, John Russ has employed various forms of microscopy and image analysis in research, developed new technologies and methods, and taught the use of these powerful tools.

John Russ received his BS and MS degrees in Engineering and Solid-State Physics from California Institute of Technology and his Ph.D. in Engineering from California Coast University. At the Homer Research Labs of Bethlehem Steel Corp, in the 1960's, development of new steel alloys, such as those used in the Trans-Alaska Pipeline, was strongly linked to the microstructure as revealed by light and electron microscopy, microprobe and x-ray analysis. In 1968, Dr. Russ became Director of the Applications Laboratories at Japan Electron Optics Laboratories (JEOL), introducing the Scanning Electron Microscope. From there, it was a natural step to join in the formation of EDAX, which became the leading supplier of microanalysis instrumentation for use on SEMs and TEMs. As Senior Vice President, Russ was deeply involved in the development of these devices, the creation of software for qualitative and quantitative interpretation of the spectra, and the imaging of elemental distributions. After the sale of EDAX to Philips, Dr. Russ joined the faculty of North Carolina State University in 1978. He also participated in research at the Danish Technological Institute. After retirement from formal teaching duties at NCSU in 1996, he accepted a position as Research Director of Rank Taylor Hobson, a British manufacturer of precision instrumentation. He continues to be active as an Adjunct Professor at NCSU, as well as a consultant and author.

As a professor in the Materials Science and Engineering Department, Russ and his students have used a broad array of microscope technologies to study materials microstructures and surfaces. These have included conventional and confocal light microscopes, electron and ion microprobes, scanning and transmission electron microscopes, X-ray and neutron tomography, and a variety of scanned probe microscopes. The need to process these images to obtain quantitative structural information led to the development of computer control for instruments and computer processing for the data. John Russ has become widely known as a leader in the development and use of these tools for image analysis. At NCSU his collaborations have extended far beyond the materials science field, including food science, archaeology, biology, veterinary medicine, textiles, and others. Beyond the campus, he has worked with a worldwide range of companies in fields such as pharmaceutical and energy applications, and has been retained as an expert witness in forensic cases, both civil and criminal.

Through academic courses and workshops, Dr. Russ has presented image analysis methods to more than 4000 students. He has taught acclaimed hands-on workshops worldwide, from Australia to Slovenia, Japan to South Africa. His more than 300 publications, including more than a dozen books, have reached thousands more. These books include “Computer Assisted Microscopy,” “Practical Stereology” (with Robert Dehoff), “Fractal Surfaces,” “The Image Processing Handbook” (now in its 5th edition), “Forensic Uses of Digital Imaging,” and “Image Analysis of Food Microstructure.” A textbook on image analysis for computer science students is currently in preparation.

After receiving the Abbe Award from NYMS president Pete Diazcuk, Dr. Russ addressed the guests with a presentation entitled: “What has Image Processing done for (and to) Microscopy?”

This talk looked at vision in creatures from birds to horses and then compared the strengths and limitations of the human eye and brain to those of the electronic sensor and processor. Lucid and artistic illustrations helped getting the point pleurably across. For example in two frames filled with numerous dots their arrangement appeared to be equally random yet numerical analysis of the distances showed patterns in one of the frames that had escaped human vision. Other examples dealt with the dependence of resolution on contrast and numerous optical illusions demonstrating that conclusions based on what we see may not always be reliable. Conversely, Dr. Russ allowed that there is the danger of asking certain questions merely because the instrumentation can answer them. Dr. Russ’ talk set the stage for the next speaker, his son Christian, who had helped to cast many of his father’s ideas in computer code. Christian Russ also reminded us of the very modest beginnings of the PC and the fanaticism of early geeks to harness their inadequate power for imaging projects against all odds.

Four invited speakers then presented papers in honor of Dr. Russ about the state of image processing and analysis today which rounded out this satisfying event.

1. Spectrum Imaging: A Pixel is Worth a Thousand Channels. Louis M. Ross, University of Missouri
2. The Importance of Observing in Two Dimensions but Realizing in Three Dimensions, Hamish L. Fraser, The Ohio State University
3. The Role of Microscopic Imaging in Drug Discovery. Michail A. Esterman, Lilly Research Laboratories, Inc.
4. “Quantitative Image Analysis—The Fourth Dimension” Brent Neal, Milliken Research

