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Microscopy and Microanalysis provides the highest quality forum for publication of truly innovative results in a wide range of fields of importance to microscopy and microanalysis. To this end, the Journal publishes original research papers in the entire range of microscopy and microanalysis, from new methods and instrumentation to their application to compositional analysis for determination of structure or chemistry at the microscopical level. Fields of interest include: microbeam analysis, scanning probe microscopies, and all forms of light microscopy. Image acquisition and improvement techniques, along with computer-assisted microscopy, are included.

Four categories of communications are published in the Journal. **Regular Articles** contain reports of new instrumentation and new theoretical methods and their applications to microstructural analysis in a broad range of fields including biological, physical, and materials science. **Communications** are short technical or scientific articles in biological, physical, or materials science. **Reviews** have a broader technical content than Regular Articles. **Letters to the Editor** may be on any topic.

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31st Annual Meeting

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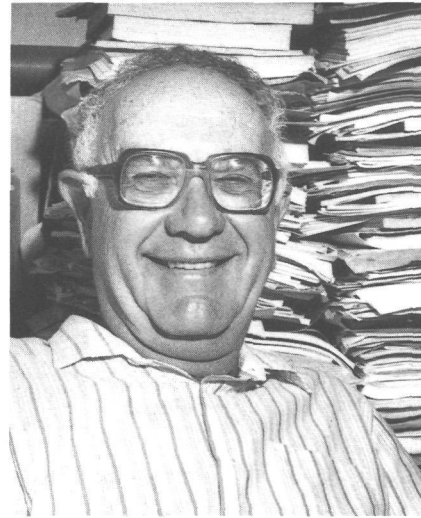
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1997 DISTINGUISHED SCIENTIST AWARDS



PETER SWANN
Physical Sciences

After obtaining a PhD from Cambridge University in 1960 Peter Swann worked at US Steel, University of Göttingen and University of London. He published over 60 scientific papers and was awarded eight medals and prizes including the prestigious Beilby Gold medal of the Royal Chemical Society and the Robert Lansing Hardy Gold Medal of the American Institute of Metallurgical Engineers. In Göttingen, after almost killing himself using a well known rocket fuel to electropolish TEM specimens he started to develop other specimen preparation methods. In 1978 he resigned his Chair at Imperial College to become CEO of Gatan. Under his direction Gatan became a worldwide leader in the design and manufacture of instruments in the field of electron microscopy and analysis. Gatan's most successful products include the DuoMill, PIPS and Dimple Grinder, a range of cameras and DigitalMicrograph software that revolutionized the way microscopists record TEM images, cryotransfer systems, the GIF (Gatan Imaging Filter), and many specialized TEM specimen holders. He has a keen interest in music and has conducted the California Symphony Orchestra. He is now studying Law in the Caribbean Island of Antigua.



S.J. SINGER
Biological Sciences

S.J. Singer is the father of immunoelectron microscopy, the use of antibodies tagged with electron-dense markers as reagents for detecting and localizing specific proteins and other antigens in biological specimens at the electron microscope level of resolution. In 1959, he described for this purpose the preparation of a conjugate of the iron-storage protein, ferritin, with antibodies. In more recent years, colloidal gold has replaced ferritin as the electron-dense marker of choice. In 1973, Dr. Singer and his colleague Dr. Kiyoteru Tokuyasu developed a general method for the routine preparation of ultrathin frozen sections of lightly-fixed biological specimens, as substrates with which to carry out immunoelectron microscopic labeling of intracellular antigens. These procedures have since become widely used, and have greatly enhanced the scope of electron microscopy in biological research. Dr. Singer, after 10 years on the faculty of the Chemistry Department at Yale University, became in 1961 a founding member of the Biology Department at the University of California at San Diego, where he is now University Professor and Professor of Biology, Emeritus.

BURTON MEDAL



P. M. AJAYAN

Professor P.M. Ajayan received his Ph.D. in materials science and engineering from Northwestern University in 1989 under the guidance of Professor L.D. Marks. He spent three years of Post-doctoral research at the fundamental research laboratory of NEC Corporation in Japan. He was part of the group headed by Dr. Sumio Iijima who discovered carbon nanotubes. Later he spent two years at the French CNRS Laboratoire de Physique des Solides in Orsay as a research scientist and a year and a half at the Max-Planck-Institute für Metallforschung in Stuttgart as an Alexander von Humboldt Research Fellow. He is presently assistant professor at the department of materials science and engineering at Rensselaer Polytechnic Institute in Troy, New York. His research interests consist of structure-property relations in low dimensional system. This includes metal clusters, carbon nanotubes and inorganic nanowires. Recently his work is focused on understanding structure and electronic properties of carbon nanotubes using high resolution transmission and scanning electron microscopy, electron energy loss spectroscopy and scanning tunneling microscopy and spectroscopy.

THE MORTON D MASER
MSA DISTINGUISHED SERVICE AWARD



WILLIAM T. GUNNING, III

William T. Gunning III received B.S. and M.S. degrees from Bowling Green State University, and a Ph.D. from the Medical College of Ohio, where he is Associate Professor of Pathology and Director of the Electron Microscopy Facility. He is a past President of the Northwest Ohio Microscopy Society and serves as a trustee for the Microscopy Society of Northeast Ohio. He was Chairman of the 1987 Great Lakes Electron Microscopy Affiliates Meeting, and is a founding member of that organization. Dr. Gunning has been an (E)MSA member since 1973, serving the Society beginning in 1983 as a member of the Certification Board and the Local Arrangement Committee for the 1984 Annual meeting in Detroit, Advertising Editor of the *Bulletin* and *The Journal of the Microscopy Society of America* from 1985 through 1996, Managing Editor of *EXPO*, and as a member of the Society Publications Committee. He recently was reappointed to serve as Editor of *EXPO*. He also served the International Congress for Electron Microscopy as an Associate and is a member of the MSA Telecommunications Committee. His research interests include clinical investigations of bleeding disorders, basic research studies of hyperbaric oxygen therapy effects on the central nervous system, and experimental carcinogenesis and chemoprevention studies involving xenobiotic chemicals and dietary supplements in murine models. Dr. Gunning is the Local Arrangements Committee Chairman for this year's Microscopy and Microanalysis '97 meeting in Cleveland.

MSA OUTSTANDING TECHNOLOGIST AWARD



JOHN P. BENEDICT

John joined IBM in 1984 as a Senior Laboratory Technician in the Surface and Material Analysis group, doing TEM sample preparation. In the last thirteen years he has received a number of internal awards for his support of IBM's logic and memory programs using TEM. For the past eleven years he has worked as a part of the East Fishkill group in refining methods for preparing samples for both TEM and SEM analysis. In 1989 he received the Outstanding Technical Achievement Award in recognition for his contributions in sample preparation. He is now a Senior Associate Engineer in the Surface and Material Analysis group and is completing his B.Sc. in Electrical Engineering. Presently, he is working on refining sample preparation



STANLEY J. KLEPEIS

Stanley Klepeis is a graduate of Lincoln Tech, Allentown, Pennsylvania and has been a technician at IBM for 29 years. His initial career at IBM involved experiments to predict the reliability of IBM technology. In 1969, Stan was drafted into the army and served in Vietnam as a combat infantryman with the 101st. Airborne Division 2/502. He welcomed a career change in 1980 to do SEM/EDX analysis and Microprobe EDX/WDX analysis of specimens from his former IBM group. In 1986 he began to improve sample preparation for TEM. IBM has presented him with numerous awards for individual and team contributions as well as major suggestion awards. In 1989 he received the MSA best poster award in physical sciences for the

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1958	Max Swerdlow	1985	Dale Johnson
1959	John H. Reisner	1986	Robert Glaeser
1960	D. Gordon Sharp	1987	Linn W. Hobbs
1961	D. Maxwell Teague	1988	John-Paul Revel
1962	Keith R. Porter	1989	Ray Carpenter
1963	Charles Schwartz	1990	Keith R. Porter
1964	Sidney S. Breese	1991	Charles Lyman
1965	Virgil G. Peck	1992	Patricia Calarco
1966	Walter Frajola	1993	Michael S. Isaacson
1967	Joseph J. Comer	1994	Robert R. Cardell
1968	John H. Luft	1995	Terence E. Mitchell
		1996	Margaret Ann Goldstein

¹Chair of committee to arrange first meeting

²Temporary (pre-constitution)

1997 MICROBEAM ANALYSIS SOCIETY AWARDS
PRESIDENTIAL SCIENCE AWARD



DAVID B. WILLIAMS

David B. Williams is the Harold Chambers Senior Professor and Chairman of the Department of Materials Science and Engineering at Lehigh University. He obtained his B.A. (1970), M.A. (1974) and Ph.D. (1974) from Cambridge University. From 1974–1976 he was a Science Research Council Fellow at the Department of Metallurgy and Materials Science in Cambridge. In 1976 he moved to Lehigh as an Assistant Professor, becoming Associate Professor in 1979 and Professor in 1983. He also directed the Electron Optical Laboratory at Lehigh from 1980–1994. He has published two books, edited three texts, five Conference Proceedings, and authored eleven other book chapters. He has more than 240 technical publications in the general areas of analytical and transmission electron microscopy and the application of these techniques to studies of precipitation and segregation. He is a Fellow of ASM International, TMS, The Institution of Materials (UK) and the Royal Microscopical Society (UK). Currently he is President of the International Union of Microbeam Analysis Societies.

PRESIDENTIAL SERVICE AWARD



JOHN A. SMALL

John Small is currently employed in the Surface and Microanalysis Science Division at the National Institute of Standards and Technology. He received his B.S. degree from the College of William and Mary in 1971 and his Ph.D. degree in Chemistry from the University of Maryland in 1976. His current research activities include automated electron microscopy analysis of particles, and high resolution imaging and analysis using a FEGSEM. He received the Department of Commerce Bronze Medal Award (1988) for his work in the establishment of methods and standards for the measurement of asbestos and the Macres Award for the best instrumentation paper at the 1988 MAS conference. John has been a member of MAS since 1976 and served on the MAS council from 1987–1995 in various capacities including director, secretary and president. He served as the MAS technical program chair for the 1992 Boston meeting and is currently listed as chair of the MAS long-range planning committee.

K.F.J. HEINRICH AWARD



RAYNALD GAUVIN

Raynald Gauvin received his Ph.D. in electron microscopy at École Polytechnique de Montréal in 1990 after receiving his B.Eng. in metallurgy at École Polytechnique de Montréal in 1985. Since then, he is full professor, with tenure, at the mechanical engineering department of Université de Sherbrooke located in the province of Québec in Canada. His research interests revolve around the development of new quantitative procedures of heterogeneous materials in the field emission gun scanning electron microscope using x-ray microanalysis and Monte Carlo simulations, the characterization of electron scattering in solids using the concepts of fractal geometry, the development of quantitative procedures for x-ray microanalysis in the transmission electron microscope using Monte Carlo simulations and on the development of new materials. He has published over 90 papers in scientific journals and conference proceedings about these topics. He has won the Young Promising Microscopist award at the 1994 ICEM conference in Paris, the "Prix d'Excellence du Président de l'École" for the best Ph.D. thesis for 1990 at École Polytechnique de Montréal, the MAS Castaing Award in 1989 and the MAS Distinguished Student Award in 1988 and in 1989. He is second vice-president of the Microscopical Society of Canada since June 1997.

1997 MAS DISTINGUISHED SCHOLAR AWARDS

Jose R. Alvarez Arizona State University	Li Fu University of Michigan
Arianna Di Francesco Cleveland Clinic Foundation	R. J. Kline North Carolina State University
D. Drouin Université de Sherbrooke	Xiwei Lin Northwestern University
	Gene Lucadamo Lehigh University

MAS PRESIDENTIAL AWARDS

	Science		Service
1977	R. Castaing	1977	P. Lublin
1978	K.F.J. Heinrich	1978	D.R. Beaman
1979	P. Duncumb	1979	M.A. Giles
1980	D.B. Wittry	1980	A.A. Chodos
1981	S.J. Reed	1981	R. Myklebust
1982	R. Shimizu	1982	J. Doyle
1983	J. Philibert	1983	D. Newbury
1984	L.S. Birks	1984	J.I. Goldstein
1985	E. Lifshin	1985	M.C. Finn
1986	R. Myklebust	1986	V. Shull
1987	O.C. Wells	1987	D.C. Joy
1988	J.D. Brown	1988	C.G. Cleaver
1989	J. Hillier	1989	W.F. Chambers
1990	T.E. Everhart	1990	C.E. Fiori
1991	J.I. Goldstein	1991	T.G. Huber
1992	G. Lorimer	1992	E. Etz
	G. Cliff	1993	H.A. Freeman
1993	D.E. Newbury	1994	J.L. Worrall
1994	D.C. Joy	1995	R.W. Linton
1995	G. Bastin	1996	P.F. Hlava
1996	A.V. Somlyo		
	A.P. Somlyo		

MAS K.F.J. HEINRICH AWARDS

1986	P. Statham	1991	A.D. Romig, Jr.
1987	J.T. Armstrong	1992	S. Pennycook
1988	D.B. Williams	1993	P.E. Russell
1989	R. Leapman	1994	J.R. Michael
1990	R.W. Linton	1995	N. Lewis

MAS PAST PRESIDENTS

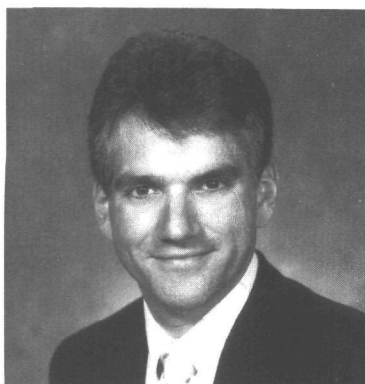
1968	L.S. Birks	1982	R. Myklebust
1969	K.F.J. Heinrich	1983	R. Bolon
1970	R.E. Ogilvie	1984	D.C. Joy
1971	A.A. Chodos	1985	D.E. Newbury
1972	K. Keil	1986	C.G. Cleaver
1973	D.R. Beaman	1987	C. Fiori
1974	P. Lublin	1988	W.F. Chambers
1975	J.W. Colby	1989	D.B. Wittry
1976	E. Lifshin	1990	A.D. Romig, Jr.
1977	J.I. Goldstein	1991	J.T. Armstrong
1978	J.D. Brown	1992	D.B. Williams
1979	D.F. Kyser	1993	T.G. Huber
1980	O.C. Wells	1994	J. Small
1981	J.R. Coleman	1995	J. McCarthy
		1996	D.E. Johnson

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1950	George B. Wislocki (Chairman)	1974	Hewson H. Swift
1951	George B. Wislocki	1975	Eric Holtzman
1952	David Glick	1976	Gunter F. Bahr
1953	Stuart Mudd	1977	Leonard Ornstein
1954	J. Walter Wilson	1978	Ludwig Sternberger
1955	Arnold M. Seligman	1979	Paul K. Nakane
1956	Charles P. Leblond	1980	Tibor Barka
1957	George Gomori	1981	Anna-Mary Carpenter
1958	Ralph D. Lillie	1982	Samuel S. Spicer
1959	Alex B. Novikoff	1983	Sidney Goldfischer
1960	Oliver H. Lowry	1984	William H. Fishman
1961	Arthur W. Pollister	1985	Leonard S. Kaplow
1962	William L. Doyle	1986	Robert E. Smith
1963	Russell J. Barrnett	1987	Stanley L. Erlandsen
1964	Earl P. Benditt	1988	Mark C. Willingham
1965	Albert H. Coons	1989	Constance Oliver
1966	Arnold Lazarow	1990	Denis G. Baskin
1967	Emmanuel Farber	1991	Moise Bendayan
1968	Lee W. Wattenberg	1992	Mark C. Willingham
1969	Robert L. Hunter	1993	Peter Petrusz
1970	David Glick	1994	Bradley A. Schulte
1971	Gerard M. Lehrer	1995	John M. Robinson
1972	George C. Glenner	1996	William L. Stahl
1973	John M. Allen		



C. Barry Carter
MSA President

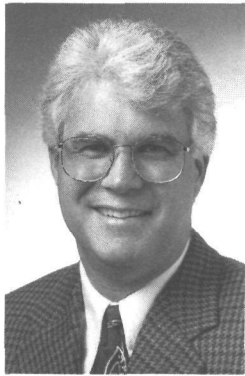


Joseph R. Michael
MAS President



Theresa P. Pretlow
HCS President

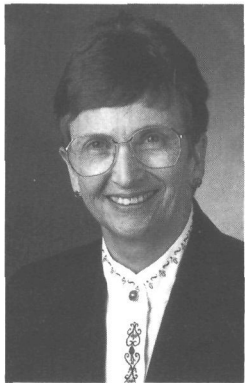
MICROSCOPY AND MICROANALYSIS 1997



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Kathleen B. Alexander
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MICROSCOPY AND MICROANALYSIS 1997

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Edward Kenik	Nestor Zaluzec
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FOREWORD

C. BARRY CARTER

President, Microscopy Society of America

JOE MICHAEL

President, Microbeam Analysis Society

THERESA PRETLOW

President, Histochemical Society

This year the Proceedings of our meeting, Microscopy and Microanalysis, is published as a supplement to our relaunched journal *Microscopy and Microanalysis*. So our Proceedings is now part of a journal not a book. The Proceedings is included in every library subscription to the Journal so you should be able to find it on the same shelf. We have continued the approach of having a single Proceedings, a single Program Committee and a single LAC. With this philosophy in mind, MSA and MAS have collaborated this year to bring you events which all attendees (including our exhibitors) can enjoy. The events have been called the Presidential Happenings because we knew they would happen but weren't quite sure what they would be! HCS offers you a more traditional Presidential Symposium.

We would like to thank the Program Committee for all their work in making this meeting such a success. Special thanks goes to Ruth Dimlich, the Chair of the Committee. Ruth has been assisted by vice-Chair Kathi Alexander (MSA) and co-Chairs Jon McCarthy (MAS) and Theresa Pretlow (HCS). This team not only designed the program of scientific talks but also coordinated the topics with Jim Turner and John Mansfield (tutorials), Jay Jerome (short courses), the Integrated Microscopy Resource at Wisconsin and the Center for Light Microscopy Imaging and Biotechnology at Carnegie-Mellon University, Nestor Zaluzec and John Mansfield (the computer workshop), Beverly Maleeff (Tech. Forum) and our many exhibitors.

We also thank the Local Arrangements Committee headed by Bill Gunning. The successful coordination of planned scientific sessions, social events, committee meetings and informal exchanges with colleagues from around the world is accomplished by the dedicated work of the LAC.

Finally, we would like to thank Jacquelyn Goss, Bill Curtis, Herb Niemirow and all the staff at Springer-Verlag for working so hard to produce the Program Supplement to the journal on time.

We congratulate the winners of all our MSA awards: S.J. Singer, the MSA Distinguished Scientist Award in the Biological Sciences, Peter Swann, the MSA Distinguished Scientist Award in the Physical Sciences, P.J. Ajayan, the MSA Burton Award, Bill Gunning, the MSA Morton D Maser Distinguished Service Award, and Stanley Klepeis and John Benedict, who share the MSA Outstanding Technologist Award. Congratulations also to David Williams, the MAS Presidential Sciences Award winner, John Small, the MAS Presidential Service Award winner and Raynald Gauvin, the Heinrich Award Winner. We also congratulate our winners of the eight MSA Presidential Student Awards and the seven MAS Distinguished Scholar Awards.

Cleveland is a center for microscopy in Ohio, but is also offers other attractions such as the Rock and Roll Hall of Fame, its new Science Museum and the Flats. After the successful meeting in Cincinnati, we are happy to be back in the Buckeye State. We thank all those involved for organizing the Microscopy and Microanalysis event of 1997 and are already looking forward to our 1998 meeting in Atlanta, Georgia.

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