Authors

Raul E. Acosta

Research Division, Yorktown Heights, New York

Dr. Acosta is manager of electrochemistry and process studies in the semiconductor packaging group at the Thomas J. Watson Research Center laboratory. His previous research activities were in the area of memory and storage. He joined IBM at the Thomas J. Watson Research Center in 1975. Prior to joining IBM, Dr. Acosta was manager of processes at the Celanese Corporation facility in Ocotlan, Mexico, from 1974 to 1975. He received a chemical engineering degree in 1965 from the National Autonomous University of Mexico in Mexico City. He came to the U.S. as a Fulbright Scholar, receiving an M.S. in 1967 from the University of New Hampshire in Durham and a Ph.D. in 1974 from the University of California, Berkeley, both in chemical engineering. Dr. Acosta is a member of the American Institute of Chemical Engineers, the Electrochemical Society, and Sigma Xi.

David C. Alvarez

Research Division, San Jose, California

Mr. Alvarez began working for IBM as a student associate in 1974 while attending San Jose State University, where he was part of the humanities program. He became a full-time employee in the San Jose Research laboratory in 1977 and is currently involved in the optical materials project. He has been responsible for sample preparation and mounting of SN_x crystals for high-pressure studies, as well as for synthesis, purification, and growth of organic crystals for optical studies. Recently Mr. Alvarez has helped to construct and operate a cw ring dye laser and has participated in the development of two-photon photochemical holograms.

Richard D. Balanson

Corporate Headquarters Division, Armonk, New York

Dr. Balanson received the Ph.D. degree in synthetic organic chemistry from Harvard University in 1975, and the B.S. in chemistry from the University of California at Los Angeles in 1971. He joined IBM's General Products Division laboratory in San Jose, California, in 1975, working in various areas of printing and magnetic storage: specifically, on water-soluble organic infrared dyes for use in ink-jet printing to aid in optical character recognition, on lubricants for magnetic storage media, and on the radioactive tagging of materials used in the manufacture of magnetic storage disks. In 1979, Dr. Balanson joined the organic and polymeric materials group at the Research Division in San Jose. He was manager of the electrophotography group in late 1979. Other interests include high-temperature polymers and organic photoconductors. He is currently on assignment as technical assistant to the IBM Chief Scientist and is Executive Secretary to the Science Advisory Committee.

Gary C. Bjorklund

Research Division, San Jose, California

Dr. Bjorklund joined the Research laboratory in San Jose as a research staff member in 1979. He is currently manager of the quantum electronics group in the Exploratory Optics Department. His research interests include nonlinear optics, multi-photon effects, and applications of laser spectroscopy. He received the B.S. in physics in 1968 from the Massachusetts Institute of Technology, Cambridge, and the Ph.D. in applied physics in 1974 from Stanford University, California. Prior to joining IBM, he spent four years as a member of the technical staff at Bell Laboratories, Holmdel, New Jersey, where he performed research in quantum electronics and nonlinear optics.

Christoph R. Bräuchle

Institute of Physical Chemistry, University of Munich, Federal Republic of Germany

Dr. Bräuchle received his M.S. in chemistry from the University of Tübingen, Federal Republic of Germany, and in 1978 his Ph.D. in physical chemistry from the University of Munich. In 1979 he joined the Physical Sciences Department at the IBM Research laboratory in San Jose, California, as a postdoctoral fellow for one year. He subsequently returned to Munich, where he is now a staff member of the Institute of Physical Chemistry. During the past five years, his studies have been concerned with optical spectroscopy, magnetic resonance in excited states, laser photochemistry, and holography. Dr. Bräuchle is a member of the Gesellschaft Deutscher Chemiker.

Donald M. Burland

Research Division, San Jose, California

Dr. Burland joined the Research laboratory in San Jose in 1971. He is currently manager of the optical materials group in the Physical Science Department. He received an A.B. in chemistry from Dartmouth College, Hanover, New Hampshire, in 1965 and a Ph.D. in chemistry and physics from the California Institute of Technology, Pasadena, in 1969. He then spent two years at the Kamerlingh Onnes Laboratory in the Netherlands before joining IBM. His work has included studies of photoconductivity and energy transfer in organic crystals and applications of laser techniques to photochemical investigations. Dr. Burland is a member of the American Chemical Society and is currently secretary-treasurer of the Division of Chemical Physics of the American Physical Society.

Kophu Chiang

General Optronics Corporation, South Plainfield, New Jersey

Dr. Chiang received his B.A. in physics from Cambridge University, England, in 1975 and his Ph.D. in physics from Columbia University, New York, in 1980. He spent 1980–1981 as a postdoctoral fellow

at the IBM Research laboratory, San Jose, California, working on phase-conjugate wavefront generation. Dr. Chiang is currently a staff scientist at General Optronics Corporation, working on applications of semiconductor lasers.

Wei-Kan Chu

University of North Carolina, Chapel Hill

Dr. Chu received the B.S. degree in physics from Cheng-Kung University, Taiwan, in 1962, and the M.S. and Ph.D. degrees in physics from Baylor University, Waco, Texas, in 1965 and 1969. He served as a postdoctoral fellow at Baylor from 1969 to 1972. In 1972, Dr. Chu joined the California Institute of Technology as a research fellow, working in the field of ion implantation. In 1975, he joined IBM's Data Systems Division laboratory in Poughkeepsie, New York. His interests included various aspects of ion implantation and the modification of solids with ion beams. In the summer of 1976, he was a NATO Summer Institute invited lecturer. In September of 1981, Dr. Chu joined the University of North Carolina as a professor in the Department of Physics and Astronomy. While at IBM, Dr. Chu received the Third Plateau Invention Award. He is a member of the American Physical Society and the Electrochemical Society.

Tung J. Chuang

Research Division, San Jose, California

Dr. Chuang received the B.S. degree from the National Taiwan University in 1963, the M.S. from the University of Illinois, Urbana, in 1966, and the Ph.D. from the University of California in 1970, all in chemistry. After a year as an IBM postdoctoral fellow in 1971, he began his staff assignment at the IBM Research laboratory. Dr. Chuang has been involved in the study of ultrafast molecular processes by means of picosecond laser spectroscopy. His current research interests include the use of lasers and electron spectroscopies to study laser-enhanced gas/surface chemistry, chemical etching, and other surface processes. Dr. Chuang is a member of the American Chemical Society, the American Vacuum Society, and Sigma Xi.

John D. Crow

Research Division, Yorktown Heights, New York

Dr. Crow received his B.S., M.S., and Ph.D. in electrical engineering from the University of California at Berkeley in 1966, 1968, and 1972. He joined IBM's Research staff at the Thomas J. Watson Research Center in 1974 after working on experimental and theoretical studies of glass optical fibers at Corning Glass Works for two years. During 1978, Dr. Crow served as technical assistant to Dr. R. E. Gomory, IBM Vice President and Director of Research. In 1979, he became manager of the fiber optic technology group at Yorktown, working on various fiber optic components and link applications.

Anthony G. Dewey

Research Division, San Jose, California

Dr. Dewey received the B.S. in engineering from Cambridge University, England, in 1962. He received the M.S. in 1964 and the Ph.D. in 1966 in electrical engineering from the University of California at Berkeley. Having served a one-year postdoctoral fellowship (1966–1967) at the Imperial College of London, he joined the IBM Research Division in San Jose in 1967, working on control systems. Dr. Dewey has worked on various aspects of power system security, surface topography, laser printing and display systems, and (currently) laser-addressed liquid-crystal displays. He received an IBM Outstanding Contribution Award in 1969 for his work on power system security assessment, and another in 1979 for his participation in the development of the laser liquid-crystal display. Dr. Dewey is a member of the Society for Information Display.

LeRoy D. Dickson

Communication Products Division, Research Triangle Park, North Carolina

Dr. Dickson joined IBM in Rochester, Minnesota, in 1968. A year later he joined the General Systems Division to work on the application of lasers to optical character recognition and document scanning. In 1975, he transferred to the System Communications Division in Raleigh to continue his work, first begun in 1972, on the supermarket scanner. His current interests include the design of optical systems for the supermarket scanner, precision measurements, holographic nondestructive testing, and liquid-crystal displays. In 1973, Dr. Dickson received an IBM Outstanding Contribution Award for his contribution to the development of the supermarket scanner, and in 1981 another for his work on the supermarket scanner's optical system using holographic laser deflection. He received the B.E.S., M.S.E., and Ph.D. degrees in electrical engineering from the Johns Hopkins University, Baltimore, Maryland, in 1960, 1962, and 1968. Dr. Dickson is a member of the Laser Institute of America, the Optical Society of America, and the Society for Photo-optical Instrumentation Engineers.

J. Friedrich

University of Bayreuth, Federal Republic of Germany

Mr. Friedrich graduated from the University of Technology in Munich. He was a postdoctoral fellow at the IBM Research Division laboratory at San Jose, California, during 1979, working in the Organic Solids Department. His interests involved laser photochemistry.

Adolfo R. Gutiérrez

Research Division, San Jose, California

Dr. Gutiérrez' work is focused on studies of organic and transition metal photochemistry using laser photochemistry and electron-beam-induced chemistry at cryogenic temperatures to study chemical processes in the excited state. Before joining the IBM San Jose Research laboratory in 1977, he worked for two years at the University of Southern California on studies of transition metal photochemistry. Dr. Gutiérrez received the Ph.D. in 1975 in physical organic chemistry/organic photochemistry from the University of North Carolina at Chapel Hill, the B.S. in 1969 in chemistry, and the M.S. in 1971 in physical organic chemistry, both from the University of Texas at El Paso.

Dietrich Haarer

University of Bayreuth, Federal Republic of Germany

Dr. Haarer was the manager of the Organic Solids Department at the IBM Research Division laboratory in San Jose, California, before joining the Lehrstuhl Experimentalphysik IV Department of the University of Bayreuth in 1981. Dr. Haarer's first association with the IBM Research Division was in 1970 when he came to San Jose from the Federal Republic of Germany as a one-year World Trade postdoctoral fellow. He had received his Ph.D. in physics from the University of Stuttgart in 1969. During his postdoctoral year at San Jose, his studies involved excitonic and photoconductive states of organic single crystals. After a brief assignment at the University of Stuttgart, Dr. Haarer returned to IBM San Jose as a staff member in 1973. His work with ionic (charge-transfer) states and with high-resolution laser spectroscopy led to an IBM Outstanding Innovation Award in 1976. From 1975 until 1979, he managed the excited states in solids project at San Jose.

Rodney T. Hodgson

Research Division, Yorktown Heights, New York

Dr. Hodgson joined IBM at the Thomas J. Watson Research Center in 1968. He has worked in various laser-related areas, including vacuum ultraviolet (vuv) lasers, electron-beam-pumped lasers, four-wave parametric generation of tunable vuv light, laser annealing, solar cells, and pulsed ion-beam implantation and annealing. Dr. Hodgson is currently working on laser-assisted etching. He received the B.Sc. degree in 1960 in mathematics and physics from the University of British Columbia in Vancouver, and the Ph.D. in physics from the same institution in 1964. From 1974 to 1975, during a sabbatical leave from IBM, he was a visiting professor at the Imperial College, London, England. Dr. Hodgson has received two IBM Outstanding Achievement Awards, one in 1970 for his work on vuv lasers, and one in 1974 for work on tunable four-wave parametric sources. He is a member of the American Optical Society, the American Physical Society, and the Institute of Electrical and Electronics Engineers.

Jörg Hofmann

Fachhochschule Heilbronn, Federal Republic of Germany

Professor Dr. Hofmann is a member of the Faculty of Medical Informatics at the University of Heidelberg and the Heilbronn School of Technology. He teaches subjects in mathematics and theoretical computer science. From 1969 to 1974 he was a scientific assistant at the research institute of AEG-Telefunken at Ulm, where he worked on performance models of computing systems. He has held his current position since 1974. In 1979–1980 he spent a half-year of research at the IBM Scientific Center at Heidelberg. Dr. Hofmann received his Master's degree in 1968, and his Ph.D. in 1972 in mathematics at the Technical University of Braunschweig. He is a member of the Gesellschaft fuer Medizinische Dokumentation, Informatik, und Statistik and of the Gesellschaft fuer Informatik.

Kanti Jain

Research Division, San Jose, California

Dr. Jain received the B.S. in electronics in 1969 from the Indian Institute of Technology, Kharaghpur, India. He received the M.S. in electrical engineering in 1970 and the Ph.D. in solid state physics in 1975, both from the University of Illinois at Urbana-Champaigne. From 1975 to 1977, Dr. Jain was an IBM postdoctoral fellow and research associate at the Massachusetts Institute of Technology, Cambridge. He joined the Hewlett-Packard Laboratory in Palo Alto, California, in 1977, working on ultraviolet lasers, and in 1979 joined the IBM Research Division in San Jose, where he is manager of an advanced laser systems group. His areas of interest include optical and laser lithography and nonlinear optics. Dr. Jain is a member of the American Physical Society.

Ying C. (John) Kiang

Data Systems Division, Poughkeepsie, New York

Dr. Kiang is an advisory engineer in the technology applications laboratory in Poughkeepsie. His current work involves laser applications in semiconductor precision components. In 1967, he joined the Quantum Electronics Department, Federal Systems Division, Gaithersburg, Maryland, where he initiated research programs in Nd:YAG lasers, nonlinear optical interactions, and mode-locked lasers. In 1974, he was transferred to East Fishkill, New York, to the future manufacturing systems group for developing width and overlay and Brewster-angle spectrophotometer optical systems for automation of integrated circuit measurements. He joined the IBM video disk project in 1976 in Poughkeepsie, and was responsible for the overall system evaluation and performance of optical recording on master disks. He joined the Poughkeepsie development laboratory in 1980. Prior to joining IBM, he worked in the Research Department of General Dynamics/Electronics at Rochester, New York, from 1960 to 1966. Dr. Kiang received the B.S. in electrical engineering from the National Cheng Kung University, Taiwan, the M.S. in electrical engineering from the University of Illinois, and the Ph.D. from the University of Maryland. Dr. Kiang is a senior member of the Institute of Electrical and Electronics Engineers and a member of the Optical Society of America.

Marc David Levenson

Research Division, San Jose, California

Dr. Levenson is a Research staff member in the excitations in solids project; he is presently concerned with laser spectroscopy, nonlinear optics, and their applications to memory and manufacturing technology. He joined IBM in 1979 in San Jose. From 1974 to 1979 he was Associate Professor of Physics and Electrical Engineering at the University of Southern California in Los Angeles, where he conducted research on laser spectroscopy and taught courses in optics, quantum mechanics, and physics. Dr. Levenson received the B.S. in physics from the Massachusetts Institute of Technology in 1967 and the Ph.D. in physics from Stanford University, California, in 1971. He is a member of the American Physical Society, the Institute of Electrical and Electronics Engineers, and the Optical Society of America. Dr. Levenson received the Adolph Lamb Medal from the Optical Society of America in 1976, the Alfred P. Sloan Research Fellowship from 1975 to 1977, and a Visiting Fellowship to the Joint Institute for Laboratory Astrophysics at the University of Colorado from 1978 to 1979.

Burn Jeng Lin

Research Division, Yorktown Heights, New York

Dr. Lin joined IBM in 1970 as a member of the technical optics group at the Thomas J. Watson Research Center. He is currently manager of the silicon lithographic studies group there. His technical interests include the simulation of near-field diffraction by submicron patterns and the development of deep-ultraviolet conformable printing to extend photolithography to the submicron region. He received a B.S. in electrical engineering from the National Taiwan University in 1963 and an M.S. and Ph.D. in electrical engineering from the Ohio State University in 1965 and 1970, respectively. From 1965 to 1969, he also worked as a research associate at the Electroscience Laboratory of the Ohio State University on microscopic holography, electromagnetics, and submillimeter spectroscopy. Dr. Lin is a member of the Optical Society of America and the Institute of Electrical and Electronics Engineers.

André B. Minn

System Products Division, Kingston, New York

Mr. Minn received the B.S. degree in electrical engineering in 1969 from the Michigan Technological University at Fort Haughton. He joined Perkin-Elmer in Chicago in 1969, working on the system logic design of medical instruments. In 1972, he returned to school and obtained the M.S. degree in electrical engineering in 1974 from the University of Iowa, Iowa City. He has also participated in a graduate work-study program run by Syracuse University. He joined IBM's Kingston laboratory in 1974, and since that time has worked on various aspects of engineering analysis, principally with regard to evaluation and test technologies and the evaluation and testing of displays and display designs.

J. Randal Moulic

Data Systems Division, Poughkeepsie, New York

Mr. Moulic joined IBM in 1973 at the Poughkeepsie development laboratory. He has worked on surface acoustic wave devices and is currently investigating the use of lasers in semiconductor technology. Mr. Moulic received a B.S. in electrical engineering in 1972 and an M.S. in 1973 from the University of Illinois. He is a member of the Institute of Electrical and Electronics Engineers.

John F. Rabolt

Research Division, San Jose, California

Dr. Rabolt is a research staff member in the polymer science and technology group. He is currently involved in the use of Fourier transform infrared and Raman spectroscopies to characterize polymer structure, morphology, and orientation in the solid state. In addition he serves as a consultant to the newly formed IBM Instruments Inc. in the area of Michelson interferometry and Fourier transform spectroscopy. Dr. Rabolt joined IBM at the San Jose Research laboratory in 1977 after completing a National Research Council/National Academy of Sciences Research Associateship at the National Bureau of Standards in Washington, D. C. He received a B.S. in physics in 1970 from the State University of New York and a Ph.D. in physics in 1974 from Southern Illinois University. Dr. Rabolt is a member of the American Physical Society and the Society for Applied Spectroscopy.

James D. Rockrohr

System Products Division, Kingston, New York

Mr. Rockrohr first joined IBM's System Communications Division in Kingston in 1975, shortly after obtaining the B.S.E.E. degree from the University of Iowa, Iowa City, in 1974. His major work area at Kingston involves the design of analog displays and CRT displays. He is currently participating in a Syracuse University graduate work-study program in electrical engineering.

Lubomyr T. Romankiw

Research Division, Yorktown Heights, New York

Dr. Romankiw is manager of the physical and process studies group at the Thomas J. Watson Research Center. He is responsible for the development of new technologies and processes for device microfabrication. In 1955 he graduated from the University of Alberta, Edmonton, Canada, with a B.Sc. in chemical engineering. He obtained the doctorate from the Massachusetts Institute of Technology, Cambridge, in metallurgy in 1962. Dr. Romankiw first joined IBM's Research Division in 1962, working on electrodeposition and

electroless deposition of magnetic films. In 1965 he spent one year on sabbatical in the Components Division in Poughkeepsie as manager of the materials and process development group. In 1969 he was named manager of the physical and process studies group, where he worked on magnetic-coupled film memory, bubble memory devices, thin-film recording heads, laser-enhanced plating and etching, and thin-film second-level packaging schemes for semiconductor memory products. In 1980 he led a technical team supporting the multi-layer ceramic plating area, and he is currently working on a variety of magnetic devices and processes. He has received three IBM Outstanding Contribution Awards for his work on thin-film heads, and an informal award for work on a magneto-resistive head. Dr. Romankiw is a member of the Institute of Electrical and Electronics Engineers, the Electrochemical Society (ECS), and the Shevchenko Scientific Society; he is currently Chairman of the Electrodeposition Division of the ECS.

Randolph Santo

General Products Division, San Jose, California

Mr. Santo joined the IBM San Jose Research laboratory in 1974, after receiving a B.S. in physics from Santa Clara University, California. His expertise and current research interests are in the fields of optical waveguides, Raman spectroscopy, surface plasmon spectroscopy, adhesion and lubrication, and monolayer and bilayer systems. In 1981, Mr. Santo started a new assignment with the General Products Division.

Nicholas E. Schlotter

Research Division, San Jose, California

Dr. Schlotter has been a postdoctoral fellow in the organic and polymer materials group since 1980. Generally interested in the structural properties of ordered and partially ordered molecular systems, he has been doing research on thin films by combining Raman spectroscopy and integrated optical techniques. He received the B.A. in chemistry from Carleton College, Minnesota in 1974, the M.S. in physics in 1978, and the Ph.D. in chemistry in 1979, both from Stanford University. Dr. Schlotter is a member of the American Physical Society, the American Association for the Advancement of Science, and Sigma Xi.

Hermann Schmutz

IBM Germany, Heidelberg Scientific Center

Dr. Schmutz has been manager of the large systems research group at the Heidelberg Scientific Center since 1979. He joined IBM in the System Development Laboratories at Böblingen, Germany, in 1964 and contributed to the first PL/I compilers developed between 1964 and 1968 at the Böblingen and Hursley Laboratories. After four years of advanced development in the areas of conversational compilers, data base systems, and operating systems, he joined the staff of the European System Research Institute at Geneva, Switzerland, to teach courses on data structures, compiler design, and process structures. In 1974 he joined the Heidelberg Scientific Center, where he initially contributed to the design and development of an interactive data base system integrated into APL. His current interest is in research in operating systems for large computer installations with a central data base. Dr. Schmutz received his Master's degree and Ph.D. in theoretical physics at the Technical University of Munich in 1964. He received an IBM Outstanding Contribution Award for design features of the DOS/TOS PL/I compiler. He is a member of the Association for Computing Machinery and the German Gesellschaft fuer Informatik.

Glenn T. Sincerbox

Research Division, San Jose, California

Mr. Sincerbox first joined the advanced technology group at IBM's Systems Development Division in Poughkeepsie, New York, in 1962, working there until joining the Research Division in San Jose in 1972. He is currently manager of the holographic optics group in San Jose. His early work resulted in the first demonstration of optical storage techniques using interferometric recording of multiple standing waves, a precursor to white-light holography. Further work in optical storage continued with the development of a read-only holographic block-transfer optical memory, work on a postal storage system based on ablative recording, and a high-density read-write magneto-optic storage disk. In the area of displays, his efforts have included the development of a real-time holographic head-up display for carrier-based aircraft operations, implementation of a thermally addressed liquid-crystal display using GaAs lasers, and the invention and demonstration of a photo-induced electrochromic effect for display applications. He subsequently worked on high-quality, high-numerical-aperture holographic optical elements, and performed basic studies on recording materials and techniques. More recently, Mr. Sincerbox was involved in the optical design and development of a holographic supermarket scanner. He received IBM's Outstanding Innovation Award for this work in 1981. His current research is centered on the use of holography for light deflection and scanning applications, with additional interests in phase conjugation and surface plasmons. Mr. Sincerbox received the B.S. degree in physics from Rensselaer Polytechnic Institute in 1959, and the M.S. in physics from the University of Illinois, Urbana-Champaign, in 1960. He has partially completed work toward the Ph.D. from the University of Illinois. Mr. Sincerbox is a member of the Optical Society of America, and is very active in the Conferences on Lasers and Electro-Optics (CLEO conferences).

Jerome D. Swalen

Research Division, San Jose, California

Dr. Swalen, manager of the excitations in organic solids project, has been with the IBM Research laboratory in San Jose since 1962, where he has held several managerial positions. During his nineteen years with IBM, Dr. Swalen has made contributions in a variety of research areas, some of which are microwave spectroscopy of

molecules with internal rotation, electron paramagnetic resonance of transition metal complexes, computer analysis of nuclear magnetic resonance spectra of organic molecules, and laser spectroscopy of gases and thin films by guided and surface waves. During a sabbatical year (1972 to 1973) he was a visiting professor at the Physical Chemistry Institute at the University of Zurich, Switzerland, where he lectured on laser spectroscopy. Dr. Swalen's current interests center around the use of optical techniques to study molecular interactions at surfaces which are related to structure, orientation, and reactivity. He received the B.S. in physics in 1950 from the University of Minnesota, and the M.A. (physics) and Ph.D. (chemical physics) from Harvard University in 1954 and 1956. From 1975 to 1981 he served as secretary-treasurer of the Division of Chemical Physics of the American Physical Society, of which he is a Fellow. He chaired the Western Spectroscopy Association in 1960. In addition, Dr. Swalen is a Fellow of the American Association for the Advancement of Science and a member of the American Chemical Society.

Andrew C. Tam

Research Division, San Jose, California

Dr. Tam received the Ph.D. degree in physics from Columbia University, New York, in 1975, and stayed at Columbia until 1977 as an assistant professor, working on laser optical pumping and photochemistry. From 1978 to 1979, he was a member of the technical staff of Bell Laboratories, Murray Hill, New Jersey, working in the fields of laser photoacoustics and laser-induced plasmas. Since 1979, he has been a staff member of the Research laboratory in San Jose, where he is working in applied photoconductivity, photoacoustics and shock waves, and laser applications.

Robert von Gutfeld

Research Division, Yorktown Heights, New York

In 1960, Dr. von Gutfeld joined the IBM Watson Laboratory in New York City to work on microwave superconductivity. Soon afterwards, he transferred to the newly opened Thomas J. Watson Research Center in Yorktown Heights. He received the B.S. in physics from Queens College, Flushing, in 1954, the M.S. in physics from Columbia University in 1957, and the Ph.D. in physics from New York University in 1965. While at IBM, he has followed many avenues of study. His work on heat pulses in solids at low temperature led to an IBM Outstanding Contribution Award in 1967. Other areas of interest have included the study of thermal relaxations in thin films, the interaction of lasers with thin films, optical memory schemes, thermoelastic wave generation using lasers, and currently, laser-enhanced plating and etching. Dr. von Gutfeld has received two other Outstanding Contribution Awards, one in 1978 for work on the nitrogen dye laser, and the other in 1980 for his contributions to the laser personalization of circuits in silicon. In 1976, he received an IBM Outstanding Patent Achievement Award for his work on thermoelectric transverse voltages in thin films. He is a Fellow of the American Physical Society and a member of the American Society for Nondestructive Testing.

Urs P. Wild

Federal Institute of Technology, Zurich, Switzerland

Dr. Wild is a professor of physical chemistry at the Physical Chemistry Laboratory at the Federal Institute of Technology (ETH). From July 1980 to October 1980 he spent a sabbatical leave at the IBM Research laboratory in San Jose, California. His education includes an M.S. in chemistry from the Federal Institute of Technology, Zurich, in 1960, an M.S. in physics from the University of Kansas in 1962, and a Ph.D. in physical chemistry from the Federal Institute of Technology, Zurich, in 1965. Dr. Wild's primary research interests lie in the field of photophysical chemistry and luminescence spectroscopy.

C. Grant Willson

Research Division, San Jose, California

Dr. Willson received the B.S. degree in chemistry from the University of California at Berkeley in 1962, the M.S. in organic chemistry from California State University at San Diego in 1969, and the Ph.D. in organic chemistry from the University of California at Berkeley in 1973. He was a member of the faculty at Revell College, California State University at San Diego, from 1973 until he joined the IBM Research Division laboratory in San Jose in 1977. He has worked on various aspects of radiation-sensitive materials as applied to resist development, and on the synthesis of novel monomeric and polymeric materials. Dr. Willson is a member of the American Chemical Society and Sigma Xi.

Albert D. Wolfheimer

Communication Products Division, Research Triangle Park, North Carolina

Mr. Wolfheimer joined IBM in 1947 as a field service customer engineer in a Philadelphia branch office. In 1954, he worked for one year on the design and installation of toll-recording equipment. In 1956, he joined a development engineering group at Endicott, New York, to work on the automatic production recorder and other data collection equipment. From 1963 to 1965, he was involved in the electrical design of the IBM Blood Cell Separator. He has worked on a number of products and projects, such as development of environmental standards for IBM equipment, keyboard development, and the design of an on-line test inspection station for automotive defects. In 1974, he became involved in the design of laser-related optical systems for the supermarket scanner; this work led to an IBM Outstanding Innovation Award in 1981. He is currently an advisory engineer in the scanner development group at Raleigh. His professional interests also include 35-mm motion

picture production and high-quality audio production. Mr. Wolfheimer is a member of the Society of Motion Picture and Television Engineers.

Herbert Wolfrum

University of Regensburg, Federal Republic of Germany

Dr. Wolfrum, who joined the IBM Research laboratory in San Jose, California, as a postdoctoral fellow in the Organic Solids Department in 1980, is now in the Physics Department of the University of Regensburg. He is working in the field of laser spectroscopy of solids. He received his Diploma in 1975 and his Ph.D. in 1979 in physics from the University of Regensburg. Dr. Wolfrum is a member of the German Physical Society.

Andrew C. Yen

General Technology Division, East Fishkill, New York

Dr. Yen joined IBM in 1978 at East Fishkill with the technology analysis area of the General Technology Division. He received the B.S. and M.S. degrees in physics in 1962 and 1965, and the Ph.D. in physical metallurgy in 1973 from the University of Illinois, Urbana. Before joining IBM, he worked as a postdoctoral research associate in the Electrical Engineering Department at the University of Illinois, Urbana, and as a postdoctoral fellow in the Department of Materials Science and Metallurgy, University of Pennsylvania, Philadelphia. Currently he is engaged in the analysis of various dopant distributions in silicon by use of secondary ion mass spectroscopy (SIMS). Dr. Yen is a member of the American Vacuum Society, the Microbeam Analysis Society, and Sigma Pi Sigma.