

Authors

Raul E. Acosta

Research Division, Yorktown Heights, New York

Dr. Acosta is manager of thin film processing 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 the 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.

John A. Asselta

General Technology Division, Endicott, New York

Mr. Asselta is a development engineer in the processor technology design area at the General Technology Division development laboratory in Endicott. He graduated from Rochester Institute of Technology, New York, in 1957 with a B.S. in mechanical engineering. Mr. Asselta joined IBM in 1957 in the Systems Manufacturing Division at Endicott as a design engineer in the automation engineering area, where he designed equipment which was utilized in the manufacture of standard modular systems, solid logic technology, and monolithic system technology printed-circuit cards and boards. In 1973 he transferred to the Endicott development laboratory, where he has responsibility for the 3081 printed-circuit board design.

Robert Babuka

General Technology Division, Endicott, New York

Mr. Babuka is an advisory engineer who has been working in connector development for the past six years. His current work is in future systems connector development. Mr. Babuka joined IBM in 1955 in Endicott as an apprentice tool maker after graduating from Broome Community College, Binghamton, New York, where he majored in mechanical engineering. He has been awarded an IBM Outstanding Contribution Award for his work on solid logic technology development. Mr. Babuka has achieved the First Level Invention Award.

Christopher H. Bajorek

Research Division, San Jose, California

Dr. Bajorek received his B.S., M.S., and Ph.D. in electrical engineering from the California Institute of Technology, Pasadena, in 1967, 1968, and 1971. Since August 1981 he has been employed at the San Jose Research laboratory, where he manages the Storage Systems and Technology Department. The department is responsible for research in magnetic recording and bubble systems, devices and materials. Between 1971 and 1981 he was assigned to the

Thomas J. Watson Research Center, Yorktown Heights, New York, where he pursued research in the field of magnetic recording and bubble devices, thin film materials, and semiconductor packaging. From 1960 to 1967 he worked for Dtex Corporation, Monrovia, California, as an associate engineer responsible for design of digital encoders, on a full-time, part-time, and summer basis while attending Pasadena City College and the California Institute of Technology. During the summers of 1969 and 1970 he worked as an engineer at the MIT Lincoln Laboratory and the Caltech Jet Propulsion Laboratory, respectively. Dr. Bajorek is a member of the Institute of Electrical and Electronics Engineers.

Diana J. Bendz

General Technology Division, Endicott, New York

Mrs. Bendz received her B.S. in polymer chemistry concurrently with a B.S. in forestry from the State University of New York and Syracuse University in 1968. She is currently a development engineer and manager of the substrate metallization photolithography and test manufacturing engineering groups at the General Technology Division laboratory in Endicott. She joined IBM in 1968 and worked on the development of electronic packages for high performance applications. She has held successive positions as package reliability manager and substrate product engineering, module technology, thermal engineering and electrical engineering project manager, responsible for the design and qualification of new electronic package designs and applications. Mrs. Bendz is a member of the American Chemical Society and the Institute of Electrical and Electronics Engineers and currently serves as the 1982 program chairman of the Electronic Components Conference.

Roy F. Bonner

Data Systems Division, Poughkeepsie, New York

Mr. Bonner is manager of engineering operations, which is responsible for the design and release to manufacturing of power, thermal, and mechanical assemblies and subproducts required by the Data Systems Division processors developed in Poughkeepsie. His group also provides support as required in the areas of design services, circuit applications, and laboratory operations for acoustics, materials, device and electrical, thermal and reliability analysis and advanced packaging. As part of this responsibility, engineering operations provides a focus for technology planning which includes strategic direction, release and engineering change projections, and tracking of product performance in manufacturing and in the field. Mr. Bonner has been product manager for the IBM 129, IBM 3890, IBM 3838, and circuit packaging since joining IBM in 1951 in the IBM Brooklyn, New York, branch office. He attended St. Francis College, Brooklyn, in 1951 as a chemistry major and, later, Northeastern University Graduate School of Business, Boston, Massachusetts, in 1976. Mr. Bonner has received an IBM Outstanding Contribution Award and two Divisional Awards.

James R. Bupp

General Technology Division, Endicott, New York

Dr. Bupp is a senior engineer/manager in materials processes at Endicott. He joined IBM in Endicott as a staff engineer in 1968 and worked on a number of technical projects in the area of second-level packaging process development. In 1974, Dr. Bupp was promoted to department manager of the 3081 board circuitization process development. Dr. Bupp holds a B.A. from Manchester College, North

Manchester, Indiana, and a Ph.D. in physics from the Ohio State University. He received an IBM Divisional Award in 1980 for his efforts on the 3081 board and an IBM Outstanding Innovation Award in 1981 for his contribution to board reliability improvements and production scale-up.

Dudley A. Chance

Research Division, Yorktown Heights, New York

Dr. Chance currently manages a group in exploratory packaging materials and processes specializing in high performance computing systems. He received his B.S., M.S., and Ph.D. degrees in engineering science from the University of California, Los Angeles, in 1959, 1960, and 1963. He was research assistant from 1959 to 1962 and Ramo Foundation Fellow 1962-63, working in the area of photo-effects at solid electrolyte interfaces. In 1963 he joined IBM's Components Division at Poughkeepsie, New York, and was engaged in GaAs tunnel diode development. Subsequently he had various assignments on joining technology for silicon devices, on the development of multilayer ceramic and glass for component packaging, and on gas laser devices. Dr. Chance is a member of the American Ceramic Society, the International Society for Hybrid Microelectronics, and Sigma Xi.

Leroy N. Chellis

General Technology Division, Endicott, New York

Mr. Chellis is a senior engineer in packaging materials engineering. He joined IBM in 1952 in Endicott, and was a materials and applications engineer in the polymers engineering laboratory from 1952 to 1953, manager of the Advanced Materials and Processes Department in the manufacturing research laboratory from 1966 to 1969, and senior engineer in lamination materials and processes in the Endicott development laboratory from 1970 to the present. Prior to joining IBM, Mr. Chellis was a development engineer in the Corolite Reinforced Plastics Division of the Columbian Rope Company, Auburn, New York, and a research engineer in polyester-glass moldings at the Auburn Plastics Company, Auburn, New York. He received his B.S. in chemical engineering from Clarkson College of Technology, Potsdam, New York, in 1940. Mr. Chellis is a member of the Society of Plastics Engineers and received the IBM First Level Invention Award in 1977.

Evan E. Davidson

General Technology Division, East Fishkill, New York

Mr. Davidson is currently manager of a group that engages in the electrical design of high performance computer packages. He joined IBM in 1968 in Poughkeepsie, New York, as a circuit designer for semiconductor memories. In 1970, he transferred to the East Fishkill location to work on the design of integrated logic circuits. Prior to joining IBM, Mr. Davidson worked for the Bell Telephone Laboratories in Naperville, Illinois, as a memory circuit designer. He received a B.S. from Rensselaer Polytechnic Institute, Troy, New York, in 1962 and an M.S. from New York University in 1964, both in electrical engineering. Mr. Davidson's professional society memberships are in Tau Beta Pi and Eta Kappa Nu.

Leonard J. Fried

General Technology Division, East Fishkill, New York

Mr. Fried is manager of semiconductor manufacturing engineering, where he is responsible for the manufacturing engineering of bipolar semiconductor devices. He joined IBM in 1964 and since then has been responsible for failure analysis of semiconductors, semiconductor process development, personalization lithography for advanced LSI devices, and semiconductor manufacturing engineering. Mr. Fried received his B.S. in chemical engineering from City College of New York in 1964 and his M.S. in metallurgy from New York University in 1969.

Ronald W. Gedney

General Technology Division, Endicott, New York

Mr. Gedney is currently assigned to the General Technology Division laboratory in Endicott, New York, but is on international assignment in Havant, England. He had been manager of packaging development in the Essex Junction, Vermont, laboratory in support of all packaged products. He joined IBM in 1957 at the Data Systems Division Poughkeepsie, New York, laboratory, working on ferrite core evaluation. Subsequently, he has held various positions in component development, reliability, and packaging and on Components and System Products Divisions staffs. Prior to assuming his present position, he was program manager for the metallized ceramic program from 1974 to 1979. Mr. Gedney received his B.S. from Tufts University, Medford, Massachusetts, in 1957. Mr. Gedney is a senior member of the Institute of Electrical and Electronics Engineers and chairman of the Components, Hybrids, and Manufacturing Technology subcommittee on packaging.

James R. Getten

General Technology Division, Endicott, New York

Mr. Getten has been the development engineer (project manager) responsible for all metallized ceramic substrate and metallized ceramic polymer substrate process development since 1979. He joined IBM in 1968 at Endicott. Previous assignments at Endicott have included management of process development for the 3081 board, 1977-1979, the printed circuit board, 1971-1977, and work in second-level packaging development, 1968-1970. Prior to joining IBM, Mr. Getten was employed as a metallurgical engineer at Kaiser Aluminum and Chemical Corporation, Union Carbide Corporation, and TRW, Inc. Mr. Getten is a 1957 graduate (bachelor of metallurgical engineering) of Rensselaer Polytechnic Institute; he received an M.S. in metallurgy in 1969 from Case Western Reserve University and in management science in 1972 from the State University of New York at Binghamton. Mr. Getten is a member of the American Society for Metals.

Frank W. Haining

General Technology Division, Endicott, New York

Mr. Haining is a senior engineer in the Processor Mechanical Design Department at the development laboratory in Endicott. He graduated from the University of Southern Mississippi, Hattiesburg, in 1956 with a B.A. in chemistry and mathematics. He attended the University of Chicago and the State University of New York at Binghamton. He joined IBM in 1961 at the Supplies Division engineering laboratory in Vestal, New York, as a photochemist in the aperture card program. In 1967, he transferred to the Endicott manufacturing research laboratory, where he developed

many of the processes used in fabricating the multilayer printed circuits in the IBM 4300 and 3081 processors. Mr. Haining has been active in the American Chemical Society, the National Microfilm Association, and the Society of Photographic Scientists and Engineers.

Janos Havas

General Technology Division, East Fishkill, New York

Mr. Havas is manager of lithography process engineering working on metal-insulator structure of semiconductor devices. He joined IBM in East Fishkill in 1968. Previous assignments have been in the fields of e-beam lithography process and engineering development on thin film and lithography processes for advanced products. Prior to joining IBM, Mr. Havas worked for the NCR Company and General Instruments Corporation, both in semiconductor device development.

William R. Heller

Data Systems Division, Poughkeepsie, New York

Dr. Heller is currently a senior physicist in the electronic design automation group at the Poughkeepsie laboratory, working on design algorithms and analysis of large computer systems. He has been in his present position since 1979. Before joining IBM, he received his B.S. in applied mathematics from Brown University in 1945 and, after military service in 1946 and 1947, he received his Ph.D. in theoretical solid-state physics as an AEC predoctoral fellow at Washington University, St. Louis, Missouri. After postdoctoral work at the University of Illinois and a year as assistant professor at Yale University, he worked at Shell Development Corporation, Emeryville, California, involved in studies of materials science from 1953 to 1959. Joining IBM at the Thomas J. Watson Research Center, Yorktown Heights, New York, in 1959, he continued to work in materials science until 1964, when he became manager of physics in San Jose Research. In 1967 he joined the technical staff of the director at San Jose, and in 1969 came to the Components Division, East Fishkill, New York, to manage a group in engineering analysis and design techniques development. In 1978, Dr. Heller was on leave as Visiting Professor of Computer Science at the California Institute of Technology, as IBM's representative to the Silicon Structures Project developing VLSI design techniques. Dr. Heller is a Fellow of the American Physical Society, and a member of the Computer Society, the Institute of Electrical and Electronics Engineers, and the New York Academy of Sciences.

Chung W. Ho

Research Division, Yorktown Heights, New York

Dr. Ho joined the IBM Research Division in 1967 after teaching at the University of California, Berkeley, for one year. He worked on projects including high-speed circuit design, computer-aided analysis and design algorithms and programs, microprocessors, and programmable logic arrays. Since 1975 he has been working on LSI packaging research, where he is currently manager of semiconductor packaging technology. Dr. Ho received his B.S. in electrical engineering from the National Taiwan University in 1961 and his M.S. and Ph.D. in electrical engineering from the University of California, Berkeley, in 1963 and 1966. He has received IBM's Outstanding Contribution Award in 1975 for his work on computer-aided circuit design and IBM's Invention Awards for his work in semiconductor packaging. Dr. Ho is a member of the Institute of Electrical and Electronics Engineers.

Robert T. Howard

General Technology Division, Essex Junction, Vermont

Dr. Howard is an advisory engineer specializing in materials science. He is currently working on controlled collapse chip connection reliability. Dr. Howard joined IBM in 1968 in Huntsville, Alabama, and transferred to Essex Junction in 1975. His previous work assignments as an advisory engineer have been in solder technology and surface characterization for soldering, adhesive bonding studies of instrument unit structure, development of a hybrid microelectronics facility, and cost reduction studies for the Patriot missile system. Prior to joining IBM he worked for several companies in the area of metallurgy and taught at the University of Missouri at Kansas City, at Wichita State University, and at the University of Kansas at Lawrence. Dr. Howard received his S.B. in 1942 and his Sc.D. in 1947, both in metallurgy, from the Massachusetts Institute of Technology. Dr. Howard is a member of the American Society for Metals, the American Welding Society, the International Society for Hybrid Microelectronics, the American Society for Engineering Education, and the American Society of University Professors. He is a registered professional engineer in Missouri and a licensed professional engineer in Kansas.

J. Henry Koch III

General Technology Division, East Fishkill, New York

Mr. Koch received a B.S. in mathematics from the University of North Carolina in 1968. He joined IBM in that year and shortly thereafter took military leave as a programmer in the U.S. Army. Since 1970, when he returned to IBM, he has worked on wiring algorithms for higher-level electronic packages for computer components. Mr. Koch is currently designing an interactive physical design system for all levels of packaging with emphasis on the data base aspects. In 1974 he received an IBM Outstanding Contribution Award for a program to wire modules. In 1979 Mr. Koch received an IBM Divisional Award for designing a system to wire cards and boards.

John S. Lechaton

General Technology Division, East Fishkill, New York

Dr. Lechaton is an advisory engineer in the advanced materials and technology laboratory in East Fishkill. Presently he is working on reactive sputter etching for VLSI applications. He joined the IBM Components Division in East Fishkill in 1968, working on sputter etching and sputter deposition of insulators. Prior to joining IBM, he worked on electron spin resonance in photo-sensitive material at Fairchild Camera, Long Island, New York. He received a B.S. in physics in 1959 from the University of Scranton, Pennsylvania, and an M.S. and a Ph.D. in 1967 in physics from Fordham University in New York. Dr. Lechaton is a member of the American Physical Society and the Electrochemical Society.

Joseph Skinner Logan

General Technology Division, East Fishkill, New York

Dr. Logan is manager of insulators and metals technology, currently responsible for multilevel interconnection technology for LSI chips. He joined IBM in 1960 in Poughkeepsie, New York. Prior to his present assignment, he worked in tunnel diode development, surface physics, rf sputtering of insulators, and reactive ion etching process development. Dr. Logan received his B.S. in 1955 from Cornell

University, Ithaca, New York, his M.S. in 1956 from Cornell University, and his Ph.D. in 1961 from Stanford University, California, all in electrical engineering. Dr. Logan is a member of the American Vacuum Society, the Electrochemical Society, the Institute of Electrical and Electronics Engineers, Sigma Xi, and Tau Beta Pi.

Wadie F. Mikhail

Data Systems Division, East Fishkill, New York

Dr. Mikhail received his B.Sc. (first class honors) in mathematics from Cairo University, Egypt, in 1949, and his Ph.D. in statistics from the University of North Carolina in 1961. In 1960 he joined IBM, working on reliability and statistical analysis in the Poughkeepsie laboratory. He developed models to evaluate the reliability and maintenance for the first semiconductor memories employing error correction used in IBM. In addition to his work on reliability, he has worked on models for yield analysis, circuit and product delay, engineering changes, and physical design. Currently he is working in the area of physical design in the field of design automation. Dr. Mikhail was promoted to senior statistician in 1969. He received an IBM Outstanding Contribution Award for his work on wireability and holds a First Level Invention Achievement Award. He participated in the IBM Faculty Loan Program in the academic year 1977-1978, teaching at both Spelman College and Morehouse College in Atlanta, Georgia. Dr. Mikhail is a member of the American Statistical Association.

Gabor Paal

General Technology Division, East Fishkill, New York

Dr. Paal is manager of personalization lithography specializing in organic and polymer chemistry and photo, e-beam, x-ray, and ion-beam resistors. He joined IBM in 1973 at the IBM Germany, Boeblingen, laboratory, where he worked on lithography process development until 1975, when he transferred to the East Fishkill facility to work on e-beam process development. Prior to joining IBM, he worked for AEG-Telefunken in Ulm, Federal Republic of Germany, on development of optical information recording/storage media e-beam resist development. Dr. Paal received his Ph.D. in polymer chemistry in 1973 from the University of Stuttgart, Federal Republic of Germany.

John Rasile

General Technology Division, Endicott, New York

Mr. Rasile is a development engineer and manager of the advanced packaging process/equipment engineering group in Endicott, which is responsible for the equipment and processes for the 3081 board expansion program. He joined IBM in 1962 at the Thomas J. Watson Research Center, Yorktown Heights, New York, and in 1969 moved to the East Fishkill facility laboratory, where he worked in glass/metal module development. From 1974 to 1980, Mr. Rasile was the manager of the metallized ceramic/cermet/polyimide development laboratory. His major area of interest has been photo-etch processes. He received an equivalent B.S. in advanced electronics from RCA Institute, New York, New York, in 1962 and a B.S. in solid state physics from the City University of New York in 1967. Mr. Rasile is a recipient of IBM's Third Level Invention Award.

Robert E. Ruane

General Technology Division, Endicott, New York

Mr. Ruane is a senior engineer in test development engineering in Endicott. He joined IBM in Endicott in 1964 and has held a variety of technical positions in the photoprocess development and engineering function. Mr. Ruane holds a B.S. in physics from the University of Scranton, Pennsylvania, and an M.S. in applied mathematics from the State University of New York at Binghamton. He received IBM Outstanding Contribution Awards in 1969 and 1974 for his efforts in the photoprocess and additive plating areas. In 1979, Mr. Ruane received an IBM Outstanding Innovation Award for his work on the 3081 board sequential construction.

George J. Saxenmeyer, Jr.

General Technology Division, Endicott, New York

Mr. Saxenmeyer is currently an advisory engineer in interconnection and packaging technology at the Endicott laboratory concerned with cable reliability enhancements. He received an A.B. degree in chemistry from the University of Rochester in 1963. While under consulting contract with IBM, he initiated an investigation into the use of palladium as an alternative to gold as a material for highly reliable electrical connectors. Since joining IBM in 1966, he has provided technical direction for a number of development projects concerned with electrical connectors, cables, and printed circuits. Mr. Saxenmeyer is a member of the Society of the Sigma Xi and a recipient of the IBM Invention Achievement and Outstanding Innovation Awards.

Lewis K. Schultz

General Technology Division, Endicott, New York

Mr. Schultz is project manager of the 3081 board yield and defect management. He joined IBM in 1961 in Poughkeepsie, New York. While at IBM he has worked on thin magnetic film memory development, semiconductor device development, and packaging process development, and has managed current packaging products and connector development projects. He received his B.A. in physics in 1968 from Marist College, Poughkeepsie, New York. Mr. Schultz has received his Second Level Invention Achievement Award.

Richard C. Senger

General Technology Division, Endicott, New York

Mr. Senger is a development engineer/manager responsible for board assembly solder process development. He joined IBM in 1966 at Endicott in the Manufacturing Research Laboratory (MRL). Since joining IBM, he has held engineering positions in MRL (1966-1969), test engineering (1969-1970), and packaging development engineering (1970-1976). He has held management positions in reliability engineering (1976-1980), packaging development engineering (1980-1981), and is presently assigned to the manufacturing engineering organization. Mr. Senger graduated in 1963 from Gannon College, Erie, Pennsylvania, with a B.S. in electrical engineering, and has pursued graduate work at Syracuse University. Mr. Senger has received the First Level Invention Achievement Award from IBM and an Outstanding Innovation Award for the development of the immersion wave soldering process.

Paul A. Totta

General Technology Division, East Fishkill, New York

Mr. Totta is senior technical staff member and project manager responsible for base technology work on device interconnection metals and insulators for advanced products. He joined IBM in 1959 in Poughkeepsie, New York, to work on wire wrap, welded electrical connectors, and computer hardware problems. In 1961 he began working on SLT device metallurgy problems and has continued to work on device and package metal and insulator technology since then. His previous employment was with General Electric Company working on the development of ferrous magnetic materials and with Handy and Harman working on applied research on precious metals and brazing alloys. In 1952 he received a B.S. in metallurgical engineering from Rensselaer Polytechnic Institute, Troy, New York. Mr. Totta is a member of the American Society for Metals, the American Vacuum Society, and the International Society for Hybrid Microelectronics.

Walter V. Vilkelis

Data Systems Division, Poughkeepsie, New York

Mr. Vilkelis is a senior engineer in the Department of Technology and Design Tools Engineering at Poughkeepsie. In 1952 he joined

the IBM Customer Engineering Division in Manhattan, and four years later received his B.A. in physics from Rutgers University, New Brunswick, New Jersey. Mr. Vilkelis is currently working on systems packaging. Over the past thirty years, he has been active in various aspects of engineering design for the Stretch system, high-speed packaging, FET devices and circuits, and logic structure and high-speed packaging for a scientific computer. He has also worked on computer-related implementations of cryogenics and ultrasonics.

John P. Wiley

General Technology Division, Endicott, New York

Mr. Wiley is an advisory engineer in manufacturing engineering at Endicott. He joined IBM in the Kingston, New York, Military Products Division in 1956 and has worked in the San Jose, California, systems engineering area and in the Endicott manufacturing research laboratory, as well as at the Glendale development laboratory. Mr. Wiley's education includes an Sc.B. in engineering from Brown University and graduate work at Syracuse University. Mr. Wiley received an IBM Outstanding Invention Award in 1974 for work in artwork generation and an IBM Outstanding Contribution Award in 1979 for circuit board dimensional control.