

Authors

Herbert R. Anderson, Jr.

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Dr. Anderson is the Manager of a Materials Science group at San Jose. He received a B.S. in Chemistry from the University of New Hampshire in 1948 and the Ph.D. in Chemistry from Cornell University in 1952. He was associated with the Manhattan Project from 1944 to 1946 and the General Electric Company, 1952 to 1953. He was a post-doctoral fellow with Professor P. Debye at Cornell University during the academic year 1953 to 1954 and then worked with the Phillips Petroleum Company, 1954 to 1961. Dr. Anderson joined IBM Research in 1961 and transferred to the Systems Development Division Laboratory in Boulder, Colorado, where he managed materials activities until 1970. He is a member of Phi Kappa Phi, Sigma Xi and the American Chemical Society.

Edward A. Bartkus

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Dr. Bartkus manages the Advanced Materials Technology Department at the Boulder laboratory, where he is responsible for introducing new materials and processes into the product line. He received his B.S. in Chemistry from the University of Rochester in 1955; an M.S. in Chemistry from the Carnegie Institute of Technology in 1958; and the Ph.D. in Chemistry from Carnegie Institute of Technology in 1959. He was a Staff Chemist at the American Cyanamid Company, Central Research Laboratory from 1959 to 1962 and joined IBM at the T. J. Watson Research Center in 1962. Subsequently, he was with the Systems Manufacturing Division in Poughkeepsie and transferred to the Advanced Technology Department at Boulder in 1965.

Raymond G. Bayer

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Mr. Bayer is manager of the Materials Application Department at the SDD Development Laboratory at Endicott. He joined IBM in 1958. His education includes a B.S. in Physics from St. Johns University, New York in 1956 and an M.S. in Applied Mathematics from Brown University in 1959. Since he has been with IBM, he has been engaged primarily in friction and wear studies and has co-authored a book on wear design.

H. D. Conway

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Dr. Conway is a Professor in the Department of Theoretical and Applied Mechanics at Cornell University. He has been a consultant to the Systems Development Division, IBM, Endicott, since 1962. His education includes a B.Sc. in 1942, a Ph.D. in 1945 and a D.Sc. in 1949, all from London University. He also received an M.A. from Cambridge University in 1946. He was a Scientific Officer, National Physical Laboratory, England from 1942 to 1945 and University Demonstrator in Engineering, Cambridge University from 1946 to 1947. He has been a Professor at Cornell University since 1947. Professor Conway was a Guggenheim Fellow and Visiting Professor at Imperial College, London University from 1953 to 1954 and Julius F. Stone Foundation Senior Postdoctoral Fellow and Visiting Professor at Imperial College from 1962 to 1963.

Keith A. Duke

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Mr. Duke is an Advisory Engineer in the Future Systems Architecture group at the Systems Development Division Laboratory in Poughkeepsie. He has been with IBM since 1960. His education includes a B.Sc. (General) in 1951 and a B.Sc. (Special) in Physics in 1952, both from the University of London. He joined the staff of the British Tabulating Machine Company (now ICL) in 1954 and spent six years at their Electronics Research Laboratory working on various aspects of computing system design. He joined IBM in Hursley, England where he was involved in the development of System/360. He transferred to Research Division in 1964, where he worked on design automation and reliability techniques and he moved to the Poughkeepsie laboratory in 1969.

Peter A. Engel

Systems Development Division, Endicott, New York

Dr. Engel is a Staff Engineer in the Mathematical Sciences Technology Department at the Laboratory in Endicott. He joined IBM in 1968 after receiving his Ph.D. degree in Theoretical and Applied Mechanics from Cornell University. His higher education was started at the Budapest Technical University, and after coming to the United States he received a B.E. degree from Vanderbilt University in 1958 and an M.S. degree from Lehigh University in 1960, both in Civil Engineering. He worked as a structural analyst with Praeger-Kavanagh-Waterbury consulting engineers in New York City between 1959 and 1962. From 1962 to 1965, he worked as a structures research engineer at the Saturn Division of the Boeing Company in New Orleans, Louisiana. Dr. Engel is a member of the American Society of Civil Engineers.

Albert Ferris-Prabhu

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Dr. Ferris-Prabhu is an Advisory Physicist in a reliability development group in Large Capacity Memory Development in the laboratory at Burlington. He joined IBM in 1968. He received a B.M.E. from the University of Dayton in 1957 and an M.S.E. from Princeton University in 1960, both in Engineering. He received his Ph.D. in Solid State Physics from the Catholic University of America in 1963. He was a post-doctoral research associate at M.I.T. from 1963 to 1964, was on the staff of the Goddard Space Flight Center from 1964 to 1966 and was Assistant Professor of applied science at the George Washington University from 1966 to 1968. Dr. Ferris-Prabhu is a member of Tau Beta Pi, Sigma Xi, the American Physical Society and the New York Academy of Sciences.

Roy L. Hoffman

General Systems Division, Rochester, Minnesota

Dr. Hoffman has been working on problems related to pattern recognition at the laboratory in Rochester since 1967. He joined IBM at Rochester in 1962, initially to work on machine acoustics. He took an educational leave of absence from 1964 to 1967. His degrees are all in Electrical Engineering—the B.S. and M.S. in 1959 and 1962, respectively, from the South Dakota School of Mines and Technology, and the Ph.D. in 1967 from the University of Denver. Dr. Hoffman is a member of the IEEE, Eta Kappa Nu and Sigma Xi.

J. Kent Howard

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Mr. Howard is a Staff Engineer in the Physics, Chemical and Metallurgy Technology group at the Laboratory in East Fishkill. He has been with IBM since 1965. His education includes a B.S. in Physics and Mathematics from North Texas State University; he is currently completing an M.S. in Operations Research at Union College. He was a member of the technical staff in the materials research laboratory at Texas Instruments from 1960 to 1964. During that time, he was engaged in the characterization of heteroepitaxial systems, such as GaAsP and GaInAs. In 1964, he was a Research Associate in Physics and Instructor in mathematics at Georgia Institute of Technology. Much of his recent work has been in the fields of thin films and materials characterization with x-ray diffraction methods.

Alan L. Jones

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Dr. Jones is a Senior Engineer and manager of the Mathematical Sciences Department at the Laboratory in Endicott. He has been with IBM since 1963. His education includes a B.S. in Engineering Science from Pennsylvania State University in 1958, an M.S. in Engineering Mechanics from Pennsylvania State University in 1960, and a Ph.D. in Engineering Science from Purdue University in 1964. After joining IBM, he worked on the development of the IBM Blood Cell Separator. Dr. Jones is a member of the Society for Engineering Sciences and the Optical Society of America.

Madhukar L. Joshi

Components Division, Burlington, Vermont

Dr. Joshi is the manager of two groups at the Components Division Laboratory in Burlington, Vermont. One of the groups is concerned with electro-optics and metallurgy, and the other with materials chemistry and process analysis. He received the B.E. in Metallurgical Engineering in 1952 from Poona University, India; the B.E. in Electrical Engineering in 1955 from Gujarat University, India; and the D. Eng. in Metallurgy in 1964 from Yale University. He has worked as a junior officer at the Atomic Energy Establishment in Bombay, and he joined IBM at the Poughkeepsie Laboratory in 1963. Dr. Joshi's work, both in Poughkeepsie and, later, in the East Fishkill laboratory was mainly in the area of diffusion-induced defect structure in silicon. He transferred to his present location in 1968. He is a member of the American Institute of Metallurgical Engineers and Sigma Xi.

Andrew J. Lavin

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Dr. Lavin is a Senior Physicist in the Physical Technology Department at the Laboratory in Endicott. His technical interests include computer solutions to practical problems in physics and engineering and advances in coherent optics. Dr. Lavin joined IBM in 1958 as a physics and mathematics consultant with the Scientific Computation Center at Endicott. In 1961, he became a member of the technical staff of the Manager of Advanced Technology. From 1963 to 1968, he served as the manager of Mathematical Sciences Department. From 1968 to recently, he served as the manager of Advanced Technology. He is a member of Sigma Xi and the Optical Society of America and is a registered Professional Engineer.

James Makris

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Mr. Makris is a Staff Metallurgist in an Applied Technology group in the Laboratory at East Fishkill. He has been with IBM since 1962. He received a B.S. from Carnegie Institute of Technology, now Carnegie Mellon University, 1956; and an M.S. in 1967 from New York University. Prior to joining IBM, he worked at the Babcock and Wilcox Research Center from 1956 to 1959 and Westinghouse Atomic Power Division from 1960 to 1961.

J. Warren McCullough

General Systems Division, Rochester, Minnesota

Mr. McCullough has worked since 1966 on problems in optical character recognition and hybrid computation applications in a group at the laboratory in Rochester. He joined IBM in 1962 to work in medical electronics and in 1965 he transferred to a physiological monitoring project located at the Institute of Medical Sciences at the Presbyterian Hospital in San Francisco. He received the B.S. and M.S. degrees in Electrical Engineering in 1961 and 1962, respectively, from North Dakota State University, where his graduate study was supported by a National Science Foundation fellowship grant. Mr. McCullough is a member of the IEEE, Tau Beta Pi, Phi Kappa Phi and Eta Kappa Nu.

Joseph A. Pesch

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Mr. Pesch joined IBM in 1962 as a Physicist in the Development Laboratory at Rochester. His present field of interest is magnetic domain structure in soft magnetic alloys. He received a B.S., in Physics in 1952 at St. Norbert College, DePere, Wisconsin, and an M.S. in Physics in 1957 at the State University of Iowa. He was a Research Physicist for Allis-Chalmers Manufacturing Company from 1957 to 1962. He is a member of the American Physical Society.

Jacqueline A. Reynolds

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Dr. Reynolds is an Associate in the Department of Biochemistry and the Department of Anatomy at Duke University Medical Center. Her education includes a B.S. from Pacific University, 1951, and a Ph.D. in Physical Chemistry from the University of Washington in 1963. Prior to her present appointment she was Research Assistant Professor in the Department of Microbiology, Washington University School of Medicine, from 1966 to 1969, a post-doctoral fellow at Georgetown University from 1965 to 1966, and was employed at Thomas J. Watson Research Center, IBM, from 1963 to 1965. Dr. Reynolds is a member of the American Chemical Society, the Biophysical Society, the American Society of Biological Chemists, and Sigma Xi. She is co-author of the book, *Multiple Equilibria in Proteins*.

H. Daniel Schnurmann

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Mr. Schnurmann is a Staff Engineer in the Test Systems Development group at the Components Division Laboratory in East Fishkill. He received a B.S. in Electrical Engineering from MIT in 1961 and an M.E.E. in 1964 from the Poly-

technic Institute of Brooklyn. He worked at the Western Union Telegraph Company from 1961 to 1963, in the design of a system for error detection and correction. He joined IBM Components Division in 1963 to work in exploratory device technology and transferred to the Research Division in Yorktown Heights, New York, in 1965, where he was involved in the development of a computer controlled system to characterize integrated circuits, and in several studies related to highly reliable computers. He returned to the Components Division in 1970, where he is currently engaged in the simulation of logic networks for testing purposes. Mr. Schnurmann is a member of IEEE.

James L. Sirico

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Mr. Sirico is an Associate Engineer in a Materials Application group at the Endicott Laboratory where he is engaged in friction and wear studies. He has been associated with IBM since 1955. He graduated from the School of Aeronautics, New York City, in 1939 and attended the Army Ordnance School for Machine Technology, U. S. Army, Aberdeen, Maryland, 1943. Mr. Sirico is a designer, tool and diemaker, model maker and machinist. In 1963, he became a member of the Physical Technology group at Endicott and was engaged extensively in developing an analytical design handbook for wear.

Patrick J. Smith

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Dr. Smith received a B.S. in Physics from Holy Cross College, 1960, an M.S. in 1963 and a Ph.D. in 1966 in Engineering Mechanics from Pennsylvania State University. From 1966 to 1969 he was an assistant professor of metallurgy at Stevens Institute of Technology. Since joining IBM in 1969 he has been working on the effect of crystallographic defects on the electrical behavior of integrated circuit devices. He is a member of the Metallurgical Society of AIME, the Electron Microscopy Society of America and Sigma Xi.

Terry Ira Wilson

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Mr. Wilson is a Staff Programmer in the Systems Design group of the Airlines Industry Systems Department in the Data Processing Division in White Plains. He has been with IBM since 1964. His education includes a B.E.E. in 1960 and an M.S.(E.E.) in 1966, both from the Polytechnic Institute of Brooklyn, and post-graduate studies in the Operations Research-Computer Science areas at New York University. He worked at Grumman Aircraft Engineering Corporation from 1960 to 1962 and at Capehart (Clavier) Corporation, Richmond Hill, Queens, New York from 1962 to 1964. At Capehart Corporation, he specialized in the logical design and construction of special purpose real-time digital control systems. Mr. Wilson is a member of the ACM and the IEEE.