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A.B. in Physics, 1951, Syracuse University; Ph.D. in Physics, 1955, Cornell University. Joined IBM Research in 1955 to work on dielectric properties of ferroelectric materials. In addressing problems related to thin film electrodes for such materials, worked on ultra-high vacuum. Subsequently worked on photoelectric emission from nickel, photon sources and detectors, superconducting thin film cryotrons, and problems related to the use of thin films for silicon monolithic devices and integrated circuits. Currently is manager of a program concerned with current-induced mass transport in aluminum films and magnetic thin film memory structures. From 1964 to 1966, served as the first chairman of AVS Thin Film Division, Greater New York Chapter. Member, Executive Committee of the AVS Thin Film Division, IEEE, and American Physical Society.

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B.S., 1960, Queens College of the City of New York; B.S.M.E., 1960, Columbia University School of Engineering; M.S. in Mechanical Engineering, 1961, M.I.T. Employed by Bell Telephone Laboratories 1961-1966. Joined IBM Components Division in October, 1966. Currently involved in mechanical analysis and fatigue of first level circuit interconnection technologies. Member, Society for Experimental Stress Analysis, Tau Beta Pi and Phi Beta Kappa.

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B.S. in Mechanical Engineering, 1951, New York University; M.S. in Mechanical Engineering, 1953, Princeton University. Joined General Electric in Schenectady in 1952 to work in development engineering, specializing in applied mechanics. Joined IBM Research in Yorktown in 1959 as Manager of Applied Mechanics. Became Manager, Interconnection and Insulation Technology, Components Division, Poughkeepsie in 1965. Member, RESA, AAAS, ASME.

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B.S. in Chemistry, 1955, Brooklyn College; M.S. in Chemistry, 1962, Syracuse University and New York State College of Forestry. Joined IBM in 1955 in a research group in Poughkeepsie, developing materials for the manufacture of printed circuits. Other work included development of magnetic printing inks for character sensing. In 1961, received an IBM Graduate Scholarship. From 1963 to 1966 he worked on the materials and processes for semiconductor device modules, with particular emphasis on conductors, resistors, and device joining. Currently, he is a member of the Patent Engineering Department in the Components Division.

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B.S. in Engineering Science in 1959, Antioch College, Yellow Springs, Ohio; M.S. in Mechanical Engineering, 1960, Columbia University, New York, N. Y.; Research Fellow at Columbia University, 1961-1962; M.E. in Mechanical Engineering, 1963, Columbia University. Joined IBM Research in 1963 where he worked on fluid dynamics. Transferred in 1965 to Components Division to do thermal analysis. Is currently Manager of Department of Environmental Analysis. Member, ASME.

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B.A. in Mathematics, 1967, State University of New York at Binghamton. Joined IBM Systems Development Division at Endicott in 1962 with Product Engineering. Assigned to a group in IBM Components Division at Endicott during 1963 to work in the field of signal distribution. Is currently developing computer solutions to electromagnetic field problems. Member, ACM.

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B.S. in Metallurgy, 1949, Grove City College; M.S. in Metallurgical Engineering, 1956, Ohio State University. Worked in mechanical and physical metallurgy at Battelle Memorial Institute 1950-59 and General Dynamics Corp. 1959-62. Joined IBM Components Division at Poughkeepsie, New York in 1962 to work on development of device interconnection metallurgy associated with Solid Logic Technology. Is currently manager of Semiconductor Technology Development in Burlington. Received invention award for work on semiconductor device metallurgy in 1967. Member, RESA, and AIME.

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B. Met. E., 1952, Rensselaer Polytechnic Institute. Worked for the General Electric Co., 1954-58, on the development of silicon iron and grain oriented ferrous magnetic materials. Did applied research on precious metals and brazing alloys at Handy and Harmon, 1958-59. Joined IBM, 1959, in the Development Laboratory at Poughkeepsie and worked on wire wrap, welded electrical interconnections and computer hardware problems. Began working on SLT device metallurgy and interconnection problems in 1961. Currently manager of device metallurgy development for advanced products. Recipient of three IBM invention awards. Member Tau Beta Pi, Phi Lambda Upsilon, AVS, ASM, and RESA.

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