

Authors

George G. Adams

Northeastern University, Boston, Massachusetts

Dr. Adams is currently an Assistant Professor of Mechanical Engineering at Northeastern University. During his stay at the IBM Research laboratory in San Jose, California, from January 1978 to May 1979, he held a postdoctoral position in the mechanics and hydrodynamics group. His assignment was the mathematical modeling and computer simulation of flexible-disk to head interfaces. Prior to joining IBM he was an Assistant Professor in the Mechanical Engineering Department at Clarkson College of Technology, Potsdam, New York, where he taught graduate and undergraduate courses in applied mechanics. His research was on moving load problems and stress singularities in elasticity. Dr. Adams received his B.S. in mechanical engineering in 1969 from Cooper Union in New York City. He did his graduate work in the applied mechanics division at the University of California at Berkeley with a National Science Foundation Fellowship, receiving his M.S. in 1972 and his Ph.D. in 1975. Dr. Adams is a member of the American Society of Mechanical Engineers.

Moshe Av-Ron

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Dr. Av-Ron joined IBM at the East Fishkill facility in 1968, working on electron transport in metals. Currently he is working in the area of electrical properties in dielectrics. He received his B.S. in 1966 and his M.S. in 1968, both in physics, from Fairleigh Dickinson University, Teaneck, New Jersey. He received his Ph.D. in 1977, in materials science, from the Polytechnic Institute of New York, Brooklyn. Dr. Av-Ron is a member of the American Physical Society.

Benjamin J. Canavello

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From 1953 to 1956 Mr. Canavello was engaged in oceanographic research for Columbia University, New York. After joining IBM's research department in Poughkeepsie, New York, in 1956, he worked mainly in semiconductor technology. Since 1965 he has worked in photolithographic and photographic aspects of the science at the Thomas J. Watson Research Center.

Wilm E. Donath

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Dr. Donath received his B.S. in chemical engineering at the Carnegie Institute of Technology, Pittsburgh, Pennsylvania, in 1954 and his Ph.D. in physical chemistry from the University of California, Berkeley, in 1958. He joined IBM in 1959 and initially

worked on atomic and molecular calculations. Since 1963 he has worked in design automation at the Thomas J. Watson Research Center. He is interested in all aspects of design automation and has worked on artwork generation, partitioning, placement, wire routing, wirability, and testing. He received IBM Outstanding Contribution Awards for his work on artwork generation and wirability. Dr. Donath is now working on the physical design system for the Josephson project.

Robert A. Gdula

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Dr. Gdula is currently a development engineer managing the master slice photolithography development department at East Fishkill. He joined IBM in 1967 at Poughkeepsie, New York, to work in the advanced ferrite development project. From 1970 to 1979, he was an advisory engineer in the advanced materials and technology function specializing in thin film insulators. Dr. Gdula received his B.S. and Ph.D. in ceramic engineering from Rutgers—the State University, New Brunswick, New Jersey, in 1961 and 1967.

Michael Hatzakis

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Mr. Hatzakis received the B.S. in 1964 and the M.S. in 1967, both in electrical engineering, from New York University, New York. He joined IBM at the Thomas J. Watson Research Center in 1961, working in the electron-beam group. He participated in the development of the electron-beam recorder for the photo-store project and the large-scale integration program. He is presently working on the development of microfabrication techniques using electron beams, which includes the development of electron-sensitive resists and fabrication of submicrometer transistors and other devices. Mr. Hatzakis is a member of Eta Kappa Nu and Tau Beta Pi.

Tadao Kasami

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Dr. Kasami is a Professor of Information and Computer Science at Osaka University. From 1964 to 1966, while on leave from Osaka University, he was an Associate Researcher with the Department of Electrical Engineering at the University of Hawaii, Honolulu, and a Visiting Associate Professor with the Coordinated Science Laboratory, University of Illinois, Urbana. From 1970 to 1971 he was a Visiting Professor of Electrical Engineering at the University of Hawaii. He received the B.E., M.E., and Ph.D. degrees in communication engineering from Osaka University in 1958, 1960, and 1963. His primary research interests are coding theory, automata, and language theory. Dr. Kasami is a member of the Institute of Electrical Communication Engineers of Japan and the Institute of Electrical and Electronics Engineers.

David F. Kyser

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Dr. Kyser is a research staff member in the storage systems and technology department of the San Jose Research laboratory. Since joining IBM in 1968, he has been active in electron-beam technology, publishing in the areas of quantitative electron probe microanalysis, scanning electron microscopy, and computer automation. He has also managed a group responsible for materials analysis with electron beams. More recently, he has been active in experimental and theoretical aspects of electron-beam lithography, including Monte Carlo calculations of electron scattering in solids and computer simulation of developed line profiles. He received a B.S. in engineering from the University of California, Los Angeles, in 1961 and the M.S. and Ph.D. in electrical engineering from the University of Southern California in 1964 and 1967. Dr. Kyser is a member of the American Physical Society, the Electrochemical Society, the Institute of Electrical and Electronics Engineers, and the Microbeam Analysis Society, serving as President in 1979.

John S. Lew

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Dr. Lew is a staff member in the mathematical sciences department at the Thomas J. Watson Research Center, which he joined in 1970. He received a B.S. in physics in 1955 from Yale University and a Ph.D. in physics in 1960 from Princeton University. He was a project officer, 1960 to 1962, at the U.S. Air Force Special Weapons Center, Kirtland AFB, New Mexico; a C. L. E. Moore Instructor in mathematics, 1962 to 1964, at the Massachusetts Institute of Technology; and an Assistant Professor of Applied Mathematics, 1964 to 1970, at Brown University. Dr. Lew is a member of the Mathematical Association of America and the Society for Industrial and Applied Mathematics.

Shu Lin

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Professor Lin received his B.S. in electrical engineering from the National Taiwan University, Taipei, in 1959. He received both his M.S. and Ph.D. in electrical engineering from Rice University, Houston, Texas, in 1964 and 1965. From 1959 to 1961, he served on active duty as a radar officer in the Chinese Air Force in Taiwan. Since 1965, he has been on the faculty of the University of Hawaii at Manoa, where he is now Professor of Electrical Engineering. He spent a year during 1978 to 1979 as a visiting scientist at the IBM Thomas J. Watson Research Center, Yorktown Heights, New York. He is the author of *An Introduction to Error Correcting Codes*. Professor Lin is a senior member of the Institute of Electrical and Electronics Engineers and a member of Sigma Xi.

Mihir Parikh

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Dr. Parikh joined IBM in 1974 at the Thomas J. Watson Research Center. Currently he is a member of the physical sciences department of the Research laboratory in San Jose. His technical interests include theoretical and experimental studies of interaction of energetic electrons with matter and applications to electron lithography. Dr. Parikh received his B.S. in 1969 and his Ph.D. in 1974 from the University of California at Berkeley in engineering-physics.

Richard Pyle

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Mr. Pyle began his technical career at the Franklin Institute Research and Development Center in Philadelphia, Pennsylvania, in 1962. In 1965 he received his B.S. in metallurgy from Drexel Institute of Technology, Philadelphia, Pennsylvania. Mr. Pyle joined the Frankford Arsenal in Philadelphia in 1967, where he pursued postgraduate work and was assigned to studies in the field of fracture mechanics. In 1969 he joined IBM's materials analysis group in Poughkeepsie, New York, and transferred to East Fishkill, New York, as a staff engineer in 1975. His assignments in IBM have included electron-beam microanalysis, x-ray diffraction, and energy-dispersive analysis, during which he began his programming career. Mr. Pyle is currently responsible for simulation programming of the electron-beam device fabrication process.

Hans R. Rottmann

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Dr. Rottmann is senior physicist in the East Fishkill mask group, where he is presently responsible for advancing miniaturization in lithography. Before joining IBM, he worked for the Owens-Illinois Glass Company, Toledo, Ohio, 1959 to 1963, where he developed automatic inspection systems, and for the Carl Zeiss Company, Jena, Germany, 1949 to 1953, as a research staff member. He was on the staff of the University of Heidelberg's Department of Nuclear Spectroscopy and was a lecturer in physics at the Instituto Tecnológico de Monterrey, Mexico, from 1958 to 1959. His education includes an M.S. and a Ph.D. in physics from Jena University in 1949 and the University of Heidelberg in 1957, respectively. In 1973 he received an IBM Outstanding Invention Award for the development of the automatic wafer flat-tener. Dr. Rottmann is a member of the Optical Society of America and the Research Society of America.

Morris Shatzkes

Data Systems Division, East Fishkill, New York

Dr. Shatzkes is an advisory physicist in the process modeling and device physics department at the East Fishkill facility. He joined IBM in 1957 at Vestal, New York, in the area of radiation effects. From 1965 to 1968, he participated in an IBM educational sabbatical program to obtain his Ph.D. in physics from Syracuse

University, New York, having received his B.S. in physics from the City College of New York in 1956, and his M.S. in physics from Syracuse University in 1963. He returned to IBM at East Fishkill to do development work in the advanced materials and technology department. His current interests are in the electrical properties of thin metal films and charge transport and electrical breakdown in insulators. Dr. Shatzkes is a member of the American Physical Society.

Jane M. Shaw

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Ms. Shaw received the B.A. in biology from Elms College, Chicopee, Massachusetts, in 1962. From 1962 to 1966, she was engaged in research at Rockefeller University, New York, investigating genetic and environmentally induced susceptibility to disease, in particular tuberculosis. In 1966 she joined the IBM

Thomas J. Watson Research Center, where she worked on the photochemical synthesis of small ringed organic compounds. From 1971 until the present, her research and development efforts have been directed toward the characterization of photore-sists for optical and electron-beam applications.

Saburo Yamamura

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Dr. Yamamura's current technical interests include work in coding theory and in programming techniques. He received the B.E., M.E., and Ph.D. degrees in control engineering from Osaka University, Japan, in 1970, 1972, and 1975. Dr. Yamamura is a member of the Association for Computing Machinery and the Institute of Electrical Communication Engineers of Japan.