

Authors

Brian T. Bennett

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Dr. Bennett is a member of the computer sciences department at the Thomas J. Watson Research Center. His work interests include computer system modeling, storage management algorithms, and memory hierarchy analysis. Before joining IBM in 1969, he received a B.Sc. and a Ph.D. in mathematics from Adelaide University, South Australia, in 1964 and 1968. Dr. Bennett is a member of the Association for Computing Machinery and the Operations Research Society of America.

Jerome J. Cuomo

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Mr. Cuomo received the B.S. degree in chemistry from Manhattan College in 1958 and the M.S. degree in physical chemistry from St. John's University, Jamaica, New York, in 1960. He joined IBM in 1963 as a research staff member and is presently manager of the materials area of the central services department at the Thomas J. Watson Research Center. His interests are in processes for materials preparation, which include sputter-, chemical vapor-, and electro-deposition. Mr. Cuomo is a senior member of the American Vacuum Society.

John E. Davies

General Products Division, San Jose, California

Dr. Davies is a staff engineer in the magnetic materials development group. He joined IBM at San Jose in 1976 and is working on the preparation of garnet films for magnetic bubble domain applications. He received his B.S. in chemistry in 1971 and his Ph.D. in materials science in 1974, both from Imperial College, University of London. He spent 1974 on a Postdoctoral Fellowship with IBM at the Thomas J. Watson Research Center, working on exploratory bubble materials, and then returned to the United Kingdom in 1975 to work on crystal growth at the Mullard Research Laboratories.

Donald Eugene Davis

System Products Division, East Fishkill, New York

Mr. Davis is an advisory engineer currently engaged in circuit and system design in electron-beam lithography. He joined IBM in 1962 at the Poughkeepsie laboratory, where he developed circuit designs for cryogenic, thin-film, and various core and monolithic memory programs. In 1969 he moved to East Fishkill and worked on semiconductor main memory technology and functional memory designs. Mr. Davis received his B.S. in electrical engineering in 1960 from Virginia Polytechnic Institute, Blacksburg, and his M.S. in electrical engineering in 1962 from the University of Illinois, Urbana. He is a member of Eta Kappa Nu, Tau Beta Pi, Phi Kappa Phi, and a senior member of the Institute of Electrical and Electronics Engineers. Mr. Davis received an IBM Invention Achievement Award in 1972 and an IBM Outstanding Innovation Award for his work in electron-beam technology in 1976.

Helmut Engelke

IBM Deutschland, Sindelfingen

Dr. Engelke is a staff member of the German Manufacturing Technology Center (System Products Division) and joined IBM in 1970. His current interest is in applications of the finite element method in different fields. Before that he was engaged in the development of contactless testing methods and electron-beam exposure systems. During 1974 and 1975 he was assigned to SPD East Fishkill where he worked on statistical methods for electron-beam exposure systems. Dr. Engelke attended the University in Stuttgart, Germany, and received an M.A. in physics in 1965 and a Ph.D. degree in solid state physics in 1969. From 1965 to 1969 he was an Assistant Professor at the Institut für Theoretische und Angewandte Physik in Stuttgart.

Ronald Fagin

Research Division, San Jose, California

Dr. Fagin is a research staff member in the computer science department. He joined IBM in 1973 at the Thomas J. Watson Research Center in Yorktown Heights, New York. He has done research on storage management analysis and on the theory of relational databases. Dr. Fagin received his B.A. degree in mathematics from Dartmouth College, Hanover, New Hampshire, in 1967, and his Ph.D. in mathematics (specializing in mathematical logic) from the University of California at Berkeley in 1973. He is a member of the Association for Computing Machinery.

Peter A. Franaszek

Research Division, Yorktown Heights, New York

Dr. Franaszek is a member of the computer sciences department at the Thomas J. Watson Research Center. His interests include analytical problems associated with storage hierarchies, magnetic recording, and digital communications. He received the B.Sc. degree from Brown University, Providence, Rhode Island, in 1962, and the M.A. and Ph.D. degrees from Princeton University in 1964 and 1965. During the academic year 1973 to 1974, he was on sabbatical leave at Stanford University as a Consulting Associate Professor of Electrical Engineering and Computer Science. Prior to joining IBM in 1968, he was a member of the technical staff at Bell Telephone Laboratories. Dr. Franaszek is a member of Sigma Xi, Tau Beta Pi, and the Institute for Electrical and Electronics Engineers.

Richard J. Gambino

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Mr. Gambino is a member of the amorphous magnetic materials group at the Thomas J. Watson Research Center, where he joined IBM in 1961. His current research involves the magnetic properties of amorphous rare earth-transition metal alloys. He received a B.A. degree in chemistry from the University of Connecticut, Storrs, in 1957 and an M.S. in chemistry from the Polytechnic Institute of New York in 1976. Prior to joining IBM, Mr. Gambino worked at the U.S. Army Signal Research and Development Laboratory, Fort Monmouth, New Jersey. He is a member of the American Ceramic Society, American Chemical Society, American Vacuum Society, and Sigma Xi.

James M. E. Harper

Research Division, Yorktown Heights, New York

Dr. Harper is a member of central scientific services at the Thomas J. Watson Research Center. Since joining IBM in 1975, he has worked on techniques for thin film deposition using controlled ion beams. He received a B.A. in physics from Harvard University in 1968 and a Ph.D. in applied physics from Stanford University in 1975. He is a member of the American Physical Society and the American Vacuum Society.

John D. Kuptsis

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Mr. Kuptsis is a research staff member in the analytical group of the physical sciences department. He joined the Research Division in 1959 and has since worked in numerous areas of analytical techniques, with particular emphasis on electron microprobe spectroscopy, spark source mass spectrography, and, at present, glow discharge optical spectroscopy. He has attended Adelphi College, Garden City, New York and New York University, majoring in chemistry.

Stephen S. Lavenberg

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Dr. Lavenberg joined IBM at the San Jose Research Laboratory in 1968 and is currently a member of the analysis and algorithms department at the Thomas J. Watson Research Center. His current technical interests include stochastic modeling of computer systems, simulation of stochastic systems, and queuing theory. He received a B.E.E. from Rensselaer Polytechnic Institute in 1963 and an M.S. and a Ph.D. in electrical engineering from the California Institute of Technology in 1964 and 1968. Dr. Lavenberg is a member of the Association for Computing Machinery, the Institute of Electrical and Electronics Engineers, and Sigma Xi.

David B. Lomet

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Dr. Lomet is a member of the automatic programming group at the Thomas J. Watson Research Center. He joined IBM in 1963 with the Federal Systems Division in the Washington, D.C. area. In 1966, he won an IBM Resident Graduate Fellowship and attended the University of Pennsylvania, receiving a Ph.D. in computer science in 1969. Since joining the Research Division in 1969, Dr. Lomet has pursued research in programming languages, machine architecture, and programming systems. He spent the 1976 academic year doing research on multiprocess programming and software reliability at the University of Newcastle-upon-Tyne in England. His current research is on strategies for coping with deadlock. Dr. Lomet has a B.S. from Lafayette College, Easton, Pennsylvania, and an M.S. from George Washington University. He is a member of the Association for Computing Machinery, the Institute of Electrical and Electronics Engineers, the American Association for the Advancement of Science, and Phi Beta Kappa.

John F. Loughran

System Products Division, East Fishkill, New York

Mr. Loughran is an advisory programmer working on correction-generation software for electron-beam systems. He joined IBM at the Poughkeepsie laboratory in 1964 where he worked on the development of the OS/360 control program. Later work included system programming, the hardware-software in-

terface, data base design, and data handling. He received an A.B. in philosophy and history from Fordham University, New York, in 1956 and an M.S. in management science from Stevens Institute of Technology, Hoboken, New Jersey, in 1966. Mr. Loughran is a member of the Association of Computing Machinery.

Haruhiro Matino

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Dr. Matino is currently on a one-year leave from the Fujisawa development laboratory in Japan (System Communications Division), where he served as device technology manager. At the Thomas J. Watson Research Center, he will be working in the area of new printing technologies. Dr. Matino joined IBM in 1973 as a staff engineer. He received a B.S. degree in 1961 in physics, and a Ph.D. degree in 1973 in electronics, both from the Tokyo Institute of Technology. Before joining IBM he worked on semiconductor devices, especially GaAs MESFETs and microwave diodes, at the Toshiba Research and Development Center as a supervisor. He is a member of the Institute of Electronics and Communication Engineers of Japan and the Applied Physics Society of Japan.

John L. Mauer, IV

System Products Division, East Fishkill, New York

Dr. Mauer is a staff physicist currently working in the advanced materials and technology area with interests including the mechanisms of reactive ion etching. Previously, he worked with the beam technology group at the same location. He joined IBM in 1973 after serving as a research associate at the Joint Institute for Laboratory Astrophysics, Boulder, Colorado. He received a B.S. from Massachusetts Institute of Technology in 1967 and a Ph.D. from Yale University in 1972. He is a member of the American Physical Society.

Michel S. Michail

System Products Division, East Fishkill, New York

Dr. Michail is an advisory engineer in the advanced tool development group. He received his B.S. in electrical engineering from Alexandria University, Egypt, in 1958, and M.S. and Ph.D. degrees in electrical engineering from Syracuse University in 1962 and 1970. Dr. Michail joined IBM in 1970 at the East Fishkill development laboratory and has since been engaged in electron-beam fabrication systems. Between 1965 and 1967 he was instructor of electrical engineering at the University of New Hampshire, Durham. He is a recipient of an IBM Outstanding Innovation Award for his work in electron-beam technology.

Richard D. Moore

System Products Division, East Fishkill, New York

Mr. Moore manages a group in the advanced tool development area at the East Fishkill laboratory. He joined IBM at the Poughkeepsie laboratory in 1962 and began working in the memory development area. Mr. Moore received a B.S. from Michigan State University, East Lansing, in 1962 and an M.S. from Syracuse University in 1967, both in electrical engineering. He has published several papers on advanced monolithic memory designs as well as on electron-beam systems design. Mr. Moore received an IBM Outstanding Contribution Award for his work in monolithic memory design and has received two invention awards.

Hans C. Pfeiffer

System Products Division, East Fishkill, New York

Dr. Pfeiffer is a senior engineer and manager of the electron-beam technology group in the East Fishkill laboratory. He joined IBM in 1968 and his interest has been focused on electron optical concepts for advanced lithography systems. He developed IBM's first electron-beam columns with shaped beams and variable shaped beams for high speed pattern exposure. Dr. Pfeiffer received his B.S. in 1960, his M.S. in 1964, and his Ph.D. in 1967 in physics and electron optics from the Technical University of Berlin, Germany. He received an IBM Outstanding Contribution Award in 1972 and a Corporate Recognition Award in 1976 for his work in electron-beam technology. He is a member of the German Physical Society.

John Paul Roth

Research Division, Yorktown Heights, New York

Dr. Roth is a research staff member at the Thomas J. Watson Research Center. He is concerned with the theory and method of computer design, and is best known for his work in algorithms for test generation. He joined IBM in 1956 and was manager of the applied combinatorial mathematics department. From 1961 to 1964 he was laboratory manager of logic automation in the Data Systems Division in Poughkeepsie, New York. He then returned to the Research Division, where he was principal investigator of a fundamental research program sponsored by NASA's Jet Propulsion Laboratory of the California Institute of Technology. He was also principal investigator of an Air Force-sponsored investigation of the design of self-repairing computers. Dr. Roth was a Visiting Assistant Professor of Mathematics at Princeton University from 1957 to 1958. He received his B.S. in mechanical engineering from the University of Detroit, Michigan, in 1946 and his M.S. and Ph.D. in mathematics from the University of Michigan, East Lansing, in 1948 and 1953.

Philip M. Ryan

System Products Division, East Fishkill, New York

Mr. Ryan joined IBM at East Fishkill in 1966 in the process control area. In 1971 he joined the electron-beam digital systems engineering group, and later became manager of that department. He is now manager of the electron-beam advanced systems group. Mr. Ryan holds a B.S. in physics and an M.S. in engineering science, both from the University of Notre Dame, Indiana. He has done further graduate work in electrical engineering at Notre Dame and at Syracuse University. He has three patents and is author of a number of articles in the IBM Technical Disclosure Bulletin. In 1976, Mr. Ryan received both an Invention Achievement Award and an Outstanding Innovation Award from IBM for his electron-beam work.

Charles H. Sauer

University of Texas at Austin

Dr. Sauer joined IBM in March 1975 at the Thomas J. Watson Research Center, where he worked on problems in computer-performance-evaluation methodology. He moved to the Department of Computer Sciences at the University of Texas at the beginning of the 1977-78 academic year. His degrees include an A.B. in mathematics (1970) and a Ph.D. in computer sciences (1975), both from the University of Texas. Dr. Sauer is a member of the Association for Computing Machinery.

Werner Stickel

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Dr. Stickel is an advisory engineer in the electron-beam technology department of the development laboratory and is currently with electron-optical components for advanced microfabrication tools. He joined IBM as a visiting scientist at Research in 1972, participating in electron-optical research work, which forms the basis of high performance electron-beam exposure tools for LSI-device fabrication. In 1973 he transferred with the project group to East Fishkill. Dr. Stickel received a Diplom-Ingenieur in 1965 and a Doktor-Ingenieur in 1967 in physics from the Technical University of Berlin, Germany. For his contributions to the science of physics he was awarded the Carl-Scheel Award of the Deutsche Physikalische Gesellschaft.

R. D. Traub

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Dr. Traub is a staff member in the general sciences department. His work is in the development of physiologically realistic models of nerve cells. Other interests include microelectrodes, epilepsy, spinal cord physiology, and dementia. He joined the Research Division in 1975 after spending two years at the National Institutes of Health. Dr. Traub obtained an A.B. in mathematics from Princeton University in 1967, an M.D. from the University of Pennsylvania Medical School, Philadelphia, in 1972, and interned at the university hospital. He is a member of the Society for Neuroscience and the Society of Industrial and Applied Mathematics.

Tatsuyuki Ushiroda

IBM Japan, Fujisawa

Mr. Ushiroda is a member of the microcode development group at the Fujisawa development laboratory (System Communications Division). He joined IBM in 1975 after receiving a B.S. degree in physics from Tokyo University.

Maurice C. Williams

System Products Division, East Fishkill, New York

Mr. Williams is a staff engineer currently working on electron-beam lithography. He is specifically concerned with control system architecture and pattern registration techniques. He joined IBM in 1964 at Poughkeepsie with an A.A.S. degree in electronics from Pennsylvania State University, University Park. From 1964 to 1966 he worked in a product engineering area designing magnetic tape test equipment.

Ollie C. Woodard

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Mr. Woodard is manager of analog systems engineering, responsible for electron-beam lithography system design and development. He joined IBM in 1965 at Poughkeepsie and transferred to East Fishkill in 1966, where he was responsible for the circuit design of equipment related to semiconductor device processing and testing. Since 1968 he has been involved with various aspects of electron-beam technology and has received eight patents. He is a 1958 graduate of North Carolina State University, Raleigh, with a B.S. degree in electrical engineering. He received his M.S. in the same field from Syracuse University in 1971. He is a member of the Institute of Electronics and Electrical Engineers. In 1976 Mr. Woodard received two IBM Outstanding Invention Awards in the area of electron-beam technology.