

Authors

Robert K. Brayton

Thomas J. Watson Research Center, Yorktown Heights, New York

B.S. in Electrical Engineering, 1956, Iowa State University; Ph.D. in Mathematics, 1961, MIT. At MIT was a research scientist in artificial intelligence. In 1956 worked for Remington Rand Univac on magnetic-core memory circuits. Joined IBM, 1957, in the Mathematics department of the Research Center, where he has worked on nonlinear differential equations arising from lumped and distributed electrical networks. Currently manager of a group in differential equations and numerical analysis in the Mathematics department. Member, AMS, SIAM, Eta Kappa Nu, Tau Beta Pi, Phi Kappa Phi, Sigma Xi, and Pi Mu Epsilon.

J. B. Gunn

Thomas J. Watson Research Center, Yorktown Heights, New York

B.A., 1948, Cambridge. Was Research Engineer, Elliott Bros. Ltd., (London) 1948 to 1953. Awarded Junior Research Fellowship, Royal Radar Establishment, Great Malvern, 1953 to 1956. Assistant Professor, Physics Department, University of British Columbia, Vancouver, 1956 to 1959. Joined IBM Research at Poughkeepsie, 1959, and is now a staff member at the Research Center.

Fred G. Gustavson

Thomas J. Watson Research Center, Yorktown Heights, New York

B.S. in Physics, 1957; M.S., 1960, and Ph.D., 1963, both in Applied Mathematics; all at Rensselaer Polytechnic Institute. From 1960 to 1963 worked for RPI doing research and teaching. The year 1961 was spent at the U. S. Army Research Center at the University of Wisconsin. Joined IBM in 1964 to work in the mathematics department of the Research Center on problems in nonlinear differential equations and celestial mechanics. Member, M.A.A., Sigma Xi, and Pi Mu Epsilon.

Millard A. Habegger

Systems Development Division, Poughkeepsie, New York

B.S. in Physics, 1956, Purdue University; M.S. in Physics, 1958, California Institute of Technology; Ph.D. in Solid State Physics, 1964, Purdue University. As a research assistant at Purdue he conducted research on the photoconductivity of semiconductors. Joined IBM in 1964 at the Poughkeepsie laboratories to do development work on laser applications and is currently engaged in this work at the same location. Member, American Physical Society, IEEE, and Sigma Xi.

Thomas J. Harris

Systems Development Division, Poughkeepsie, New York

B.S. in Electrical Engineering (cum laude), 1954, University of Buffalo; M.S., 1960, University of Rochester; has partially completed work toward a Ph.D. in Electrical Engineering at the University of Rochester. Was at the Bell Telephone Laboratories 1954 to 1957 where he was engaged in problems concerned with relay switching circuit design for crossbar toll telephone systems; magnetic core circuit design for an experimental electronic switching telephone system; logic design for a magnetic drum auxiliary sender; and measurement of minority carrier lifetime in silicon solar cells. At the Stromberg-Carlson Corporation, he designed transistor circuits for a baud-synchronous teletype system and was in charge of development of a 63-Mc/sec transistor IF amplifier for TACAN aircraft receivers. Since joining IBM in 1961, he has investigated various applications for lasers and techniques for controlling the parameters associated with laser beams. He is presently manager of an advanced optics group in the laboratories at Poughkeepsie. Member, IEEE, Optical Society of America, and Pi Mu Epsilon.

Claude Johnson, Jr.

Thomas J. Watson Research Center, Yorktown Heights, New York

Graduated Montgomery Junior College, 1953, and RCA Institute, 1957. Has been employed by Radio Corporation of America and by New York Telephone Company, where he worked on radio-video switching techniques. Joined IBM in 1957 at Kingston, New York, for work on SAGE system test equipment. Transferred to the Research Laboratory in 1960 at Poughkeepsie, where he worked on investigation of magnetic memories and materials. Since 1961, he has been engaged in the investigation of magnetic film memories and is presently working on integrated circuit technology at the Research Center.

Werner Liniger

Thomas J. Watson Research Center, Yorktown Heights, New York

Diploma in Mathematics, 1951, Swiss Federal Institute of Technology; Dr. ès Sc., 1956, University of Lausanne. Was Research Assistant in numerical analysis, University of Lausanne, 1952 to 1955, and worked as a Research Mathematician in applied mathematics with Sperry Rand Corp., 1957 to 1959. Joined IBM Research Center in 1959 and has since worked on applied mathematics problems in physics, technology, biology, chemistry, and medicine. His current research in numerical analysis is concerned with the design of new algorithms for integration in the solution of differential equations. Member, AMS, SIAM, ACM, Gesellschaft für angewandte Mathematik und Mechanik, and RESA.

Richard E. Matick

Thomas J. Watson Research Center, Yorktown Heights, New York

B.S., 1955; M.S., 1956; and Ph.D., 1958; all in Electrical Engineering from Carnegie Institute of Technology. Joined IBM Research in 1958 as a member of the Devices and Circuits Group doing work on magnetic films and film memories. Did a fundamental study of magnetic fields associated with NiFe film and implications for memory design. Switched field of interest to investigate the possible co-existence of ferroelectricity and magnetism in inorganic compounds. Invented and pursued the development of a thick film read only memory. Became manager of the magnetic film memory group in 1962, and is presently a member of the technical staff of the Director of Research. Member, IEEE and Eta Kappa Nu.

Erhard Max

Systems Development Division, Boeblingen, Germany

Dipl. Phys., 1955, University of Rostock, Germany; Dr. rer. nat., 1960, M. Luther University of Halle, Germany. Joined IBM in 1960 at World Trade Corporation Laboratories in Boeblingen, Germany, and has worked in electro-optics and electro-optic printing. From 1963 through 1965 he was engaged in the field of light control and light deflection at the laboratories in Poughkeepsie, and is presently working in the same field at Boeblingen. Member, German Physical Society.

Simon Middelhoek

Research Division, Zurich, Switzerland

M.S. in Physical Engineering, 1956, Technical University of Delft; Ph.D. in Physics, 1961, University of Amsterdam. Joined IBM in 1956 as Physicist in the Research Laboratory, Zurich. His present field of interest is fast active devices. Member, Dutch Physical Society, Royal Institute of Engineers, and the German Study Group on Ferromagnetism.

Peter Pleshko

Thomas J. Watson Research Center, Yorktown Heights, New York

B.E.E., 1956; M.E.E., 1958, City College of New York. He is presently enrolled in the doctoral program at New York University. At Kearfott and International Telephone and Telegraph Company worked on design and development of transistorized digital circuits for logic and core memories and on tunnel diode logic and memory circuits. Since joining IBM in 1963 at the Research Center, has worked on circuits for high speed film memories, and is presently working on monolithic memories. Member, IEEE.

Max Preisinger*

Systems Development Division, Boeblingen, Germany

Elektroingenieur, Oskar von Miller Polytechnik Institute, Munich, 1949. Worked in the development laboratories of Rohde & Schwarz, Munich, and Sudwestfunk, Baden-Baden, in the development of measuring equipment and vhf television relaying. Joined IBM World Trade Corporation in 1955

and has since then worked in the field of nonmechanical, high-speed printing. Up to the present time, had been working on magnetomechanical high-speed devices at the Boeblingen laboratories. Member, Verein Deutscher Ingenieure.

J. Paul Roth

Thomas J. Watson Research Center, Yorktown Heights, New York

B.M.E., 1946, University of Detroit; M.S., 1948 and Ph.D., 1953, both in Mathematics, at the University of Michigan. Research Engineer, Continental Aviation and Engineering Corporation, 1946-47; Adjunct Professor of Mathematics, Wayne State University, 1946-47; Research Associate, University of Michigan Research Institute, 1947-53; Pierce Instructor in Mathematics, University of California, Berkeley, 1953-55; Consultant, Shell Development Co., 1954-55; Consultant, General Electric Company, 1955; Staff Member, Electronic Computer Project, The Institute for Advanced Study, 1955-56 (under grant from Army, Office of Naval Research, and Air Research and Development Command); Visiting Assistant Professor of Mathematics, Princeton University, 1957-58; Professor, Centro Internazionale Matematico Estivo, University of Rome, 1959. Joined IBM in July 1956. Subsequently worked at the laboratories in Poughkeepsie, from 1961-63, where he was laboratory logic automation manager. Presently staff member, Research Division, concerned with algorithms for diagnosis and design. Member, American Mathematical Society, IEEE, and Sigma Xi.

Charles H. Sie

Thomas J. Watson Research Center, Yorktown Heights, New York

B.S.E.E., 1957, Manhattan College; M.S.E.E., 1960, Drexel Institute of Technology. From 1957 to 1963, was employed by RCA, where he worked on transistor and magnetic circuits for pulse communication systems. Joined IBM at the Research Center in 1963. His present interest is magnetic film devices for digital memories. Member, Eta Kappa Nu and IEEE.

Lewis M. Terman

Thomas J. Watson Research Center, Yorktown Heights, New York

B.S. in Physics, 1956; M.S. in Electrical Engineering, 1958; Ph.D. in Electrical Engineering, 1961; all from Stanford University. Joined IBM in 1961 to work in the experimental machines department at the Research Center. Participated in the design and organization of the ADAM machine and in 1963, became manager of the read only storage development group. Is now manager of the monolithic circuits for memory group at the Research Center. Member, Phi Beta Kappa, Sigma Xi, and IEEE.

Robert C. Turnbull

Systems Development Division, Poughkeepsie, New York

B.S., 1947; M.S., 1950; in Glass Technology, Alfred University. Employed radio tracer techniques in diffusion studies at Alfred University, 1950-54. Joined IBM in 1954 at Poughkeepsie to do research work on ferrite materials. Work since then has included studies on ferrite reaction mechanisms and fabrication of ferrite arrays. Presently working on ferrite core compositions for large-capacity, high-speed memory arrays. Member, American Chemical Society, Keramos, and RESA.

* Now a private industrial consultant.

• *Articles:*

Formation of Built-In Light-Emitting Junctions
in Solution-Grown GaP Containing
Shallow Donors and Acceptors
by *L. M. Foster, T. S. Plaskett, and
J. E. Scardefield*114

Green Luminescence from Solution-Grown
Junctions in GaP Containing
Shallow Donors and Acceptors
by *M. H. Pilkuhn and L. M. Foster*122

Effects of a Keeper on Thin Film Magnetic Bits
by *C. G. Ravi and G. G. Koerber**130

PERT as an Aid to Logic Design
by *T. I. Kirkpatrick and N. R. Clark*135

Design of a Printed
Card-Capacitor Read-Only Store
by *J. W. Haskell*142

* *Erratum*

Equation (3), p. 131 and Eq. (4), p. 132: For *X* and *2X* wherever
the term appears.

• *Short Communications:*

A Practical Class of Polynomial Codes
by *W. F. Rogers*158

Stimulated Emission Observed from an
Organic Dye, Chloro-Aluminum Phthalocyanine
by *P. P. Sorokin and J. R. Lankard*162