

# Authors

## Claude L. Bertin

B. E. E., 1960, College of the City of New York; M.S. in Electrical Engineering, 1961, Columbia University. Worked at Bell Telephone Laboratories, Inc., in the summer of 1960. Joined IBM in 1961, working in the memory circuits group in the Components Division, Poughkeepsie. Member of Eta Kappa Nu and Tau Beta Pi.

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## Ernest E. Conrad

Served four years as electronic technician in the U. S. Navy. Joined IBM in 1960 as technician on the development of surface passivated semiconductor devices. Presently is process control specialist for manufacturing transistors and diodes at the Components Division, Poughkeepsie.

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B.S.E.E., 1954, and M.S.E.E., 1956, Southern Methodist University; Ph.D., 1958, Carnegie Institute of Technology. Joined IBM Research in 1958. Worked with data communications systems at the Advanced Systems Development Division. Presently engaged in exploratory memory work at the IBM Thomas J. Watson Research Center. Member of IEEE and of Sigma Xi.

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Electrical Engineering Diploma, 1951, ETH (Swiss Federal Institute of Technology) Was employed by Brown, Boveri and Co., Switzerland, in the development of electrical accelerators. Joined IBM in 1956 and is manager of the special studies and engineering projects at the Zurich Research Laboratory. Member of the Swiss Physical Society, Schweizerische Gesellschaft für Automatik (Swiss Society for Automation), and the Deutsche Nachrichtentechnische Gesellschaft (German Telecommunications Society).

## Samuel E. Estes

B.S.E.E., 1957, Texas Technological College; S.M. in E.E., 1958, Massachusetts Institute of Technology; presently a candidate for the Ph.D. degree at Stanford University. Research Assistant in E.E. at MIT, 1957-1958. Joined IBM at San Jose in 1959 and worked on signal detection problems. Currently a Research Staff Member engaged in full time study at Stanford University under the IBM Graduate Resident Study Program.

Present technical activity is in the areas of signal processing and pattern recognition. Associate member of Sigma Xi. Member of IEEE, Phi Kappa Phi, Eta Kappa Nu, Tau Beta Pi.

## Thomas J. Harris

B.S. cum laude, 1954, University of Buffalo; M.S., 1960, University of Rochester. Previously was Member of the Technical Staff, Bell Telephone Laboratories, working on telephone switching systems and solid state devices and circuitry. At General Dynamics Electronics (Stromberg-Carlson Corporation), worked in solid state circuit design and in IF amplifier development. At the University of Rochester, Mr. Harris was engaged in instrumentation for optical equipment and design of a servo-mechanism for a rocket spectrometer; was also instructor in electronic circuitry. Joined IBM Data Systems Development Laboratory in Poughkeepsie in 1961, where he supervised the development and construction of a high-power pulsed ruby laser system. He is currently working with solid state cw laser systems and investigating uses for the laser beam and electro-optic devices. Member of IEEE, OSA, and Pi Mu Epsilon.

## Emil Hopner

University of Paris (Sorbonne), 1939; University of Zagreb, Yugoslavia, 1940-1941; University of Lausanne, Switzerland, 1943; Degree in E.E. (equivalent to an M.S.), 1945, Swiss Federal Institute of Technology, Zurich. Post-graduate studies at McGill University, Montreal, 1951, and Stanford University. Ph.D. degree, 1962, Swiss Federal Institute of Technology, Zurich. Worked on telephone carrier systems at Yugoslav Telephone Services, 1946-1947; telephone carrier systems at Philips Laboratory, Zurich, 1948-1951; microwave relays, telegraph and telephone carrier systems, Federal Telephone and Radio Corp., Montreal, 1951-1952; microwave radio systems, Lenkurt Electric Co., San Carlos, California, 1952-1955. Joined IBM San Jose Research Laboratory in 1955. During 1958-1962 was responsible for IBM Research and Advanced Systems Development Division program in computer communications. Presently manager of IBM Advanced Information Retrieval Technology, San Jose.

## H. Ray Kerby

B.S. in E.E., 1957, Texas Technological College; M.S. in E.E., 1960, Stanford University. Joined IBM San Jose Research Laboratory in 1957 and worked on problems in magnetic recording until 1961. Worked in the area of speech synthesis at the same laboratory from 1961 until recently. Presently project leader of the speech recognition group in the Communication Science Department. Member IEEE, Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi.

## Kurt Kosanke

Engineer of Physics Degree, 1959, from the Physikalisch-Technische Lehranstalt, Luebeck, Germany. Joined IBM Germany in 1959, working on the electro-optic effect in crystals. Since 1962 he has been investigating a variety of electro-optic devices at the IBM Data Systems Division Development Laboratory, Poughkeepsie, N. Y. He is a member of Verein Deutscher Ingenieure, Germany.

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Dipl. Phys., 1951, Technische Hochschule, Stuttgart, Germany; Dr. rer. nat. in Physics, 1956, Technische Hochschule, Stuttgart, Germany. Previously, worked on x-ray investigations of the structure of amorphous selenium and, at the Max Planck Institute for Physics of the Stratosphere, Weissenau, Germany, developed a radiosonde for measurement of the ozone content of the upper atmosphere. Joined IBM in 1956, working on ferroelectric materials, electro-optics, and optical printing in the IBM World Trade Laboratories, Boeblingen, Germany. Since 1962 he has been at the IBM Data Systems Development Laboratory, Poughkeepsie, N. Y., working on electro-optic devices. He is a member of the Physical Society of Germany.

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Engineering Diploma, 1963, Evening Technical College, Zurich. Joined IBM in 1957 and is presently working on thin magnetic and superconducting films at the Zurich Research Laboratory.

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B.S. in Education, 1941, Kent State University; M.S. in Physics, 1943, Ohio University; Ph.D. in Physics, 1949, Ohio State University. Fellow at Ohio State University, 1948-1949. Joined IBM in 1959 and now works in the Components Division, Poughkeepsie, as a Senior Physicist in the study of surfaces and surface passivation of semiconductor devices and, par-

ticularly, the structure and application of oxide and glass systems on silicon devices. Previously was a research physicist at Texaco Research Center, working on fundamental catalysis studies such as molecular surface structures determined by the infrared spectra of chemisorbed molecules. Member of Sigma Xi, Pi Mu Epsilon, Sigma Pi Sigma, American Physical Society, American Chemical Society, Electrochemical Society, and RESA; Senior Member, IEEE.

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Physics Diploma, 1952, ETH (Swiss Federal Institute of Technology), Ph.D. in Physics, 1960. Was Assistant in Physics at the Swiss Federal Institute of Technology, Zurich. Joined IBM in 1959, and is presently working on thin magnetic and superconducting films at the IBM Research Laboratory in Zurich. Member of the Swiss Physical Society, the American Physical Society, and the British Physical Society.

### **Robert M. Walker**

Radio Engineer, KOMO-KJR, Seattle, Washington, 1935-41; Staff Member, MIT Radiation Laboratory, 1941-45; Senior Staff, IBM Watson Research Laboratory, 1946-60. Adjunct Assistant Professor, Electrical Engineering, Columbia University, 1953-55; Adjunct Associate Professor, 1957-58. Since 1960, at IBM San Jose Research Laboratory as Manager of the Communication Science Department. Member of AAAS and American Physical Society; Senior Member of the IEEE and Associate Member of the Acoustical Society of America.

### **Aaron D. Wyner**

B.S. in Mathematics and Physics, 1960, Queens College; B.S., 1960; M.S., 1961; Ph.D. in Electrical Engineering, 1963, Columbia University. Assistant Professor of Electrical Engineering at Columbia University, Spring, 1963. Formerly a consultant to the IBM Thomas J. Watson Research Center. Presently a member of the Mathematical Research Department at Bell Telephone Laboratories, Murray Hill, N. J. where his research interest is in the field of communication theory. Member of Sigma Xi, Tau Beta Pi, and Eta Kappa Nu.