

## Contributors to This Issue

**Charles A. Brackett**, B.S.E.E., 1962, M.S.E.E., 1963, M.S. (Physics), 1966, Ph.D., 1968, University of Michigan; Bell Laboratories, 1968—. Mr. Brackett has studied microwave circuits and low frequency phenomena in IMPATT oscillators, GaAs lasers, the coupling of GaAs lasers into optical fibers, receiver design for optical fiber communications, and optical fiber data link design. Member, IEEE, Sigma Xi, Tau Beta Pi, Eta Kappa Nu.

**Michael J. Buckler**, B.S.E.E., 1971, M.S.E.E., 1971, Georgia Institute of Technology; Bell Laboratories, 1971—. Mr. Buckler has worked on digital circuit and system design for high speed digital multiplexers and test equipment. He is currently engaged in optical waveguide design, analysis and characterization. Member, IEEE, OSA, Eta Kappa Nu.

**F. S. Chen**, B.S., 1951, National Taiwan University; M.S.E.E., 1955, Purdue University; Ph.D. 1959, The Ohio State University; Bell Laboratories, 1959—. Mr. Chen has worked in the development of ferrite devices, masers, and optical modulators, and is presently engaged in development of lightwave transmitter subsystems.

**Steven Shui-uh Cheng**, B.S., 1963, National Taiwan University; M.S., 1967, Tufts University; Ph.D., 1970, California Institute of Technology, all in physics; Bell Laboratories, 1971—. Between 1970 and 1971, Mr. Cheng participated in the first U.S. electron-position colliding-beam experiment at Harvard University. Since joining Bell Laboratories, he has worked on the millimeter waveguide system and recently on the fiber-optic transmission system. He is currently supervisor of the fiberguide applications group. Member, IEEE, American Physical Society, and Sigma Xi.

**J. S. Cook**, B.E.E., M.S. (Electrical Engineering), 1952, The Ohio State University. Bell Laboratories, 1952—. Mr. Cook has done research in the fields of traveling-wave tubes, microwave propagation and devices, antennas, and satellite communications. He has been working with optical fiber communication systems in recent years and currently heads a department responsible for development of optical fiber connectors and the special technology of optical fiber telecommunication systems. Senior member, IEEE, member, OSA, SPIE, Eta Kappa Nu, Tau Beta Pi, Sigma Xi.

**Frank V. DiMarcello**, B.S. (Geochemistry) 1960, Pennsylvania State University; M.S., (Ceramics) 1966, Rutgers University; Bell Laboratories, 1960—. Mr. DiMarcello has been involved in the development of glazes for ceramic substrates and the preparation and property evaluation of ceramics and glasses for various applications. He is currently involved in the preparation of glass-fiber optical waveguides.

**Paul W. Dorman**, B.S. (E.E.), 1972, Newark College of Engineering; Bell Laboratories, 1964—. Mr. Dorman's work has recently included studies of modulation characteristics of (Al,Ga)As injection lasers and development of practical modulator circuitry. Member, IEEE, Eta Kappa Nu, Tau Beta Pi.

**Adrian R. Hartman**, B.S. (E.E.), 1965, University of Pittsburgh; S.M. (E.E.), 1966, Prof. E.E., 1967, and Ph.D. (E.E.), 1970, Massachusetts Institute of Technology; Bell Laboratories, 1970—. Mr. Hartman has worked in the areas of solar energy conversion, low-temperature photoluminescence, GaP light-emitting diodes, GaAlAs double heterostructure lasers, optical detectors, bipolar integrated circuits, and switching devices. He is currently Supervisor of the Silicon Device Technology Group. Member, IEEE and Sigma Xi.

**Ira Jacobs**, B.S. (physics), magna cum laude, 1950, City College of New York; M.S. (physics), 1952, Ph.D. (physics), 1955, Purdue University; Bell Laboratories, 1955—. Mr. Jacobs became supervisor in the Communications and Electromagnetic Analysis Department of Bell Laboratories in 1960, participating in satellite communication and radar cross-section studies. In 1962 he was appointed Head of the Military Communication Analysis Department, with responsibilities for projects in satellite communication, deep space communication, and signal processing. He became Head of the Digital Transmission Analysis Department in 1967, where he managed design work on digital transmission systems. He was appointed Director of the Transmission Systems Research Center in 1969. There he was in charge of departments performing studies on transmission objectives, performance measurement, and human factor analysis. In 1970 he became Director of the Transmission Operations and Analysis Center, managing departments involved in transmission systems maintenance, testing, and performance analysis. From 1971 to 1976, Mr. Jacobs served as Director of the Digital Transmission Laboratory where his responsibilities included the development of planning tools and digital transmission facilities including the T1/OS,

T2, and T4M systems. In 1976, Mr. Jacobs became Director of the Wideband Transmission Facilities Laboratory, in charge of the design and development of digital transmission systems using optical fiber and coaxial cables, and the provision of the network services for radio and television broadcasting. Member, American Physical Society, IEEE, American Association for the Advancement of Science, Phi Beta Kappa, Sigma Xi, Sigma Pi Sigma.

**Richard S. Kerdock**, RCA Institutes, 1966; B.S.E.E., 1972, Polytechnic Institute of Brooklyn; M.S.E.E., 1975, Polytechnic Institute of New York; U.S. Air Force 1957-1961; New York Telephone Co. 1961-1962; Federal Electric Corp. (ITT) 1962-1963; Bell Laboratories 1966—. Since joining Bell Laboratories, Mr. Kerdock has done circuit and systems work on digital transmission systems. He worked on the development of the T2 Digital Line, and is presently involved in exploratory and early development of fiberguide transmission systems.

**Theodore L. Maione**, B.S.E.E., 1952, Massachusetts Institute of Technology; RCA, 1952; U.S. Army Signal Corps, 1952-1954; Communications Development Training Program, 1954-1956; Bell Laboratories, 1954—. Mr. Maione has worked on submarine cable systems and repeater design, general purpose communications test equipment for carrier and data systems, the T2 Digital Line, and lightwave communications system development. He currently has responsibility for lightwave terminal circuits and M12 and M13 multiplexes.

**Hans Melchior**, Dipl. E.E. and Dr. Sc. Tech., 1959 and 1965, Swiss Federal Institute of Technology, Zurich; Department of Advanced Electrical Engineering, Swiss Federal Institute of Technology, 1960-1965; Bell Laboratories, 1965-1976; Swiss Federal Institute of Technology, 1976—. As an Assistant and Research Associate at the Swiss Federal Institute, Mr. Melchior worked on noise problems of p-n junctions at breakdown, high injection effects, second breakdown in diodes and transistors, and tunnel diode mixers and oscillators. At Bell Laboratories, he worked on the development of high-speed avalanche photodiodes, thin-film photoconductors and noise problems in MOS devices.

**Calvin M. Miller**, B.S.E.E., 1963, North Carolina State University at Raleigh; M.S.E., 1966, Akron University; Goodyear Aerospace Corporation, 1963–1966; Martin Marietta Company, 1966–1967; Bell Laboratories, 1967—. Before joining Bell Laboratories, Mr. Miller designed electronic and optical components of side-looking radar processor equipment and control systems for reentry vehicles and aircraft flying simulators. At Bell Laboratories, Mr. Miller developed equipment and methods for transmission line characterization. His present interests are in the area of fiber optics as a practical transmission medium. He is supervisor of an exploratory optical fiber splicing group. Member, OSA.

**Joe H. Mullins**, B.S. (Physics), 1950, Texas A&M University; M.S. (Physics), 1954, Ph.D. (Physics), 1959, California Institute of Technology; California Institute of Technology, 1959–1967; Bell Laboratories, 1967—. Mr. Mullins worked on the Millimeter Waveguide System (WT4) during his first years at Bell Laboratories. In 1972, he was appointed Head, Fiberguide Trunk Development Department, with primary responsibility for the T2 transmission system, an intercity paired cable digital facility which was introduced into the Bell System in that year. In 1978 he became Director, Switching Operations Systems Laboratory. Member, American Institute of Physics, American Physical Society, American Association for the Advancement of Science, Sigma Xi; Senior member, IEEE.

**Daryl L. Myers**, B.S., 1953, Carnegie Institute of Technology; Western Electric, 1953—. Mr. Myers transferred from the Baltimore Works to the Product Engineering Control Center in Atlanta in 1969 and was assigned to the lightguide project in 1973. He is presently a Senior Staff Engineer responsible for fiber-drawing process development.

**Fred P. Partus**, Ph.D., 1971, Tulane University; Western Electric, 1971—. Mr. Partus' work on the lightguide project began in 1973 with internships at Bell Laboratories in Atlanta and Murray Hill. He is presently a Senior Engineer responsible for the process developments related to preform fabrication at the Western Electric Product Engineering Control Center in Atlanta.

**W. A. Reenstra**, B.S.E.E., 1947, M.S. (Physics), 1949, Rensselaer Polytechnic Institute; Bell Laboratories, 1942-1956; AT&T, 1956-1961; Bell Laboratories, 1961—. Mr. Reenstra's first assignment with Bell Laboratories was in the Switching Research Department, where he worked on the remote line concentrator. In 1961 he was appointed supervisor in the Systems Engineering Department and in 1965 became Head, Military Switching Systems Department. He is presently Head, Loop Plant Construction and Installation Department. Member, IEEE, American Physical Society.

**Henry W. Reinbold**, A.T., 1961, Temple University; B.S., 1973, Fairleigh Dickinson University; Bell Laboratories, 1961—. After joining Bell Laboratories in 1961, Mr. Reinbold became involved with ruby maser development, with emphasis on material studies. Later he worked with electro-optic light modulators and optical communication links. His present activity includes design of test apparatus used in evaluating various lightwave devices and subsystems.

**Peter K. Runge**, Dipl. Ing., 1963, Dr. Ing., 1967, Technical University of Braunschweig, Germany; Bell Laboratories, 1967—. Mr. Runge has been engaged in research of He-Ne and organic dye layers and exploratory development of fiber optic repeaters and single-fiber optic connectors. He is currently Supervisor of the Fiberguide Technology Group and is responsible for the development of single-fiber optic connectors.

**M. R. Santana**, B.S.E.E., 1970, University of Hartford; M.S.E.E., 1971, Georgia Institute of Technology; Bell Laboratories, 1970—. Mr. Santana has been continuously involved in cable design and development in the Loop Transmission Division. At present he is involved in optical fiber cable design, analysis, and testing. Member, IEEE, Kappa Mu.

**M. J. Saunders**, B.S. (Physics), 1950 and M.S. (Physics), 1952, University of Virginia; Ph.D. (Physics), 1956, University of Florida; Bell Laboratories, 1956—. Mr. Saunders has worked on a variety of optical problems and is currently investigating methods of determining the refractive index profiles of optical fibers and preforms. Member, Optical Society of America, New York Academy of Sciences, American Association for the Advancement of Sciences, and the Federation of American Scientists.

**David P. Schinke**, B.S., 1963, Central Methodist College; Ph.D., The University of Kansas; Bell Laboratories, 1968—. Mr. Schinke's fields of interest have included quantum electronics, thin film optics, and avalanche photodetectors.

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**Morton I. Schwartz**, B.E.E., 1956, City College of New York; M.E.E., 1959, Eng. Sci.D. 1964, New York University; ITT Laboratories, 1956-1962; Bell Laboratories, 1961—. At ITT, Mr. Schwartz' principal efforts were in the field of radar systems studies and design. At Bell Laboratories, he has been engaged in theoretical and experimental work in radar, sonar, and communications. Since 1972, he has been responsible for the exploratory development of optical fiber communication media which led to the Atlanta Lightwave Communications Experiments and to the Chicago Lightwave Communication Project. He is currently responsible for the development of optical fiber communications media.

**Darrell D. Sell**, B.A. 1962, St. Olaf College; Ph.D. (Physics), 1966, Stanford University, Bell Laboratories, 1967—. Mr. Sell joined Bell Laboratories in the physical research area and for six years carried out optical spectroscopic research on materials. He transferred to lightwave development work in 1973, where he has been involved in system design, testing, field evaluations, and lightwave regenerator development.

**Paul W. Shumate, Jr.**, B.S. (physics), 1963, College of William and Mary; Ph.D. (physics), 1968, University of Virginia; Bell Laboratories, 1969—. Mr. Shumate's first assignments at Bell Laboratories included research on the physical properties of magnetic bubble materials and magnetic bubble memory devices. He transferred to the Integrated

Circuit Marketing and Applications Department in 1973, where he studied memory applications for integrated circuits. In 1975 he became Supervisor in the Lightwave Devices and Subsystems Department, where he directs the design and packaging of gallium-arsenide laser transmitters for use in future lightwave communications systems. Member, American Physical Society, Phi Beta Kappa, Sigma Xi, IEEE. Member of the IEEE Magnetics Advisory Committee and editor of the *IEEE Transactions on Magnetics*.

**Richard G. Smith**, B.S. E.E., 1958, M.S. E.E., 1959, Ph.D., 1963, Stanford University; Bell Laboratories, 1963—. Mr. Smith has been engaged in research and development in the areas of solid-state lasers, nonlinear optics, and electro-optic devices, and most recently in fiber optics. His current work involves the development of detectors and receivers for lightwave applications. Member, AIP, IEEE, Phi Beta Kappa, Tau Beta Pi.

**John Williams**, B.S. (Cer. E.) 1950, M.S. (Cer. E.), 1951, Prof. Degree (Cer. E.) 1969, University of Missouri-Rolla; Bell Laboratories, 1951—. Mr. Williams has been engaged in ceramic materials research and development of substrates for carbon film resistors and thin film circuits, ceramic dielectrics for microwave windows, and insulators in ocean cables. He is presently involved in the preparation of glass-fiber optical waveguides. Fellow, American Ceramic Society; Member, National Institute of Ceramic Engineers, ASTM-F-1.

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