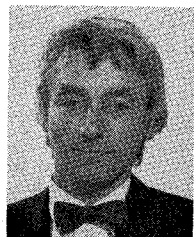


# Contributors



**Eric A. Ash** (A'53-M'55-F'68) was born in Berlin, Germany, in 1928. He received the B.Sc. degree in electrical engineering in 1948, and the Ph.D. degree in 1952, both from the Imperial College of Science and Technology, University of London, London, England.

From 1952 to 1954 he was a Research Associate in the Electronics Research Laboratory at Stanford University, Stanford, Calif. In 1955 he joined the Standard Telecommunication Laboratories, Harlow, England, where

he worked on vacuum and solid-state electron devices. In 1963 he joined the staff of University College, London, England, where he is now Professor of Electrical Engineering.

Dr. Ash is a member of the IEE (London) and a Fellow of the Institute of Physics.

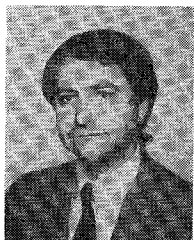


**DeLamar T. Bell, Jr.** (S'56-M'59) was born in New York, N. Y., on April 29, 1935. He received the B.S. degrees in electrical engineering and engineering physics from Lehigh University, Bethlehem, Pa., in 1957 and 1958, respectively, and the M.S. degree and the E.E. degree from Stanford University, Stanford, Calif., in 1959 and 1965, respectively.

Since joining Texas Instruments, Inc., Dallas, Tex., in 1963, he has worked on a variety of development projects associated

with ultrasonic and optical techniques for signal analysis and real-time displays. In 1970 he transferred to the Central Research Lab. to develop surface-wave device technology for application to spread spectrum and radar systems.

Mr. Bell is a member of the American Institute of Physics, Tau Beta Pi, and Eta Kappa Nu.



**Alain G. Bert** was born in Marseille, France, in September 1937. He received the Engineer's degree from the Ecole Nationale Supérieure des Télécommunications, Paris, France, in 1959, the M.S. degree from Stanford University, Stanford, Calif., in 1960, and the Docteur Ingenieur degree in 1964.

He was in charge of research and development in the High Power Klystron Department of Thomson-Varian before joining Thomson-CSF, Orsay, France. He is currently at

the Research Laboratory, Thomson-CSF Electron Tube Group.



**Joseph Burnsweig** (S'42-M'47-SM'64) was born in Tulare, Calif., on October 1, 1919. He received the B.A. degree in physics from the University of California, Berkeley, in 1942. He completed advanced engineering studies at U.C.L.A. during 1950 to 1953.

During World War II he was a member of the Signal Corps Electronics Training Group at Harvard University and the Massachu-



setts Institute of Technology. He was an Air Force Design and Development Officer with the Ultrasonics Trainer Group at the M.I.T. Radar Laboratory, and later a radar field engineer with the Air Force. From 1946 to 1950 he was a radar system and transmitter designer at Convair, San Diego, Calif. Since joining Hughes in 1950, he has contributed to the design of missile data links and radar using pulse, pulse Doppler, and synthetic aperture processing for airborne and space programs. His efforts over the past three years have been directed towards the design and application of surface-wave devices to radar and data-link applications. He has published and presented a number of papers in this field. Some contributions have been reported upon at IEEE conventions sponsored by Ultrasonics, MTT, ED, SSC Groups, Michigan Radar, and Old Crows ECM Symposiums. He is now a Senior Scientist in the Radar Microwave Laboratory at Hughes Aircraft Company, Culver City, Calif., engaged in the design and development of surface-wave devices for application to military electronic systems. He has been awarded seven patents in the fields of wide-band signal coding and high-level modulation techniques.

Mr. Burnsweig is a member of the professional groups on MTT, AES, SU, and COMTECH. He is a Registered Professional Engineer in the State of California.



**Lewis T. Claiborne** (M'72) was born in Holly Grove, Ark., on September 17, 1935. He received the B.S. degree in physics and mathematics at Baylor University, Waco, Tex., and the Ph.D. degree in physics from Brown University, Providence, R. I., in 1957 and 1961, respectively.

He joined Texas Instruments, Inc., in 1962, and is currently Manager of the Electronic Components Branch of the Advanced Technology Laboratory. He is engaged in

studies of surface elastic waves and microwave acoustics.

Dr. Claiborne is a member of the Americal Physical Society and the IEEE Group on Sonics and Ultrasonics.



**Jeffrey H. Collins** was born in Luton, England, on April 22, 1930. He received the B.Sc. degree in physics and the M.Sc. degree in mathematics from the University of London, London, England, in 1951 and 1954, respectively.

From 1951 to 1956 his experience in the areas of highpower traveling wave tubes, ferrite parametric amplifiers, and the backward-wave oscillator was obtained during employment at the Hirst Research Center,

Wembley, England, and at Ferranti Ltd., Edinburgh, Scotland, where he was a Senior Engineer. From 1957 to 1967 he was with the Electrical Engineering Department, University of Glasgow, Glasgow, Scotland, where he taught in the fields of networks and material science and did research on microwave ferrites and microwave acoustics. During the scholastic years 1966-1968, he was a Research Engineer in the W. W. Hansen Laboratories of Physics, Stanford University, Stanford, Calif., where he was engaged in research on micro-

wave acoustics, garnet delay lines, optoacoustic interactions, and pulse compression applications. From 1968 to 1970 he was Director of Physical Sciences at the Autonetics Division of North American Rockwell Corporation. He is currently Research Professor in electrical engineering at the University of Edinburgh, Edinburgh, Scotland, where he is actively engaged in programs in the areas of systems applications of surface acoustic waves and magnetic bubble domains.



**Barry J. Darby** was born in Birmingham, England, on August 28, 1947. He received the B.Sc. degree in applied physics from Bath University of Technology, Bath, England, in 1969.

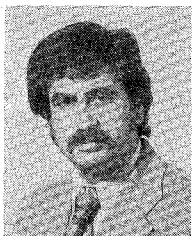
He then joined the Plessey Company Ltd., England, at the Allen Clark Research Center to continue research on MOS integrated optoelectronic devices that he began as a student. In 1970 he joined Emihus Microcomponents Ltd., Glenrothes, Scotland, as an MOS Process Development Engineer, spending ten months with this company before commencing doctoral studies at Edinburgh University, Edinburgh, Scotland.



**Bernard Epsztein** was born in Paris, France, in November 1924. He received the Licence es Sciences and the Doctorat es Sciences from Paris University, Paris, France, in 1947 and 1958, respectively.

He has been with Thomson-CSF, Orsay, France, and its predecessor C.S.F. since 1947. From 1947 to 1958 he was engaged in microwave tube research, in particular in the klystron and crossed-field amplifier areas. During these studies, he filed the basic patent for the backward wave oscillator and took part in its development. From 1958 to 1960 he did microwave research work at Polytechnic Institute of Brooklyn, Brooklyn, as Staff Member. From 1965 to 1968, he led a Particle Accelerator Research Laboratory. Since 1968 he has been head of the Microwave Research Laboratory of the Tube Division.

Dr. Epsztein is a member of Sigma Xi.



**Henry M. Gerard** was born in Brooklyn, N. Y., on November 7, 1942. He received the B.S. and M.S. degrees in physics in 1964 as a participant in the Unified Honors Program of the Polytechnic Institute of Brooklyn, Brooklyn, N. Y. As a research assistant at the Microwave Laboratory of Stanford University, Stanford, Calif., from 1964 through 1969, he studied piezoelectric surface waves and interdigital transducers leading to conferral of the Ph.D. degree in applied physics in 1970.

Since 1969, he has been a member of the Technical Staff at Hughes Aircraft Company, Fullerton, Calif., where he has been engaged in the development of broad-band acoustic signal processing devices.

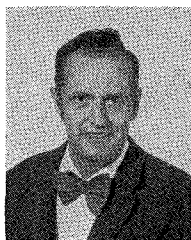
Dr. Gerard is a member of Sigma Xi.



**Peter M. Grant** was born in St. Andrews, Scotland, on June 20, 1944. He received the B.Sc. degree in electronic engineering from Heriot-Watt University, Edinburgh, Scotland, in 1966.

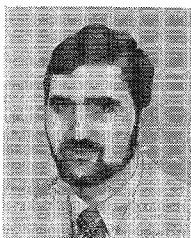
From 1966 to 1970 he worked as a Development Engineer with the Plessey Company Ltd., England, at both the Allen Clark Research Center and Havant, designing frequency synthesizers and standards for mobile military communications. Following a year as Senior MOS Applications Engineer with Emihus Microcomponents, Glenrothes, Scotland, he was appointed to a research fellowship at the University of Edinburgh, Edinburgh, to study the applications of surface acoustic wave analog matched filters to communication systems.

Mr. Grant is an associate member of the IEE (London).



**J. Benjamin Harrington** (S'50-A'51-SM'61) was born in Seattle, Wash., on February 27, 1926. He received the B.S.E.E. degree from Cornell University, Ithaca, N. Y., in 1950.

He served in the U. S. Navy as a Radio Technician for two years during World War II. He was employed for eleven years at General Electric, Utica, N. Y., as a Research Engineer, where he headed the APS-96 receiver and signal-processing design group. He participated in the design and development of the receiver and AMTI portions of airborne radar and cloud mapping systems from 1950 until 1961. Specific signal processing included various AMTI configurations, both coherent and noncoherent, which utilized clutter locking, displaced phase center antenna processing, Time Average Clutter Coherent Airborne Radar (TACCAR), and radar pulse-compression techniques. He joined Hughes Aircraft Company in August 1961 as Head of the IF Signal Processing Group. His experience with Hughes has been concentrated mainly in radar signal-processing areas such as MTI, coherent integration, pulse compression, and ultrasonic devices. He has participated in the Hughes development of several new techniques in the areas of coded pulse work, correlation techniques, and advanced ultrasonic devices. He is currently a Senior Staff Engineer in the Ground Systems Group of the Hughes Aircraft Company in Fullerton, Calif. He has several patents and has given and written numerous papers in the field of coherent signal processing and advanced acoustic bulk-wave and surface-wave devices.



**Clinton S. Hartmann** (S'66-M'67) was born in Fredericksburg, Tex., on December 31, 1944. He received the B.S. degree in electrical engineering from the University of Texas, Austin, in 1967. He received the S.M. and E.E. degrees from the Massachusetts Institute of Technology, Cambridge, in 1968 and 1969, respectively.

In July 1969 he joined Texas Instruments Incorporated, Dallas, Tex., where he is doing basic and applied research on surface-wave

acoustics.

Mr. Hartmann is a member of Tau Beta Pi, Eta Kappa Nu, and Sigma Xi.



**Jerry D. Holmes** (S'57-M'61) was born in Lockney, Tex., on March 11, 1937. He received the B.S.E.E. degree from Texas Technological College, Lubbock, in 1959, the S.M.E.E. degree from Massachusetts Institute of Technology, Cambridge, in 1960, and the Ph.D. degree in electrical engineering from Oklahoma State University, Stillwater, in 1965.

From 1960 to 1963 he was a Lieutenant in the U. S. Air Force assigned to the Satellite Test Center, Sunnyvale, Calif., where he participated in the command and control of earth satellites. In 1965 he joined Texas Instruments, Inc., Dallas, Tex., and has been engaged in the analysis and development of advanced radar and communication techniques, especially those relating to surface-wave and charge transfer technologies.

Dr. Holmes is a member of Sigma Xi, Tau Beta Pi, and Eta Kappa Nu.



**Gordon S. Kino** (S'52-A'54-SM'63-F'66) was born in Melbourne, Australia, on June 15, 1928. He received the B.Sc. and M.Sc. degrees in mathematics in 1948 and 1950, respectively, from London University, London, England. In 1955 he received the Ph.D. degree in electrical engineering from Stanford University, Stanford, Calif.

He joined the Mullard Radio Valve Company, in Salfords, Surrey, England, in 1947, where he did research on microwave triodes, traveling-wave tubes, and klystrons. From 1951 to 1955 he was employed as a Research Assistant at the Electronics Research Laboratory of Stanford University, where he carried out research on microwave tubes. He joined the Bell Telephone Laboratories, Murray Hill, N. J., and was a member of the Technical Staff from Dec. 1955 until 1957. Since 1957 he has been at Stanford University, and is currently a Professor of Electrical Engineering. At Stanford he has worked on microwave tubes and plasmas. His present interests are in microwave acoustics and solid-state devices. During the 1967 to 1968 academic year he was on Sabbatical leave in England, and held a Guggenheim Fellowship.

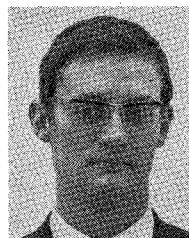
Dr. Kino is a Fellow of the American Physical Society.



**William R. Jones** (SM'69) was born in Globe, Ariz., on November 8, 1932. He received the B.A. degree in mathematics from the University of California, Riverside, in 1957, and the M.S. and Ph.D. degrees in mathematics from Stanford University, Stanford, Calif., in 1958 and 1967, respectively.

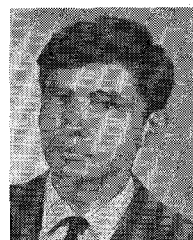
From 1952 to 1954 he served in the U. S. Navy as a Training Devices Technician. From 1954 to 1957, while at the University of California, he was employed at the U. S. Naval Ordnance Laboratory, Corona, Calif., as a Microwave Technician. From 1958 to 1960 he was employed at the IBM Watson Laboratory, Yorktown Heights, N. Y., as a member of a microwave computer group investigating the application of microwave techniques to the development of high-speed logical circuits. In June 1960 he joined Hughes Aircraft Company, Fullerton, Calif., where he concentrated primarily on the study of electromagnetic surface-wave excitation and diffraction problems. From 1962 to 1966 he returned to full-time academic study at Stanford University with the aid of a Hughes Fellowship. At present he is a Senior Scientist at Hughes Ground Systems Group, where he is involved primarily with research in the areas of electromagnetic and acoustic wave propagation and diffraction problems.

Dr. Jones is a member of Sigma Xi.



**Paul E. Lagasse** was born in Ghent, Belgium, on April 19, 1947. He received the E.E. degree in 1969 and the Sc.D. degree in 1972, both from the University of Ghent, Ghent, Belgium.

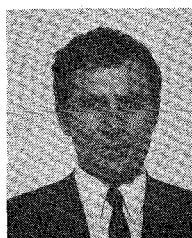
In 1969 he joined the Laboratory for Electromagnetism and Acoustics at the University of Ghent where he pursues research on microwave acoustics in cooperation with University College, London, England.



**Stephen Ludvik** (S'68) was born in Budapest, Hungary, in 1944. He received the B.S. degree in physics, and the B.E. and M.S. degrees in electrical engineering, all from the University of Sydney, Sydney, Australia, in 1965, 1968, and 1970, respectively. He is currently studying for the Ph.D. degree in electrical engineering at Stanford University, Stanford, Calif., where his dissertation is concerned with acoustic wave interactions in piezoelectric semiconductors.

He is employed as a Research Assistant at the Microwave Laboratory at Stanford University.

Mr. Ludvik is a member of Sigma Xi.



**Gérard Kantorowicz** received an engineering degree from Ecole Supérieure d'Electricité, Paris, France, in 1954.

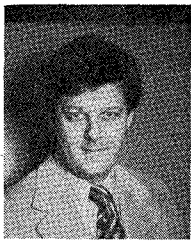
He joined the Compagnie Générale de T.S.F. (now Thomson-CSF) in 1957, where he worked in the Research Laboratory of the Electron Tube Group. He has been engaged in the field of high-power klystrons, crossed-field amplifiers, electronically variable microwave delay lines, propagation in plasmas, high-power traveling-wave tubes, and micro-

wave acoustics.



**F. Graham Marshall** (M'72) was born in Newark, England, on March 28, 1942. He received the B.Sc. degree in physics from Birmingham University, Birmingham, England, in 1963 and the Ph.D. degree for work on microwave acoustic paramagnetic resonance from Nottingham University, Nottingham, England, in 1967.

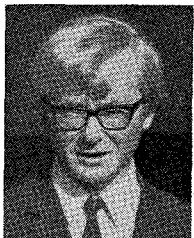
Since 1967 he has been with the Royal Radar Establishment, Great Malvern, England, where he has worked on acoustoelectric phenomena and surface acoustic wave devices.



**Tom A. Martin** (M'66) was born in Great Bend, Kans., on September 14, 1941. He received the B.S. degree in 1963 from Stevens Institute of Technology, Hoboken, N. J., the M.S. degree in mathematics in 1969 from Trinity College, Hartford, Conn., and the M.S.E.E. degree in 1971 from the University of Connecticut, Storrs.

From 1964 to 1965 he was with IBM's Advanced Systems Development Division, Yorktown Heights, N. Y. Since 1965 he has been with Andersen Laboratories, Inc., Bloomfield, Conn., where he is working on the analysis, design, fabrication, and applications of a variety of ultrasonic delay lines. He is presently responsible for dispersive device development and is a part-time doctoral student at the University of Connecticut.

Mr. Martin is a member of Tau Beta Pi and Sigma Xi.



**Iain M. Mason** was born in Kasama, Northern Rhodesia, on July 16, 1943. He received the B.Sc.(Eng.) degree from the University of Cape Town, Cape Province, South Africa, in 1964, and the Ph.D. degree from the University of Edinburgh, Edinburgh, Scotland, in 1968. His dissertation was on acoustoelectric surface-wave amplification.

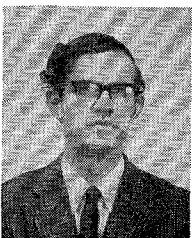
In 1968 he joined the Marconi Company, Witham, England, where he worked on a silicon-diode array target for a beam-scanned camera tube. In 1969 he joined the staff of University College, London, England. His current interests are in the propagation, guiding, and nonlinear interaction of acoustic surface waves.



**David P. Morgan** (S'67-M'72) was born in Danbury, England, on May 19, 1941. He received the B.A. degree in physics in 1962 from the University of Cambridge, Cambridge, England, the M.Sc. degree in 1966 from Chelsea College, London, England, where he studied helicon waves in solids, and the Ph.D. degree in 1969 from University College, London, England, where he did research on dispersive delay lines using surface acoustic waves.

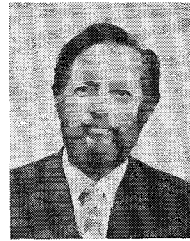
During 1970-1971 he was with the Central Research Lab., Nippon Electric Company, Kawasaki, Japan, where he worked on surface acoustic wave filters. He is now a Research Fellow at the University of Edinburgh, Scotland, where his main interest is in surface acoustic wave convolvers using nonlinear interactions.

Dr. Morgan is a member of the IEE (London).



**Cleland O. Newton** was born in London, England, on June 28, 1940. He received the B.A. degree in physics in 1962 and the D.Phil. degree for work on negative resistance properties of semiconductors in 1966, both from Oxford University, Oxford, England.

He joined the Royal Radar Establishment, Great Malvern, England, in 1966. He has worked on the Gunn effect and is currently engaged on work on surface acoustic waves.



**Edward G. S. Paige** was born in Hastings, England, on July 18, 1930. He received the B.Sc. degree in physics in 1952 and the Ph.D. degree in 1955, both from Reading University, Reading, England.

He joined the Royal Radar Establishment, Great Malvern, England, in 1955 and has worked on transport and optical properties of semiconductors. He is currently engaged on work on surface acoustic waves.

Dr. Paige is a fellow of the Institute of

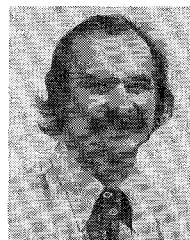
Physics.



**Richard V. Ridings** (S'57-M'59) was born in Macon, Mo., on June 2, 1936. He received the B.S.E.E. and M.S. degrees from Saint Louis University, Saint Louis, Mo., in 1958 and 1961, respectively, and the Ph.D. degree from the University of Wisconsin, Madison, in 1967.

From 1958 to 1967 he held full- and part-time teaching appointments at Saint Louis University and the University of Wisconsin. In the summers of 1963 and 1964 he was employed by the Center for Naval Analyses, Washington, D. C. Since joining Texas Instruments, Inc., Dallas, Tex., in 1967, he has been working in the area of radar and communications systems analysis and advanced signal processing techniques.

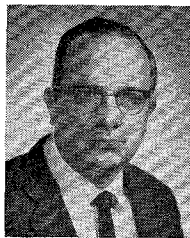
Dr. Ridings is a member of Sigma Xi, Eta Kappa Nu, and Pi Mu Epsilon.



**Ronald C. Rosenfeld** (S'64-M'72) was born in Marshalltown, Iowa, on September 21, 1943. He received the B.S., M.S., and Ph.D. degrees in electrical engineering from Iowa State University, Ames, in 1966, 1969, and 1971, respectively.

Since joining Texas Instruments Incorporated in 1971, he has been involved in research with acoustic surface waves.

Dr. Rosenfeld is a member of Tau Beta Pi, Eta Kappa Nu, and Pi Mu Epsilon.



**L. R. Schissler** (S'52-M'72) received the B.S. degree in electrical engineering from Lehigh University, Bethlehem, Pa., in 1953 and the S.M. and Sc.D. degrees from Massachusetts Institute of Technology, Cambridge, in 1955 and 1959, respectively.

Currently he is a Member of the Technical Staff at Sperry Rand Research Center, Sudbury, Mass. He has designed several kinds of instruments including sounding rocket payload packages, Loran-C timing receivers, a scanning optical microdensitometer, and high-speed multiplexers.

Dr. Schissler is a member of Sigma Xi and the American Association for the Advancement of Science.



**H. J. Shaw (M'55)** was born in Seattle, Wash. He received a B.A. degree from the University of Washington, Seattle, and the Ph.D. degree from Stanford University, Stanford, Calif.

He is presently Senior Research Associate at Stanford University and Associate Director of the Microwave Laboratory. He has been actively engaged in research on microwave antennas, microwave tubes, high-power klystrons, and microwave measurements, and has recently been concerned with solid-state microwave devices, involving resonance and spin waves in ferrites, acoustic and magnetoacoustic waves in solids, interaction of acoustic waves with laser light, and acoustic mechanisms for microwave signal processing. He has been a consultant to a number of electronics laboratories. During 1968 to 1969 he was liaison scientist for the Office of Naval Research in London, England.

Dr. Shaw is a member of APS, Tau Beta Pi, and Sigma Xi. He is past chairman of the Professional Group on Electron Devices, San Francisco Section, IRE.



**William R. Shreve (S'71)** was born in Dobbs Ferry, N. Y., on June 28, 1947. He received the B.S. degree in engineering physics from Cornell University, Ithaca, N. Y., in 1969, and the M.S. degree in applied physics from Stanford University, Stanford, Calif., in 1971. He is currently working towards the Ph.D. degree in applied physics at Stanford University.

His area of specialization is the parametric interaction of surface acoustic waves to produce the matched filter response of coded inputs.



**Henry I. Smith** was born in Jersey City, N. J., on May 26, 1937. He received the B.S. degree in physics from Holy Cross College, Worcester, Mass. in 1958, and the M.S. and Ph.D. degrees, both from Boston College, Chestnut Hill, Mass., in 1960 and 1966, respectively.

From 1960 to 1963 he was in the Air Force, stationed at Air Force Cambridge Research Laboratories, where he did work in geophysics and microwave ultrasonics. He was at Boston College as an Assistant Professor of Physics until 1968, when he joined M.I.T. Lincoln Laboratory, Cambridge, Mass. At Lincoln Laboratory he has worked on the development of UHF elastic surface-wave devices. The emphasis of his work has been on specialized fabrication techniques and has included the preparation of piezoelectric thin films, photolithography, electron-beam lithography, X-ray lithography, and ion-beam sputter etching.

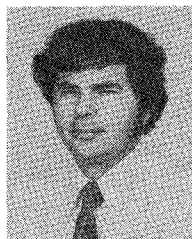


**W. Richard Smith (M'72)** was born in Salem, N. J., on July 2, 1942. He received the A.B. degree in physics from Princeton University, Princeton, N. J., in 1964, and the M.S. and Ph.D. degrees in applied physics from Stanford University, Stanford, Calif., in 1966 and 1970, respectively.

In 1969 he served as a Technical Consultant to North American Rockwell Corporation, Autonetics Division, in the area of microwave acoustic surface waves. Since 1970, he

has been on the technical staff at Hughes Aircraft Company, Fullerton, Calif., where he has been engaged in research on acoustic surface waves, especially as applied to filter and delay-line design.

Dr. Smith is a member of Sigma Xi.



**Edward J. Staples (S'70-M'72)** was born in San Francisco, Calif., in 1943. He received the B.S.E.E. degree from Loyola University, Los Angeles, Calif., in 1966, the M.S.E.E. degree from University of Arizona, Tucson, Ariz., in 1968, and the Ph.D. degree for work on surface-wave detection using piezoresistive MOSFET's, from Southern Methodist University, Dallas, Tex., in 1971.

He has done research on phased array antennas, thin-film microwave acoustics, MOS integrated circuits, and silicon processing as a Graduate Assistant and Engineer. He is currently a member of the Technical Staff of the Advanced Technology Laboratory of Central Research, Texas Instruments, Inc., Dallas, Tex., where he is engaged in the research and development of acoustic surface-wave signal processing techniques and devices.



**H. van de Vaart (M'65)** was born in Arnhem, The Netherlands, on April 11, 1934. He received the Ingenieurs degree in applied physics in 1958, and the Ph.D. degree in 1969, both from the Technological University, Delft, The Netherlands.

From 1958 to 1960 he served in the Dutch Army as a Radar Instructor. He joined Transitron Electronic Corporation, Wakefield, Mass., in 1960 where he did research on diffusion processes in silicon. Since 1962 he has been with the Sperry Rand Research Center, Sudbury, Mass., where he has been concerned with nuclear quadrupole and ferromagnetic resonances, and with linear and nonlinear phenomena involving spin wave and magnetoelastic waves at microwave frequencies in ferrites. More recently, his work has concentrated on magnetic and acoustic surface-wave device studies.

Dr. van de Vaart is a member of the American Physical Society and the Royal Dutch Institute of Engineers. He was Secretary/Treasurer (1970-1971) and Chairman (1971-1972) of the Boston Section of the IEEE Group on Sonics and Ultrasonics.



**James M. White (S'68)** was born in Fountain Inn, S. C., on February 16, 1945. He received the B.S. degree in physics from the Georgia Institute of Technology, Atlanta, Ga., in 1967, and the M.S. degree from Stanford University, Stanford, Calif., in 1969, where he is currently working toward the Ph.D. degree in applied physics.

From 1967 to 1969, as a Research Assistant at the Stanford Microwave Laboratory, he did research on thin-film piezoelectric transducers.

Between 1969 and 1971 he served as a Signal Corps Lieutenant at Fort Monmouth, N. J., where he did research and development in microwave acoustics for the Electronic Components Laboratory. He returned in 1971 to the Stanford Microwave Laboratory, and since that time has studied microwave signal processing using the nonlinear interactions of acoustic waves.

Mr. White is a member of Tau Beta Pi.





**Richard C. Williamson** (M'72) was born in Minocqua, Wis., on September 10, 1939. He received the B.S. and Ph.D. degrees in physics from the Massachusetts Institute of Technology, Cambridge, in 1961 and 1966, respectively.

From 1966 to 1970 he was a staff physicist at the NASA Electronics Research Center in Cambridge, Mass. While there he was involved in research programs in the areas of fluid critical phenomena and superconductivity.

During this period he was also a Visiting Scientist at the Center for Materials Science and Engineering, M.I.T. In 1970, he joined the staff of M.I.T. Lincoln Laboratory, where he is now engaged in the development of elastic surface-wave devices.

Dr. Williamson is a member of the American Physical Society and Sigma Xi.

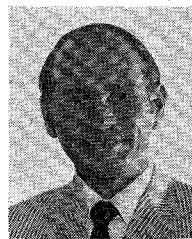


**Donald K. Winslow** (SM'57) was born in Hanford, Calif., on September 25, 1914. He received the A.B. and M.A. degrees in mathematics from the University of California, Berkeley, in 1936 and 1939, respectively, the M.S. degree in meteorology from the California Institute of Technology, Pasadena, in 1943, and the M.S. and Ph.D. degrees in physics from Stanford University, Stanford, Calif., in 1954 and 1957, respectively.

From 1938 to 1957, he taught in High Schools and Junior Colleges in California, except from 1942 to 1946, when he was an officer in the United States Navy. From 1947 to 1951 he was an Assistant Professor of Physics at Fresno State College. From 1951 to 1957 he was a graduate student in Physics and

Research Assistant in the Microwave Laboratory at Stanford University. From 1957 to the present he has been a Research Associate and Research Engineer at the Microwave Laboratory doing research in high-power traveling-wave tubes, microwave properties of ferrites, the interaction of the acoustic waves with laser beams, and microwave acoustics. He has been a consultant for Ampex, Sylvania, Varian, Lockheed, Litton, Sperry, and Stanford Research Institute. The year of 1969 to 1970 was spent at the Technical Universities of Denmark and Norway and Thompson-CSF, France.

Dr. Winslow is a member of Sigma Xi and the American Physical Society.



**J. Wooldridge** was born in Los Angeles, Calif., on July 3, 1933. He received the B.A. degree from the University of California at Berkeley in 1955, and the Ph.D. degree from the University of Southern California, Los Angeles, in 1967, under a Work Study Program.

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