

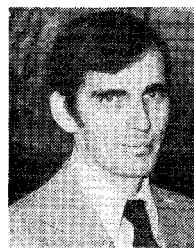
Contributors



Hiroyuki Abe was born on December 5, 1944. He received the B.S. and M.S. degrees from Kyoto University, Kyoto, Japan, in 1967 and 1969, respectively.

He joined the Nippon Electric Company, Ltd., Kawasaki, Japan, in 1969, and is now a Supervisor of the Electron Device Research Laboratory, Central Research Laboratories. He has been engaged in research and development of microwave semiconductor devices, and his latest interest lies in the circuit application of high-power GaAs FET's.

Mr. Abe is a member of the Institute of Electronics and Communication Engineers of Japan.



Richard Aston (M'61) was born in Wilkes-Barre, PA, in 1936. He studied microwaves under Harry Atwater and received the Ph.D. degree from Ohio State University, Columbus, in 1969.

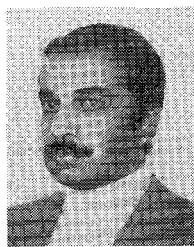
At Ohio State University he developed sensory aids for the deaf, and taught microwaves at Bucknell University, Lewisburg, PA. In 1972, he did IR&D for the Hughes Aircraft Company on Gunn amplifiers, and for several years was the Principal Investigator on IMPATT power combiners for General Dynamics, Pomona Division. He is now an Associate Professor in Engineering at Wilkes College, Wilkes-Barre, PA.

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Richard Allison graduated from the Massachusetts Institute of Technology, Cambridge.

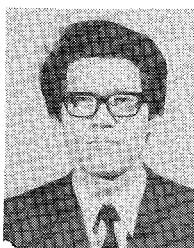
He has been with TRW Semiconductors, Lawndale, CA, for the past ten years. Since 1973, he has been the Program Manager for power products, assigned to develop new transistors for use in the automotive, switching power supply, and motor control markets. Since 1976, he has also been the Program Manager for RF pulse programs for the development of 500-1000-W amplifiers at *L* band and 65 W at *S* band.



Attaollah Azizi (S'76) was born in Kabul, Afghanistan, on January 16, 1944. He received the B.E.E. degree from the Ecole Polytechnique Fédérale de Lausanne, Switzerland, in 1976.

After a short period of practical work in the industry, he became a Member of the Microwave and Electromagnetic Group of the Ecole Polytechnique Fédérale de Lausanne. He is currently working towards the Ph.D. degree. His principal field of interest lies in microwave transistors and microwave nonlinear amplifier

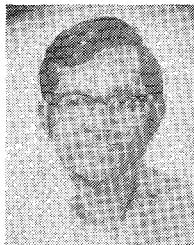
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Yoichi Aono was born in Ibaraki, Japan, on November 27, 1943. He graduated from Mito Technical High School, specializing in electrical engineering, in 1962.

He joined the Nippon Electric Company, Ltd., Kawasaki, Japan, in 1962, and has worked on millimeter-wave electron tubes, Gunn diodes, and GaAs IMPATT diodes. He is now engaged in the development of GaAs power FET's as a Member of the Technical Staff in the Central Research Laboratories, Nippon Electric Company.

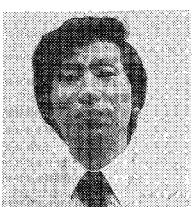
Mr. Aono is a member of the Institute of Electronics and Communication Engineers of Japan.



Ganesh R. Basawapatna (S'65-M'68) was born in Tinneveli, Tamil Nadu, India, on September 14, 1942. He received the B. Tech. (Hons.) degree in electronics from the Indian Institute of Technology, Kharagpur, India, in 1963, and the M.S. degree in electrical engineering from the Illinois Institute of Technology, Chicago, in 1964.

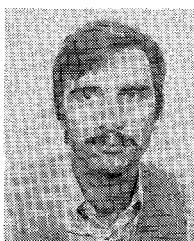
He was employed at the Research Division of Johnson Service Company, Milwaukee, WI, from 1965 to 1967, working on computerized systems. From 1967 to 1971 he was with the Raytheon Company, Murray Hill, NJ, where he designed GaAs IMPATT diode circuits. From 1971 to 1972 he was a founding partner in the Star Optics Corporation, Warren, NJ, manufacturing YAG gemstones. Since 1972 he has been employed by the Santa Rosa Division of the Hewlett-Packard Company, Santa Rosa, CA, where he is presently a Project Manager in the Network Analyzer R&D Laboratory, working on various microwave component subsystems.

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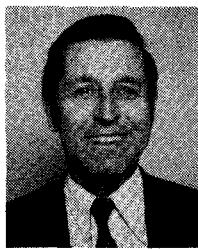
Yasushi Asano was born in Kyoto, Japan, on January 10, 1948. He received the B.S. degree in electrical engineering and the M.S. degree in electrics from Sophia University, Tokyo, Japan, in 1971 and 1973, respectively.

He has been with the TEAC Corporation since 1973 where he has initially worked on the design and development of an optical video system.



Karl Behm was born in Innien, Germany, in 1947, and studied electrical engineering at the Technische Universität Braunschweig, Braunschweig, Germany.

Since 1974 he has worked at the Institut für Hochfrequenztechnik, TU-Braunschweig, Germany, and is engaged in investigations on fibers for optical communication.

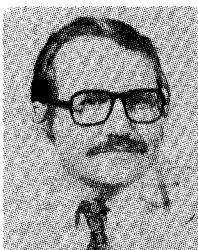


Emil Benko was born in Lakewood, OH. He received the B.S. and M.S. degrees in physics from Purdue University, Lafayette, IN, in 1951 and 1953, respectively.

From 1953 to 1958 he did basic research and development on breakdown mechanisms in solid-state devices at the Hughes Aircraft Company, Semiconductor Division. From 1958 to 1971 he was responsible for development and production of Zener diodes and other semiconductor devices at Continental Device Corporation (later Teledyne Semiconductor). In 1971 he joined the Electron Dynamics Division of the Hughes Aircraft Company, Torrance, CA, to work on microwave solid-state devices and is currently developing compound semiconductor devices.

Mr. Benko is a member of the American Physical Society.

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Robert L. Bernick (M'70) was born in St. Paul, MN, on May 7, 1938. He received the B.A. degree in mathematics from the University of Minnesota, Minneapolis, in 1959, the M.A. degree in physics from the University of California, Berkeley, in 1962, and the Ph.D. degree in physics from the University of Southern California, Los Angeles, in 1970.

In 1959 and 1960 he was with the AC Spark Plug Division, General Motors Corporation, El Segundo, CA, where his work was concerned with inertial guidance systems. From 1962 to 1965 he was employed at the Atomics International Division of North American Aviation Corporation, Canoga Park, CA, where he worked on nuclear reactor kinetics and reactor shielding design. In 1969 he joined the Hughes Aircraft Company where he has worked on the research and development of microwave semiconductor devices including avalanche and Gunn diodes and field-effect transistors.

Dr. Bernick is a member of Phi Beta Kappa.

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Harold T. Buscher (S'63–SM'77) was born in Cleveland, OH, on April 27, 1943. He received the B.S.E.E. degree from the Case Institute of Technology, Cleveland, OH, in 1964, and the M.S.E.E. degree from Ohio State University, Columbus, in 1965.

In 1964 he joined the Electroscience Laboratory, Ohio State University, and did research on laser-induced gas breakdown. Since then he has worked in plasma wave propagation, microwave component and scanning antenna design, MMW spectroscopy, and radar systems design at a number of research and industrial concerns. He is presently an Engineering Specialist in the Research and Advanced Techniques Department of General Dynamics/Pomona Division. His current interest is in MMW radar systems and high-power propagation.

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Gérard Cachier was born in Clermont-Ferrand, France, on December 7, 1943. He graduated from the Ecole Polytechnique, Paris, France, in 1964, and received the Doctorat ès Sciences Physiques degree from the University of Paris, Paris, France, in 1970.

He has been with the Thomson-CSF, Domaine de Corbeville, Orsay, France, since 1970. He has worked on digital integrated circuits using FET's, and on millimeter solid-state devices and technology. He is presently

Head of the Millimeter Laboratory at the Laboratoire Central de Recherches, Orsay, France.



Raymond L. Camisa (M'68) received the B.E.E., M.E.E., and Ph.D. degrees from the City College, City University of New York, New York, NY, in 1965, 1969, and 1974, respectively.

From 1965 to 1967 he was a Member of the Technical Staff at the RCA Advanced Communications Laboratory, New York. While there he worked on microwave filters, low-noise parametric amplifiers, and microwave integrated-circuit techniques. From 1967 to 1970, as a Member of the Technical Staff at Wheeler Laboratories, Inc., Great Neck, NY, he was part of a group developing a microwave integrated-circuit receiver for IFF applications. Specifically, he developed various MIC components; including low-noise transistor amplifiers, frequency multipliers, and filters. From 1970 to 1974 he was a part-time lecturer teaching courses in electromagnetic theory, electronics, and microwave measurements. At the university, he also worked as a Graduate Research Assistant investigating the use of MIS varactors in microwave networks. During those years he was a consultant to Wheeler Laboratories and the RCA Advanced Communications Laboratory. In 1974 he joined the Microwave Technology Center of the RCA Laboratories. His responsibilities include research on GaAs field-effect-transistor device technology and linear-amplifier development. He has published papers on low-noise parametric amplifiers, microwave integrated circuits, MIS varactors, and GaAs FET amplifiers, oscillators, and devices. He currently holds two U.S. patents.

Dr. Camisa has been serving on many committees on the local chapter level of IEEE. He is a past chairman of the MTT/ED Princeton section, and is a member of Sigma XI.

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James T. C. Chen (S'71–M'71) received the B.S. degree in electrical engineering from Cheng Kung University, Tainan, Taiwan, in 1960, and the M.S. and Ph.D. degrees in electrical engineering from the University of California, Berkeley, in 1967 and 1971, respectively.

In 1961, he served as an Electronics Officer in the Chinese Navy where he designed and constructed power supplies for transmitters. From 1962 to 1965, he was a Research Engineer developing radio communication equipment in Radio Suisse, Bern, Switzerland. From 1965 to 1969, while working towards his advanced degrees, he was a Research Assistant in the Electronics Research Laboratory and Space Science Laboratory at the University of California. From 1969 to 1971, he was a Senior Development Engineer at Texas Instruments Incorporated, Dallas, TX, where he was concerned with MOS transistors and bipolar RF power transistors. From 1972 to 1978, he was with the Hewlett-Packard Company, Palo Alto, CA, as a Project Engineer developing microwave power transistors. In 1978, he formed Four Dimensions, Inc., San Mateo, CA, in the interest of developing instruments for the semiconductor industry. He is presently the President of Four Dimensions, Inc., and a Consultant to the Microwave Semiconductor Division of the Hewlett-Packard Company. He holds a patent and has published more than ten papers in major journals and conferences.

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Philip T. Chen (S'67–M'70) was born in Shanghai, China, on June 23, 1940. He received an equivalent to the B.S. degree in electrical engineering from Tung-chi University, Shanghai, China, in 1962, the Full Technological Certificate in telecommunication from the City and Guilds of London Institute, London, England, in 1965, and the M.S. degree in electrical engineering from the Case Institute of Technology, Cleveland, Ohio, in 1969.

From 1963 to 1967 he was a Teaching Assis-

tant in the Physics Department, University of Hong Kong, where he was engaged in ionospheric physics research. In 1969 he joined the Microwave Division of the Hewlett-Packard Company, Palo Alto, CA, where he was concerned with the development of microwave mixers, transistor amplifiers, and oscillators. Since 1975, he has transferred to the Microwave Technology Center, Santa Rosa, CA, where he has been involved with research of GaAs MESFET's and their various applications up to 40 GHz.

Mr. Chen is a member of Sigma Xi and the American Association for the Advancement of Science.



Jacques Espagnol was born in Castelsarrasin, France, on August 5, 1934. He received the Engineer degree in electronics from the Ecole Supérieure d'Electricité, Malakoff, Seine, France, in 1959.

In 1962, he joined the Thomson-CSF Laboratories, Orsay, France, where he has worked on traveling-wave tube amplifiers up to 1967. From 1967 to 1975 he has been engaged on X-band IMPATT and S-band TRAPATT oscillators. In 1975, he joined the millimeter laboratory, where his current interest is in technology for solid-state oscillators and circuits.

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Rocky Curby was born in Dalehart, TX, in 1947. He received the B.S.E.E., M.S., and Ph.D. degrees from Texas Technical University, Lubbock, in 1969, 1970, and 1973, respectively.

Upon receiving the Ph.D. degree, he joined the Hewlett-Packard Company, Microwave Semiconductor Division, as an R & D Project Engineer working on low-series resistance diodes. In 1975 he was promoted to Engineering Manager for the Diode Engineering Department. This group is responsible for the development of new devices for the diode production, primarily beam lead PIN and Schottky's. In 1977, he acquired the responsibility for IMPATT diode development and production.

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James V. DiLorenzo received the M.S. and Ph.D. degrees from the State University of New York, Stony Brook, and pursued post-doctoral work in chemical physics at Yale University, New Haven, CT.

In 1969 he joined Bell Laboratories, Murray Hill, NJ, to study chemical vapor deposition of compound semiconductor materials, and since then has worked on studies of materials and processes important in the design and fabrication of microwave devices, including Gunn and

IMPATT devices, and more recently, GaAs field-effect transistors. He is currently Supervisor of the Microwave Materials and Processes Group at Bell Laboratories.

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Michael E. Elta (S'75-M'78) was born in Flint, MI, on January 1, 1951. He received the B.S. degree in electrical engineering from General Motors Institute, Flint, MI, in 1975, and the M.S.E. degree in electrical engineering from the University of Michigan, Ann Arbor, in 1975. He completed a dissertation for the Ph.D. degree in electrical engineering at the University of Michigan in 1978.

From 1969 to 1973 he was a cooperative engineering student at AC Spark Plug, GMC, Flint, MI, and at the University of Michigan he was a Research Assistant in the Electron Physics Laboratory from 1975 to 1978. At present he is with Massachusetts Institute of Technology Lincoln Laboratory, Lexington, MA. He held a General Motors Fellowship for the academic year of 1973-1974, and a Rackham Predoctoral Fellowship for the academic year of 1977-1978. His research interests include physical electronics, device physics, semiconductor materials, and microwave and optical devices.

Dr. Elta is a member of Tau Beta Pi and Sigma Xi.



T. T. Fong (S'67-M'69) received the B.S.E.E. degree from Cheng Kung University, Taiwan, China, in 1961, and the M.S. and Ph.D. degrees in engineering from the University of California, Los Angeles, in 1966 and 1969, respectively.

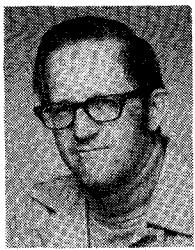
From 1964 to 1967 he was a Teaching Assistant at the University of California and became Acting Instructor in 1968, teaching solid-state electronics. In 1969, he joined the Hughes Aircraft Company, Torrance, CA, as a Member of the Technical Staff working on microwave solid-state devices and circuits. He is currently Assistant Manager of the Solid-State Subsystems Department responsible for research and engineering of solid-state microwave and millimeter-wave devices and subsystems.



Fred E. Gardiol (S'68-M'69-SM'74) was born in Corsier-sur-Vevey, Switzerland, in 1935. He received the degree of Physicist Engineer from the Ecole Polytechnique de l'Université de Lausanne, Switzerland, in 1960, the S.M. degree in electrical engineering from the Massachusetts Institute of Technology, Cambridge, MA, in 1965, and the doctorate degree in applied sciences from the Catholic University of Louvain, Belgium, in 1969.

During 1960 and 1961, he was production Engineer with Transistor Electronic Corporation, Wakefield, MA. From 1961 to 1966, he was employed by the Special Microwave Devices Operation of Raytheon Company, Waltham, MA, where he designed and developed microwave ferrite devices for high power application. In 1966, he joined the staff of the Microwave Laboratory of the Catholic University of Louvain, Belgium, becoming Assistant Professor in 1969. Since October 1970, he has been a Professor of Electromagnetism and Microwaves at the Ecole Polytechnique Federale de Lausanne, Switzerland. He is the author of *Electromagnétisme* (in French), and the author or coauthor of more than 70 technical publications in the areas of loaded waveguides, microwave ferrites, and industrial applications of microwaves.

Professor Gardiol is a member of Sigma Xi, IMPI, the Association of Swiss Electricians (ASE-SEV), and the Swiss Alpine Club. He is the Swiss Representative in Commission B of URSI (fields and waves) and in the project COST 25/4 of the European Communities. He was Chairman of the Fourth European Microwave Conference in Montreux, in September 1974, and remained Chairman of the Management Committee of EuMC until 1976.



Robert V. Garver (M'57-SM'68) was born on June 2, 1932, in St. Paul, MN. He received the B.A. degree in physics from the University of Maryland in 1956, and the Master's degree in engineering administration from George Washington University, Washington, DC, in 1968.

He served in the U.S. Army during the Korean War, and since 1956 has been employed at the Harry Diamond Laboratories in the Washington, DC area. Since 1970 he has been

working as Technical Manager in the areas of radar fusing and hardening communication systems for survival in a nuclear electromagnetic pulse environment. He continues as a Consultant to various projects in the area of microwave diode control devices. He has numerous patents and papers in the area of diode switches, limiters, and phase shifters, and is the author of one book on the subject.

Mr. Garver has served on the IEEE MTT AdCom, IEEE Solid-State Circuits Council, and committees of the IEEE International Microwave Symposium, and International Solid-State Circuits Conference including program chairman of the 1971 Microwave Symposium. He served as Associate Editor of the IEEE JOURNAL OF SOLID-STATE CIRCUITS and has served on the editorial board of the IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES since 1963.

devices, fluctuation phenomena, and noise at the M.I.T. Research Laboratory of Electronics.

Dr. Gupta is a member of Eta Kappa Nu, Sigma Xi, AAAS, and Phi Kappa Phi, and is a Registered Professional Engineer in the province of Ontario.



James W. Gewartowski (S'53-M'57-SM'63) was born in Chicago, IL, on November 10, 1930. He received the B.S. degree in electrical engineering from the Illinois Institute of Technology, Chicago, in 1952, the S.M. degree in electrical engineering from Massachusetts Institute of Technology, Cambridge, in 1953, and the Ph.D. degree in electrical engineering from Stanford University, Stanford, CA, in 1958.

He was at Bell Telephone Laboratories, Murray Hill, NJ, from 1957 to 1971. His early work at Murray Hill included slow-wave structures and electron guns for high-power traveling-wave tubes. He was Supervisor of the Microwave Source Group from 1962 to 1971. This group studied varactor harmonic generators and upconverters and circuit properties of avalanche diodes. Since 1971, he has been Supervisor of the Microwave Integrated Circuit and Amplifier Group at Bell Telephone Laboratories, Allentown, PA. This group has been primarily concerned with the development of IMPATT diode and GaAs FET amplifiers for radio-relay applications. He is the coauthor of the books *Principles of Electron Tubes* and *Introduction to Electron Tubes* and the author of numerous technical papers.

In 1960, Dr. Gewartowski was awarded the Browder J. Thompson Memorial Prize of the IEEE (IRE).



Madhu Sudan Gupta (S'68-M'72-SM'78) received the Master's and Ph.D. degrees from the University of Michigan, Ann Arbor, in 1968 and 1972, respectively.

From 1968 to 1972, while at the University of Michigan, he carried out research on large-signal and noise characteristics of IMPATT diodes at the Electron Physics Laboratory, and was a Teaching Fellow in the Department of Electrical and Computer Engineering. He was Assistant Professor of Electrical Engineering at Queen's University, Kingston, Ont., Canada, during 1972-1973. Since 1973, he has been on the Faculty of the Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge. He is presently an Associate Professor of Electrical Engineering and is engaged in research on semiconductor-microwave



George I. Haddad (S'57-M'61-SM'66-F'72) was born in Aindara, Lebanon, on April 7, 1935. He received the B.S.E., M.S.E., and Ph.D. degrees in electrical engineering from the University of Michigan, Ann Arbor, in 1956, 1958, and 1963, respectively.

From 1957 to 1958 he was associated with the Engineering Research Institute of the University of Michigan, where he was engaged in research on electromagnetic accelerators. In 1958 he joined the Electron Physics Laboratory, University of Michigan, where he has been engaged in research on masers, parametric amplifiers, detectors, electron-beam devices, and microwave solid-state devices. He held a University of Michigan Research Institute Fellowship for the academic year of 1958-1959 and a sponsored research fellowship for the spring semester of 1959-1960. He served successively as Instructor, Assistant Professor, and Associate Professor in the Department of Electrical Engineering from 1960 to 1969. He is presently a Professor and Chairman of the Department of Electrical and Computer Engineering.

Dr. Haddad received the 1970 Curtis W. McGraw Research Award of the American Society for Engineering Education for outstanding achievements by an Engineering Teacher. He is a member of Eta Kappa Nu, Sigma Xi, Phi Kappa Phi, the American Physical Society, and the American Society for Engineering Education.



Risao Hayashi (M'75) was born in Chiba, Japan, on January 5, 1936. He received the B.S. degree in electrical engineering from the Musashi Institute of Technical College, Tokyo, Japan, in 1960, and the M.S. degree in electrics from Tokyo Electrical College, Tokyo, Japan, in 1964.

Since joining the Radio Research Laboratories, Tokyo, Japan, in 1960, he has been engaged in the research of millimeter-wave solid-state circuits and the development. His research interests are in the field of the design of satellite transponder, circuit devices, and the space communications in millimeter-wave region. He is presently Chief of the Space Communication Research Section, Kashima-Branch, Radio Research Laboratories, Ibaraki, Japan.

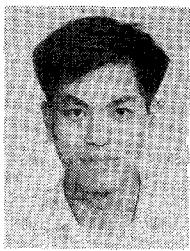
Mr. Hayashi is a member of the Institute of Electronics and Communications Engineers of Japan and the Physical Society of Japan.



Anthony M. Howard was born in Gloucester, England, on December 18, 1947. He received the B.Sc. degree in electrical and electronic engineering from the University of Leeds, England, in 1970.

He has worked on the fabrication of microwave transferred electron and avalanche diodes since 1970 at Plessey Research (Caswell) Ltd., Towcester, Northants, England.

Mr. Howard is an associate member of the Institution of Electrical Engineers.



Fwu-Jih Hsu (S'77-M'77) received the B.S. degree in electrical engineering from Cheng Kung University, Tainan, Taiwan, in 1967, and the M.S. and Ph.D. degrees in electrical engineering from the University of New Mexico, Albuquerque, in 1972 and 1977, respectively.

From 1977 to 1978, he was with the Department of Electrical Engineering, University of Kentucky, Lexington, as a Postdoctorate Fellow working on millimeter-wave and EM transcent phenomena investigations. In 1978 he joined Anaconda Telecommunications as an Engineer where he is engaged in design and development of switching systems.

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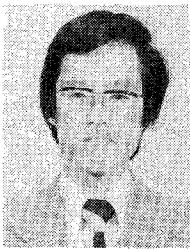
Tatsuo Itoh (S'69-M'69-SM'74) received the Ph.D. degree in electrical engineering from the University of Illinois, Urbana, in 1969.

From September 1966 to April 1976 he was with the Electrical Engineering Department, University of Illinois. From April 1976 to August 1977 he was a Senior Research Engineer in the Radio Physics Laboratory, SRI International, Menlo Park, CA. From August 1977 to June 1978 he was an Associate Professor at the University of Kentucky, Lexington. In July 1978

he joined the faculty at The University of Texas at Austin, Austin, where he is now an Associate Professor of Electrical Engineering.

Dr. Itoh is a member of the Institute of Electronics and Communication Engineers of Japan, Sigma Xi, and Commissions B and C of URSI.

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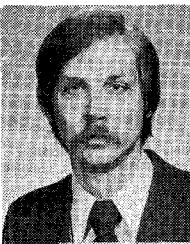


Ryoji Kawasaki was born in Kagoshima-shi, Japan, on September 8, 1950. He received the B.S. degree from the Kyushu University, Fukuoka-shi, Japan, in 1973.

Since joining the Yokosuka Electrical Communication Laboratory, Nippon Telegraph and Telephone Public Corporation (NTT), Yokosuka-shi, Japan, in 1973, he has been engaged in the research of millimeter-wave solid-state circuits and measuring equipment. He is currently an Engineer of the Mobile Communication Equipment Section, Integrated Transmission System Development Division, Yokosuka Electrical Communication Laboratory, NTT, where he is working on the development of the mobile unit for the land mobile telephone system.

Mr. Kawasaki is a member of the Institute of Electronics and Communications Engineers of Japan.

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Richard A. Kiehl (M'75) was born in Akron, OH, on February 14, 1948. He received the B.S.E.E., M.S.E.E., and the Ph.D. degrees from Purdue University, West Lafayette, IN, in 1970, 1970, and 1974, respectively.

From 1971 to 1974 he was a Research Assistant and Teaching Assistant in the School of Electrical Engineering, Purdue University. During that time he was engaged in research on transferred-electron devices. In 1974 he joined Sandia Laboratories, Albuquerque, NM, as a Member of the Technical Staff in the Solid State Device Physics Division. His present research is concerned with optical control of solid state microwave devices.

Dr. Kiehl is a member of Sigma Xi.

H. J. Kuno (S'61-M'63-SM'75-F'77), for a photograph and biography please see page 366 of this issue.

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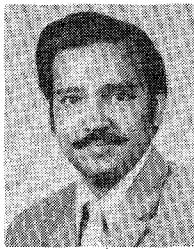


Chiung-Tung Li (M'73) was born in Tainan, Taiwan, in 1938. He received the B.S. degree in electrical engineering from Cheng Kung University, Taiwan, in 1961, the M.S. degree in electrical engineering from the Institute of Electronics, Chiao Tung University, in 1963, and the Ph.D. degree in materials science from the University of Southern California, Los Angeles, in 1970.

Since joining the Hewlett-Packard Company, Santa Rosa, CA, in 1970, he has been engaged in the research and development of GaAs LPE and VPE technology for the production of microwave devices. Presently, he is also involved in research on device physics and development of device fabrication.

Dr. Li is a member of Sigma Xi, the Electrochemical Society, and the IEEE Electron Devices Society.

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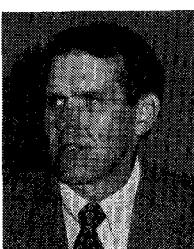


Shamsur R. Mazumder (S'74-M'76) received the B.Sc. degree in electrical engineering from the Bangladesh University of Engineering & Technology, Dacca, Bangladesh, in December 1968, and the M. eng. and Ph.D. degrees from the Department of Electronics, Carleton University, Ottawa, Ont., Canada, in 1973 and 1976, respectively.

From January 1969 to September 1971, he taught electrical engineering at the Bangladesh University of Engineering & Technology, Dacca. From September 1971 to December 1976, he was a graduate student and Teaching Assistant with the Department of Electronics, Carleton University, Ottawa, Ont., Canada. His Ph.D. research work was on characterization and design of the microwave class-C transistor power amplifier. He worked as a Postdoctoral Fellow from January 1977 to June 1977, at the Carleton University, Ottawa, where he was engaged in developing IMPATT-diode oscillator circuits for high power applications. Since July 1977, he has been with the Chaire d'Electromagnetisme et d'Hyperfréquences, Ecole Polytechnique Fédérale de Lausanne, Switzerland, as a Premier Assistant. His present research interests lie in the areas of microwave solid-state devices and their circuit applications.

Dr. Mazumder received the "Presidential Award for Outstanding Student" from the President of Pakistan for work done toward the B.Sc. eng. degree.

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Thomas A. Midford (M'67) was born in Pullman, WA, on June 9, 1934. He received the B.A. degree from Reed College, Portland, OR, in 1956 and the M.A. and Ph.D. degrees in physics from Stanford University, Stanford, CA, in 1958 and 1962, respectively.

From 1962 to 1964 he was employed by Standard Telecommunications Laboratory, Harlow, Essex, England, where he worked on acoustic amplifiers and electron optics. From 1964 to 1968 he worked at the General Electric Electronics Laboratory, Syracuse, NY, where he did research on acoustic devices, bulk-effect devices, and avalanche diodes. In 1968 he joined the Hughes Aircraft Company. Since 1974 he has been Manager of the Torrance Research Center where he is responsible for research and development of microwave and millimeter-wave semiconductor devices and components.

Dr. Midford is a member of the American Physical Society, Phi Beta Kappa, and Sigma Xi.



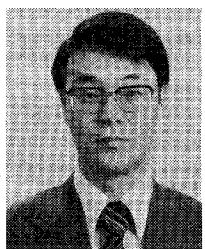
Katsuhiko Mishima was born in Hiroshima, Japan, on July 5, 1942. He received the B.S. and M.S. degrees in electronic engineering from Tokyo University, Tokyo, Japan, in 1965 and 1967, respectively.

Since 1967 he has been with the Research and Development Center of Toshiba Corporation, Kawasaki, Japan. His research has concentrated on application circuits of microwave semiconductor devices.

Mr. Mishima is a member of the Institute of Electronics and Communication Engineers of Japan.

He is currently a Staff Engineer of the Semiconductor Device Section, Musashino Electrical Communication Laboratory, NTT.

Dr. Ohmori is a member of the Institute of Electronics and Communication Engineers of Japan, and the Japan Society of Applied Physics.



Hideki Mizuno was born in Niigata, Japan, on February 1, in 1952. He received the B.S. degree in electrical engineering from Tohoku University, Sendai, Japan, in 1975.

He joined the Yokosuka Electrical Communication Laboratory, Nippon Telegraph and Telephone Public Corporation, Yokosuka-shi, Kanagawa-ken, Japan, in 1975, and has since been engaged in research work on GaAs FET amplifiers for satellite communication system. He is currently an Engineer of the Satellite

Communication Equipment Section, Integrated Transmission System Development Division, Yokosuka Electrical Communication Laboratory.

Mr. Mizuno is a member of the Institute of Electronics and Communication Engineers of Japan.



Christopher H. Oxley was born in Middlesex, England, on February 7, 1947. He received the B.Sc. degree with honours in physics from Chelsea College, University of London, England, in 1969.

He joined the Allen Clark Research Centre, Plessey Company Ltd., Caswell, Towcester, Northants, England, in 1970, where he worked on the development of acoustic surface wave devices. From 1973, his responsibilities have included the design of Gunn diode cavities, and research and development of X-band TRAPATT oscillators and amplifiers. He is currently engaged in the development of microstrip circuitry, Read-IMPATT and indium phosphide TED amplifiers and oscillators.



Gary K. Montress (S'66-M'76) was born in East Orange, NJ, on April 10, 1947. He received the B.S.E.E., M.S.E.E., Electrical Engineer, and Ph.D. degrees from the Massachusetts Institute of Technology, Cambridge, in 1969, 1971, 1971, and 1976, respectively.

From 1969 to 1972, he was a Teaching Assistant in the Electrical Engineering Department at Massachusetts Institute of Technology teaching courses in Solid State Devices and Circuits while also pursuing research on p-n junction breakdown effects. From 1972 to 1975, he was an Instructor in the Electrical Engineering Department, teaching and supervising courses on Solid State Devices and Physics, and Microelectronics. From 1975 to 1976, he was a Research Assistant in the Research Laboratory for Electronics, pursuing research in the area of Solid-State Microwave Diodes. Since September 1976, he has been a member of the Professional Staff at United Technologies Research Center, East Hartford, CT, where he is engaged in research on solid-state devices, SAW oscillators, and SAW filters for signal-processing applications.

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



George Pfund (M'73) was born in Hallau, Switzerland, in 1937. He received a Diploma in electronics from the Onken Engineering College, Switzerland, in 1958.

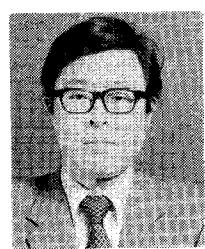
He spent two years at Landis & Gyr, Zug, Switzerland, in the development laboratory, where he worked with magnetic amplifiers. After three years in the U.S. Army as a Communication Specialist, he joined the Hewlett-Packard Company, Microwave Semiconductor Division, Palo Alto, CA, in 1966 as a Senior Electronic Technician. In 1971, he became an Associate Engineer working on the development of double-drift pulse IMPATT diodes. In 1975, he was promoted to Engineer (MTS) responsible for IMPATT product development. His recent activity has been concerned with double-drift IMPATT diodes for high-power pulsed applications.



Jeffrey J. Purcell was born in Glascoed, Monmouthshire, United Kingdom, on February 4, 1941. He received the B.Sc. (Hons.) degree in physics, and the M.Sc. and Ph.D. degrees from the University of London, London, England, in 1962, 1962, and 1968, respectively.

From 1967 to 1968, he was a Research Associate of Surrey University. From 1968 to 1969, he was a Research Associate at the University of Michigan, Ann Arbor. Since April 1970, he has been with the Allen Clark Research Company Ltd., Towcester, Northants, United Kingdom, and has been Leader of the Avalanche Diode Group. He is presently a Research Associate within the Microwave Devices Group.

Dr. Purcell is a member of the Institution of Electrical Engineers and a member of the Institute of Physics.



Masamichi Ohmori (M'77) was born in Ibaragi, Japan, on March 28, 1941. He received the B.S., M.S., and Ph.D. degrees in electronic engineering from Tohoku University, Sendai, Japan, in 1963, 1965, and 1976, respectively.

Since joining the Electrical Communication Laboratory, Nippon Telegraph and Telephone (NTT) Public Corporation, Tokyo, Japan, in 1965, he has been engaged in the research works on millimeter-wave IMPATT diodes and frequency multipliers, and GaAs logic devices.



Kenneth J. Russell was born in Oklahoma City, OK, on March 13, 1936. He received the B.S. degree in physics and the Ph.D. degree in solid-state physics from Oklahoma State University, Stillwater, in 1959 and 1965, respectively.

From 1965 to 1967 he worked for the Martin Company, Orlando, FL, with electroluminescent diodes. Since 1967 he has been with Hughes Research Laboratories, Malibu, CA, and has made contributions in the areas of ion propulsion system design, where he developed computer programs for optimizing ion propelled spacecraft designs, electron-beam semiconductor analysis, where he investigated applications of the electron-beam semiconductor concept to produce new devices, and solid-state power combiner design, where he has been concerned with the design and development of many different types of solid-state power combiners. He holds several patents in the area of power combining and has authored numerous papers.

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Klaus F. Schünemann (M'76) was born in Braunschweig, Germany, on June 17, 1939. He received the Dipl. Ing. degree in electrical engineering and the Doktor-Ing. degree from Technische Universität Braunschweig, Braunschweig, Germany, in 1965 and 1970, respectively.

From 1965 to 1970 he was Assistant at the Institut für Hochfrequenztechnik of the Technische Universität Braunschweig, where he was engaged in investigations on frequency multiplication and on diode modeling for switching applications. He has published several papers on these topics. From 1970 to 1971 he was with Valvo GmbH, Hamburg, Germany, working in the area of high-power high-stable solid-state oscillators. Since 1972, he has been with the Institut für Hochfrequenztechnik of the Technische Universität Braunschweig, where he has been involved with investigations on high-speed modulators for PCM communication systems and on amplification and noise in solid-state oscillators. His current research interests are principally concerned with new technologies for microwave integrated circuits such as fin-line and waveguide-below-cutoff techniques.

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Franco N. Sechi (M'70) received the doctoral degree in electrical engineering in 1964, from the Polytechnic Institute of Milano, Milan, Italy.

From 1965 to 1968, he was employed by ITT, Milan, Italy, where he was concerned with the design of solid-state microwave radio-link equipment. In 1968 he joined RCA, Electronic Components, Harrison, NJ, as a Design Engineer in the Solid State Product Design Group. In this position he designed various types of transferred-electron oscillators and developed a technique for measuring the impedance of transferred-electron diodes under large-signal conditions. In 1973, he transferred to the Microwave Technology Center, RCA Laboratories, Princeton, NJ, as a Member of the Technical Staff. In his position he was involved in the thermal and large-signal characterization of microwave power transistors. He also developed special techniques for the design of linear power amplifiers. He authored papers on the development of transferred-electron oscillators, thermal and large-signal characterization of microwave devices, and on high-power microwave transistor amplifiers.

Dr. Sechi received an RCA Laboratories' Outstanding Achievement award in 1976 for his work on linear microwave power amplifiers. He is a member of the Association of Italian Electrical Engineers.



Craig P. Snapp (S'66-M'66) was born in Lima, OH, in 1944. He received the B.S. degree in engineering science from Case Western Reserve University, Cleveland, OH, in 1966, and the Ph.D. degree in applied physics from Cornell University, Ithaca, NY, in 1971.

During the spring of 1971, he was a Part-Time Instructor in the Department of Electrical Engineering, Cornell University. In the fall of 1971, he joined the Microwave Institute Foundation of the Royal Institute of Technology, Stockholm, Sweden, as a Guest Scientist, where his research activities involved barrier-injection transit-time devices. In 1973, he joined the Hewlett-Packard Company, HPA Division, Palo Alto, CA, and was initially concerned with the design and development of a family of double-drift IMPATT diodes. He is presently Manager of an R&D Section in the Microwave Semiconductor Division of the same company, involved with the design and process technology of low-noise and power silicon bipolar and FET microwave transistors and microwave integrated circuits. He has authored or coauthored more than 20 technical papers and HP application notes.

Dr. Snapp was the corecipient of a 1969 IEEE ISSCC Outstanding Paper award. He served as an Associate Editor of the IEEE TRANSACTIONS ON ELECTRON DEVICES from 1974 to 1977, in addition to coediting the June 1978 *Special Issue on Microwave Semiconductor Devices*, and is a member of the American Physical Society.

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Roger B. Stanchfield (S'72-M'73) was born in New Haven, CT, on May 7, 1950. He received the B.S.E.E. and M.E.E. degrees from Cornell University, Ithaca, NY, in 1972 and 1973, respectively.

Since 1973, he has been with the Sweeper R&D Section of the Santa Rosa Division of the Hewlett-Packard Company, Santa Rosa, CA, where he has worked on control circuitry, microwave oscillators, amplifiers, modulators, detectors, and multipliers. He is currently working on millimeter-wave solid-state sources.

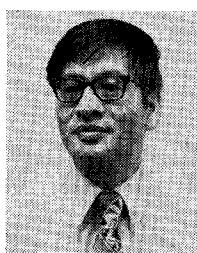
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Jean Stévance was born in Rouen, France, on October 29, 1932. He graduated from the Ecole Française de Radioélectricité, Paris, France, in 1953.

He joined the Thomson-CSF Laboratories, Orsay, France, in 1958. Since then he has been engaged in the development of various equipments at microwave and millimeter frequencies, including radars and satellite communications. He is presently working on millimeter measurements and applications of solid-state devices.

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C. Sun (S'63-M'65) received the B.S. degree in electrical engineering from National Taiwan University, Taipei, in 1958, and the M.S. and Ph.D. degrees from Cornell University, Ithaca, NY, in 1962 and 1965, respectively.

In 1964 he joined the RCA Corporation in Princeton, NJ, where he was engaged in the development of various microwave solid-state sources and laser devices. Since 1971 he has been with the Hughes Aircraft Company, Electron Dynamics Division, Torrance, CA, where

he is currently supervising a group engaged in the development of millimeter-wave circuits.

Dr. Sun is a member of Sigma Xi.



Raytheon Research Division, Waltham, MA.

Mr. Tajima is a member of the Institute of Electronics and Communication Engineers of Japan.

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Yusuke Tajima was born in Chiba, Japan, on February 19, 1945. He received the B.S. degree in electrical engineering from Tokyo University, Tokyo, Japan, in 1968.

After graduation, he joined the Research and Development Center of the Toshiba Corporation, Kawasaki, Japan, where he has been engaged in the research and development of microwave semiconductor devices and circuit components. From 1973 to 1974 he worked on FET amplifier design as an Exchange Engineer at the

Raytheon Research Division, Waltham, MA.

Mr. Tajima is a member of the Institute of Electronics and Communication Engineers of Japan.

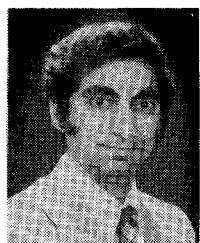


Tohru Takada was born in Iwate, Japan, on October 12, 1950. He received the B.S. degree in electrical engineering from Iwate University, Morioka, Japan, in 1973.

In 1973, he joined the Electrical Communication Laboratory, Nippon Telegraph and Telephone Public Corporation, Musashino, Japan, where he has been engaged in the research and development of millimeter-wave integrated circuits and gallium-arsenide diodes.

Mr. Takada is a member of the Institute of Electronics and Communication Engineers of Japan.

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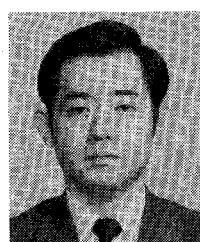
Ashok K. Talwar (S'67-M'72) received the M.Sc. and M.Sc. Tech. degrees in physics and electronics, respectively, from the University of Rajasthan, Jaipur, India, and the Ph.D. degree in electrical engineering from the University of Michigan, Ann Arbor.

During 1972-1974, he was a Research Engineer at Ford Motor Company, Dearborn, working on automobile radar systems and on-board computer applications. Since 1974, he has been involved in development of Gunn and

GaAs FET amplifiers, Gunn and transistor VCO's, phase-locked oscillators, and frequency multipliers at the Micromega Group of Bunker Ramo Corporation, Westlake Village, CA. He is presently the Manager of Microwave Sources Engineering Section. During 1976-1978, he was also a part time Assistant Professor at California State University, Northridge, where he taught courses on solid-state device physics, and physics and circuit applications of microwave semiconductor devices.

Dr. Talwar is a member of Sigma Xi.

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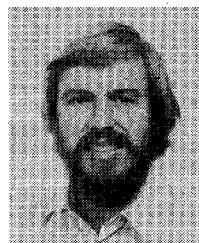
Hideki Tohyama (M'77) was born in Kyoto, Japan, on August 30, 1944. He received the B.S., M.S., and Ph.D. degrees in electrical engineering from the Keio University, Tokyo, Japan, in 1968, 1970, and 1973, respectively.

He joined the Yokosuka Electrical Communication Laboratory, Nippon Telegraph and Telephone Public Corporation, Yokosuka-shi, Kanagawa-ken, Japan, in 1973, and has since been engaged in research and development of satellite communication equipment. At present,

he is a Staff Engineer of the Satellite Communication Equipment Section, Integrated Transmission System Development Division, Yokosuka Electrical Communication Laboratory.

Dr. Tohyama is a member of the Institute of Electronics and Communication Engineers of Japan.

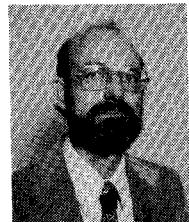
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Rodney S. Tucker (S'72-M'75) was born in Melbourne, Australia, in March 1948. He received the B.E. and Ph.D. degrees from the University of Melbourne, Melbourne, Australia, in 1969 and 1975, respectively.

From 1973 to 1975 he was a Lecturer in Electrical Engineering at the University of Melbourne. In 1975 he was awarded a Harkness Fellowship for two years postdoctoral study in the U.S. During 1975-1976 he was with the Department of Electrical Engineering and Computer Sciences, University of California, Berkeley, and during 1976-1977 he was with the School of Electrical Engineering, Cornell University, Ithaca, NY. From 1977 to 1978 he was a Principal Research Scientist with Plessey Research (Caswell) Ltd., Allen Clark Research Center, England. He is presently a Lecturer in Electrical Engineering at the University of Queensland, St. Lucia, Qld., Australia. His major research interests are in microwave active and passive circuits and optical communications systems.

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John W. Tully (S'69-M'69) was born in Los Angeles, CA, on March 24, 1944. He received the B.S., M.S., and Ph.D. degrees in engineering at the University of California, Los Angeles, in 1966, 1967, and 1969, respectively.

He joined Hughes Research Laboratories in 1969. He has been engaged in research and development of millimeter solid-state devices and components in the Research Laboratories and subsequently in Hughes' Electron Dynamics Division. His primary responsibilities have been in the areas of millimeter mixer diodes and circuits, product development of millimeter components, and GaAs Gunn-effect devices and circuits. He is currently Project Manager for the GaAs Diode Projects Group with current activity in IMPATT's, Gunn-effect devices, and mixers.

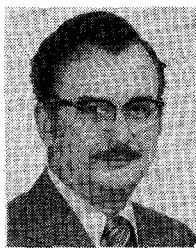
Dr. Tully is a member of the Electrochemical Society and Tau Beta Pi.

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Patrick Hwayan Wang (M'74) was born in China on June 14, 1938. He received the M.S.E.E. degree from Stanford University, Stanford, CA, in 1966.

In 1966, he joined the Hewlett-Packard Company, Palo Alto, CA, working on thin film integrated circuit process development and microwave circuit designs. From 1968 to 1974, he was engaged in microwave silicon transistor development. Since 1974, he has been engaged in GaAs MESFET development work. He is presently an Engineering Section Manager in the Microwave Technology Center, Santa Rosa, CA, responsible for research and development work of a wide range of GaAs devices.

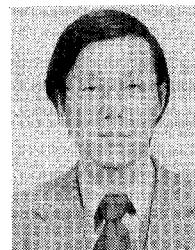


William R. Wisselman (M'72-SM'77) was born on November 2, 1932, in Hallettsville, TX. He received the Bachelor of Nuclear Engineering degree from North Carolina State College, Raleigh, in 1954, and the Ph.D. degree in physics from Duke University, Durham, NC, in 1959.

He joined the Central Research Laboratories, Texas Instruments, Incorporated, Dallas, in 1960. He was initially engaged in a study of the properties of superconducting alloys. Later he studied electromagnetic wave propagation in solid-state plasmas. He has been involved in GaAs microwave device research since 1965, when work was initiated at Texas Instruments on Gunn diodes. In 1970 he started a program to develop GaAs IMPATT diodes. More recently, he has been actively involved in the development of GaAs FET's. He is currently Manager of the Advanced Microwave Components Branch of the Advanced Components Laboratory. In addition to his work on Gunn and IMPATT diodes and GaAs FET's, his current activities include the development of Si microwave bipolar transistors and GaAs high-speed logic circuits.

Dr. Wisselman is a member of the American Physical Society, Sigma Xi, Phi Beta Kappa, Tau Beta Pi, and Phi Kappa Phi.

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Kazuyuki Yamamoto (M'76) was born in Kyoto, Japan, on July 13, 1946. He received the B.S. and M.S. degrees in electrical engineering from the University of Kyoto, Kyoto, Japan, in 1969 and 1971, respectively.

Since joining the Electrical Communication Laboratory, Nippon Telegraph and Telephone Public Corporation (NTT), Tokyo, Japan, in 1971, he has been engaged in the research of filters, solid-state circuits, and transmission lines for millimeter- and submillimeter-wavelengths. He is currently a Staff Engineer of the Radio Transmission Section, Trunk Transmission System Development Division, Yokosuka Electrical Communication Laboratory, NTT.

Mr. Yamamoto is a member of the Institute of Electronics and Communication Engineers of Japan.