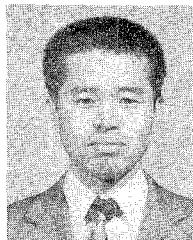


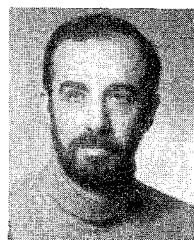
Contributors



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

He joined Nippon Electric Co., Ltd., in 1969 and is now a Research Member 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.



Franco Bertolani was born in Scandiano (RE), Italy in 1946. He received the Dr. Ing. degree in electronic engineering from the University of Bologna, Bologna, Italy, in July 1972.

From the same year he has been with Fondazione Ugo Bordoni at Centro Onde Millimetriche, where he was involved in the Italian program on millimeter-waveguide communication systems. His main field of interest is in microwave circuit design and measurement.

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Yalçın Ayaslı was born in Ankara, Turkey, on February 14, 1946. He received the B.S. degree in electrical engineering from Middle East Technical University, Ankara, Turkey in 1968. He received the M.S.E.E. and Sc.D. degrees in electrical engineering from Massachusetts Institute of Technology, Cambridge, MA in 1970 and 1973, respectively.

He is currently Assistant Professor in the Department of Electrical Engineering at Middle East Technical University, Ankara, Turkey.



Bruno Bianco was born in Savona, Italy, in 1941. He received a degree in electronic engineering from the University of Genoa, Genoa, Italy, in 1967.

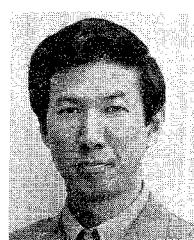
In 1967 he joined the National Institute of Electrotechnique "Galileo Ferraris," Turin, Italy. Since 1971 he has been with the Laboratorio Circuiti Elettronici (Laboratory for Electronic Circuits) of CNR, Genoa, Italy, and he is also Assistant Professor of Electrical Engineering (Electrical Measurements) at the University of Genoa, Genoa, Italy. His activities focus mainly on the field of measurements and device characterization in the microwave range.

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Sevîg Ayter was born in Eskisehir, Turkey, on July 18, 1952. He received the B.S.E.E. degree in 1974 and M.S.E.E. degree in 1976, both from the Middle East Technical University, Ankara, Turkey. His research topic was on wide-band operation of Y-junction stripline circulators.

He is now with the Department of Electrical Engineering, Stanford University, Stanford, CA, where he is working for his Ph.D. degree. His primary interests are ferrites, microwave acoustics, and imaging systems.

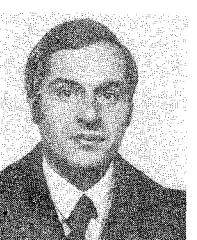


Chung-Kwang Chou (S'72-M'75) was born in Chung-King, China, on May 11, 1947. He received the B.S. degree from the National Taiwan University in 1968, the M.S. degree from Washington University, St. Louis, MO, in 1971, and the Ph.D. degree from the University of Washington, Seattle, in 1975, all in electrical engineering.

After spending a year as an NIH post-doctoral fellow in the Regional Primate Research Center and the Department of Physiology and Biophysics at the University of Washington, he is presently an Assistant Professor in the Department of Rehabilitation Medicine at the University of Washington. His research interests include biological effects of ionizing and nonionizing radiation, as well as cancer hyperthermia.

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

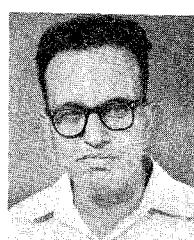
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Paolo Bernardi was born in Bologna in 1945. He received the Dr. Ing. degree in electronic engineering from the Università degli Studi di Bologna, Bologna, Italy, in 1969.

In 1970 he was with Fondazione Ugo Bordoni at Centro Onde Millimetriche. Since January 1972 he has been with CSELT at Centro Onde Millimetriche dealing with circular waveguide communication research.

Mr. Bernardi is a member of the AEI.



B. N. Das received the M.Sc. (Tech) degree in radiophysics and electronics from the University of Calcutta, Calcutta, India, in 1956, and the Ph.D. degree in electronics and electrical communication engineering from the Indian Institute of Technology, Kharagpur, India, in 1967.

From 1956 to 1957 he worked in Philips India Limited, Calcutta as a trainee, and from 1957 to 1958 he was a Research Scholar in the University of Calcutta. In 1958 he joined the Department of Electronics and Electrical Communication Engineering, Indian Institute of Technology, Kharagpur, India, where he is currently a Professor.

Dr. Das is a member of the Institutions of Electrical Engineers, London.

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Rene J. P. Douville (S'64-M'68) was born in Coleman, Alberta, Canada, on March 30, 1943. He received the B.A.Sc. and M.A.Sc. degrees in electronics engineering from the University of British Columbia, Vancouver, Canada, in 1966 and 1968, respectively.

He joined the Space Electronics Directorate, Defence Research Telecommunications Establishment, later to become the Communications Research Center, in 1968. He has worked on VHF mixers, microwave solid-state multipliers and oscillators, microstrip discontinuity studies, and has performed a conceptual design of a microwave attitude sensing system using higher order mode conical feeds. He was responsible for the design of one of the two redundant 12-GHz FET amplifiers used on the Hermes (CTS) satellite. In 1976 he became Project Leader of the Low Cost Earth Terminal Project for which he has designed MIC image-enhanced mixers.

Mr. Douville is currently chairman of the Ottawa Chapter of the MTT and a member of the steering committee for the 1978 MTT Symposium.

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Robert L. Eisenhart (S'70-M'71) was born in San Antonio, TX, December 5, 1938. He received the B.E.E. degree from Rensselaer Polytechnic Institute, Troy, NY, in 1960. He received the MSE and Ph.D. degrees in electrical engineering in 1966 and 1970, respectively, from The University of Michigan, Ann Arbor.

He spent two years as a Project Officer with the Research and Development Division, US Army Security Agency Headquarters in Arlington, VA. Upon discharge from the service in 1962 he remained with the Army Security Agency in a civilian capacity to become a Staff Engineer with their European Headquarters, Frankfurt, Germany. From 1965 to 1970, he was engaged in the theoretical and experimental analysis and design of microwave circuits with the Cooley Electronics Laboratory, Ann Arbor, Michigan. Since then he has been with Hughes Aircraft Company, Culver City, CA, working on a variety of solid-state microwave components where he is presently head of the Solid-State Transmitter Section in the Missile Division at Canoga Park, CA.

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

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Paul T. Greiling (S'61-S'64-M'69) was born in Cleveland, Ohio, on October 19, 1939. He received the B.S. degree in electrical engineering, the B.S. degree in mathematics, and the M.S.E. and Ph.D. degrees, all from the University of Michigan, Ann Arbor, in 1963, 1964, and 1970, respectively.

From 1970 to 1972 he was an Assistant Professor in the Department of Electrical Engineering, Northeastern University, Boston, MA, and a Consultant for the Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA. From 1972 through 1976 he was an Assistant Professor in the Electrical Sciences and Engineering Department, University of California, Los Angeles, and a Consultant for local industry. At present he is a Member of the Technical Staff at Hughes Research Laboratories in Malibu, CA, working on GaAs FET integrated circuits.

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



Arthur W. Guy (S'54-M'57-SM'74-F'77) was born in Helena, MT, December 10, 1928. He received the B.S. degree in 1955, the M.S. degree in 1957, and the Ph.D. degree in 1966, all in electrical engineering, from the University of Washington, Seattle.

From 1947 to 1950, and from 1951 to 1952, he served in the US Air Force as an electronic technician. Between 1957 and 1964 he was a Research Engineer in the Antenna Research Group, Boeing Aerospace Co., Seattle, WA. While there his field included research on broadband and microwave devices, surface wave antennas, propagation through anisotropic dielectrics, and antennas buried in lossy media. Between 1964 and 1966 he was employed by the Department of Electrical Engineering, University of Washington, conducting research on VLF antennas buried in polar ice caps. At that time he also served as a consultant to the Department of Rehabilitation Medicine, doing work on problems associated with the effect of EM fields on living tissue. In 1966 he joined the University of Washington Medical School faculty and accepted his current position as Research Director in the Department of Rehabilitation Medicine. He is presently a Professor in that department, Adjunct Professor in the Department of Electrical Engineering, a member of the Core Faculty, Center for Bioengineering, and is involved in teaching and research in the area of biological effects and medical applications of EM energy.

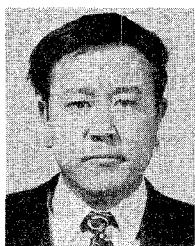
Dr. Guy holds memberships in Phi Beta Kappa; Tau Beta Pi, and Sigma Xi. He is also a member of the American Association for the Advancement of Science. He has positions on the IEEE Technical Committee on RF Radiation Socio-Technological Activity Committee on Man and Radiation (COMAR); the IEEE MTT-S Administrative Committee (ADCOM); the American National Standards Institute, Inc. (ANSI) C95 Committee, where he holds chairmanship of the ANSI C95 Subcommittee IV; the National Council on Radiation Protection; Armed Forces-National Research Council Committee on Vision, Working Group 35; Commission A, Radio Measurement Methods and Standards, International Scientific Radio Union (URSI), and Publicity Chairman. He serves as a consultant to Battelle Pacific Northwest Laboratories; National Institute of Environmental Health Sciences on the USSR-US Health Cooperative Program; Physical Medicine Device Classification Panel, Electrotherapeutic Subcommittee, Food and Drug Administration; National Research Council, Evaluation Panel for Electromagnetics Division, National Bureau of Standards. He is a member of the editorial boards of the Biophysical Journal and the Journal of Microwave Power.

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Hans Ludwig Hartnagel received the German University Degree (Diplom Ingenieur) from the Technical University of Aachen, Germany, and the Ph.D. and Dr.Eng. degrees from the University of Sheffield, England.

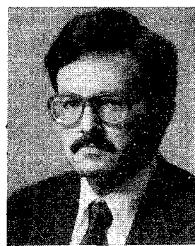
He was first with the Microwave Tube Laboratories of the German electronics company, Telefunken, in Ulm, Germany, where he worked on the development of traveling wave tubes. Subsequently, he joined the Institut National des Sciences, Appliquées, Villeurbanne, Rhône, France. From October 1961 he was with the Department of Electronic and Electrical Engineering at the University of Sheffield, first as a Senior Research Assistant and then from October 1962 as a Lecturer, subsequently as a Senior Lecturer and finally as a Reader. Since January 1971 he has held the Chair of Electronic Engineering in the Department of Electrical and Electronic Engineering at the University of Newcastle upon Tyne, Newcastle upon Tyne, England. He has a research group involved with microwave circuit and component activities and with III-V compound semiconductor technology.



Asamitsu Higashisaka was born in Hiroshima prefecture, Japan, on June 20, 1944. He received the B.E. and M.E. degrees from Hiroshima University, Hiroshima, Japan, in 1967 and 1969, respectively.

After graduation he joined the Central Research Laboratories of Nippon Electric Co., Ltd., Kawasaki, Japan, where he has been engaged in research and development of microwave semiconductor devices, particularly GaAs bulk effect devices and GaAs MESFET's.

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



Scott L. Norman (M'73) was born in Chicago, IL, on May 22, 1940. He received the B.S. degree in physics from the Illinois Institute of Technology, Chicago, in 1961, and the S.M. and Ph.D. degrees in physics from the University of Chicago, Chicago, IL, in 1962 and 1968, respectively.

From 1967 to 1972 he was with GTE Automatic Electric Laboratories, Northlake, IL, where he headed the Advanced Materials Studies Group. Since 1972, he has been with GTE Laboratories,

Waltham, MA. As a Member of the Technical Staff, he conducted research in optical information storage, with emphasis on materials and techniques for holographic recording, optical memory system design, encoded-color imagery, and micropublishing. Since 1975, he has been a Research Manager in the Exploratory Research Laboratory. His current responsibilities include the areas of chemistry and metallurgy of refractory metals and metals for electrical contacts, electrical arc discharge phenomena, electronic phenomena in liquids, novel techniques for microwave generation, high-voltage switching, and the growth of materials for LED's and semiconductor lasers.

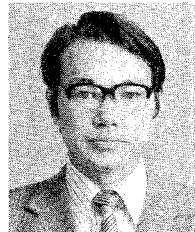
Dr. Norman is a member of the American Physical Society, the Optical Society of America, and Sigma Xi.



David S. James (M'71) was born in Bradford-on-Avon, England, on January 24, 1945. He received the B.Sc. and Ph.D. degrees in electronics engineering from the University College of North Wales, Bangor, Wales, UK.

From 1970 to 1977 he was employed by the Department of Communications, Communications Research Centre in Ottawa, Ont., Canada. He is now with Ferranti Limited, Manchester, England. His work involves the development of passive and solid-state microwave circuits, especially low-noise satellite subsystems.

Dr. James was Chairman of the Ottawa X-MTT Chapter, and is a member of the A.V.S. and the I.E.E. in England.



Kazuhiko Ogusu (M'76) was born in Hamamatsu, Japan, on June 25, 1947. He received the B.E. and M.E. degrees from Shizuoka University, Hamamatsu, Japan, in 1970 and 1972, respectively.

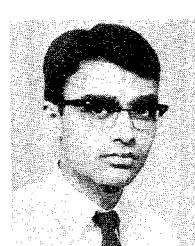
Since 1972, he has been a Research Associate with the Department of Electrical Engineering, Shizuoka University. At present, his main fields of interest are millimeter and optical integrated circuits.

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



Reinhard Knöchel was born near Hamburg, West Germany, on June 20, 1948. He received the Dipl.-Ing. degree in electrical engineering from the Technische Universität Braunschweig, West Germany, and joined the Institut für Hochfrequenztechnik of this University in 1975.

He is working on stabilization and injection locking of solid-state oscillators and is currently concerned with new methods of microwave integration in the frequency region above Ku band.



V. M. Pandharipande was born in Chhapara, Madhya Pradesh, India on March 28, 1949. He received the B.E. degree in electrical engineering from Nagpur University, Nagpur, India, and M.Tech. degree in microwaves and radar engineering from Indian Institute of Technology, Kharagpur, India, in 1970 and 1972, respectively.

From 1970 to 1972 he was a Scientific Officer at Tata Institute of Fundamental Research, Bombay, India. In 1972 he joined the Radar and Communication Centre, I.I.T., Kharagpur, India, as a Lecturer where he is working towards his Ph.D. degree.

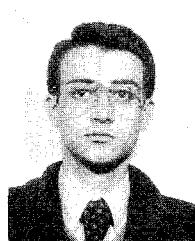
Mr. Pandharipande is a graduate member of the Institution of Electronics and Telecommunications Engineers, India.



Shutaro Nanbu was born in Kanazawa City, Ishikawa, Japan, February 24, 1946. He received the B.S. and M.S. degrees in electrical engineering from Kyoto University, Kyoto, Japan, in 1968 and 1970, respectively.

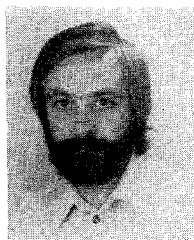
In 1970 he joined Matsushita Electronics Corporation, Takatsuki, Osaka, Japan. Since 1971 he has been working in the Research Laboratories, specializing in research and development of MIC solid-state oscillator and other MIC components.

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



Luigi Panini was born in Genoa, Italy, on July 10, 1951. He received a degree in electronic engineering from the University of Genoa, Genoa, Italy, in 1977, submitting a thesis on the convergence in frequency of relaxation methods (finite-difference analysis).

After a period spent at the CNR Laboratory for Electronic Circuits in Genoa, Italy, he is now with Marconi Italiana S.p.A., Genoa Cornigliano, Genoa, Italy. His main interest is devoted to numerical computation, measurement theory, and device characterization in the microwave range.



Mauro Parodi was born in Genoa, Italy, in 1948. He received a degree in electronic engineering from the University of Genoa, Genoa, Italy, in 1972.

Since 1972, he has been with the University of Genoa and is now Assistant Professor of Electrical Engineering (Network Theory). His field of research is mainly devoted to measurement theory and device characterization in the microwave range.



Sandro Ridella (M'76) was born in Genoa, Italy, in 1943. He received a degree in electronic engineering from the University of Genoa, Genoa, Italy, in 1966.

He joined the Electrical Engineering Department of the University of Genoa in 1966, and he is now Professor of Electrical Engineering. He has also been the Director of the Laboratorio per i Circuiti Elettronici (Laboratory for Electronic Circuits) of CNR, Genoa, Italy, since 1974. His interests are in the fields of network theory, computerized measurements, and device characterization and modeling.

Dr. Ridella is a member of AEI.

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Dimitrios Pavlidis was born in Athens, Greece, on July 9, 1950. He received the B.Sc. degree in physics from the University of Patras, Patras, Greece, in 1972, and the Ph.D. degree from the University of Newcastle upon Tyne, Newcastle upon Tyne, England, U.K., in 1976.

Since January 1973 he has been engaged in research and applications of active solid-state devices for microwave communication systems. This research is being carried out at the Department of Electrical and Electronic Engineering, University of Newcastle upon Tyne, England. In 1975 he was appointed Research Associate in this department. In his present capacity he is responsible for various dielectric surface waveguide, high microwave power transmission and active device-circuit interaction development programs. His interests include injection locking transient phenomena and broadband frequency switching of microwave oscillators, microstrip networks, and high power and integrated circuit applications of dielectric waveguides. In January 1978 he was appointed Wissenschaftlicher Angestellter in the High Frequency Institute of the Technische Hochschule Darmstadt, Germany. He is presently involved with research and teaching in the field of modern microwave semiconductor applications.

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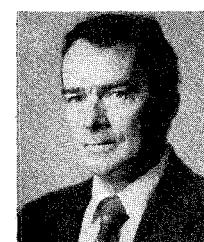
Vittorio Rizzoli was born in Bologna, Italy, in 1949. He graduated from the School of Engineering, University of Bologna, Bologna, Italy, in July 1971.

From 1971 to 1973 he was with the Centro Onde Millimetriche of Fondazione Ugo Bordoni, Pontecchio Marconi, Italy, where he was involved in a research project on millimeter-waveguide communication systems. In 1973 he spent six months at Hewlett-Packard Company, Palo Alto, CA, working in the area of MIC and microwave power devices. Since 1974 he has been Associate Professor at the University of Bologna, Italy, where he is now teaching a course on Microwave Integrated Circuits. His current fields of interest are the design of microstrip circuits and the theoretical aspects of electromagnetic propagation in optical fibers.

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Larry K. Roberts was born in Decatur, IL, August 10, 1949. He received the B.S. degree in electrical engineering from the University of Illinois, Urbana, in 1971, the M.S. degree in 1975 from University of California, Los Angeles, and the J.D. degree in 1976 from Loyola University School of Law in Los Angeles, CA.

From 1971 to 1973 he was employed by Hughes Aircraft Company at El Segundo and Culver City, CA, and was engaged in satellite communication system testing and the development of microwave radar components. He is presently employed by the law firm of Blakely, Sokoloff, Taylor, & Zafman in Beverly Hills, CA.

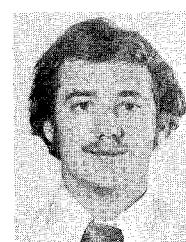


Joseph M. Proud, Jr. was born in North Adams, MA, on January 27, 1930. He received the B.A. degree from Wesleyan University, Middletown, CT, in 1952, and the Sc.M. and Ph.D. degrees in physics from Brown University, Providence, RI, in 1955 and 1957, respectively.

He joined Sandia Corporation as a Technical Staff Member in 1957. In 1961, he cofounded Space Sciences, Inc., and later became Vice-President of Ikor, Inc., a position he held until 1974, when he joined GTE Laboratories as a

Member of the Technical Staff. He has been engaged primarily in the investigation of high-voltage breakdown, fast switching, and short time-domain phenomena with applications in microwave generation and impulse electromagnetic techniques. In the past, he has been engaged in nuclear weapons effects experimentation, underwater acoustics, plasma acceleration and air pollution measurement instrumentation. At GTE, he is continuing his investigations of fast switching and transport processes in solids and liquids as well as gases.

Dr. Proud is a member of Sigma Xi, the American Physical Society, and the Association of Old Crows.



Ralston S. Robertson was born in Kingston, PA, November 30, 1950. He received the B.S. degree in electrical engineering from Lafayette College, Easton, PA, in 1972, and the M.S. degree from University of California, Los Angeles, in 1975.

From 1972 to 1975, he held a Master's Work-Study Fellowship from the Hughes Aircraft Company while engaged as a member of the technical staff. During this time he was engaged in analog and digital circuit design for signal processing applications and performed work in the characterization of various microwave semiconductor devices. He is presently working for the Hughes Aircraft Missile Division at Canoga Park, CA, where his responsibility includes microwave solid-state circuit design and pulsed IMPATT diode studies for radar applications.

Mr. Robertson is a member of Eta Kappa Nu, Tau Beta Pi, and Phi Beta Kappa.

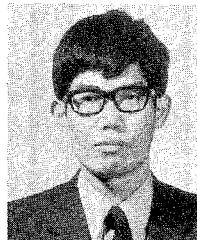
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Klaus Schünemann (M'76) was born in Braunschweig, West Germany, on June 17, 1939. He received the Diplom-Ingenieur degree in electrical engineering and the Doktor-Ingenieur degree from Technische Universität Braunschweig, West Germany, in 1965 and 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, 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 again, 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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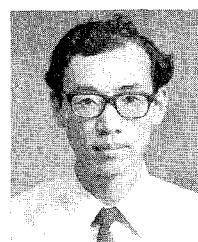


Yoichiro Takayama (M'72) was born on January 3, 1942. He received the B.E., M.E., and Dr.Eng. degrees from Osaka University, in 1965, 1967, and 1973, respectively.

He joined Nippon Electric Co., Ltd., in 1967 and is now Supervisor of the Electron Device Research Laboratory, Central Research Laboratories. He has been engaged in the research and development of microwave semiconductor devices, and is presently working on microwave GaAs FET applications.

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

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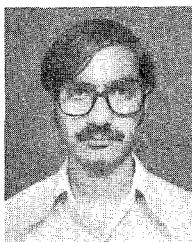


Kazutaka Tomizawa was born in Taiyuan, China, on October 29, 1941. He received his undergraduate and postgraduate training at the University of Meiji, Tokyo, where he obtained the B.Sc., M.Sc., and Ph.D. degrees in 1967, 1969, and 1972, respectively, for work on transferred electron effect.

He then worked on microwave active devices as a research associate at the University of Newcastle upon Tyne, Newcastle upon Tyne, England, from 1972 to 1974. In 1974, he was appointed Lecturer in the Department of Electrical and Electronic Engineering at the University of Meiji, Tokyo, Japan.

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

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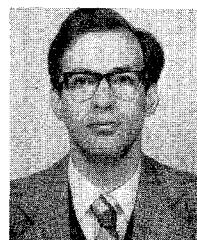


N. C. Srivastava was born on Sept. 29, 1953 in Jodhpur, India. He received the B.Sc. degree from Jodhpur University, Jodhpur, India, in 1972 and was awarded the Sir Donald Field Gold medal and the University gold medal. He received the M.Sc. (physics) and Ph.D. degrees from the Indian Institute of Technology, Delhi, India, in 1974 and 1977, respectively.

At present, he is Senior Scientific Officer in Physics Department, I.I.T., Delhi, India, and is engaged in research on guided waves in gyrotropic

media.

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Hideo Takamizawa was born on November 22, 1938. He graduated from Yamagata Technical High School in 1958.

Since 1958, he has been with Nippon Electric Co., Ltd., working on oxide magnetic materials, and is now Engineering Supervisor of the Material Research Laboratory, Central Research Laboratories. For his research on Mn-Zn ferrites, he received the Imperial Prize from the Invention Association.

Mr. Takamizawa is a member of the Institute of Electronics and Communication Engineers of Japan, Japan Society of Powder and Powder Metallurgy, and the Ceramic Society of Japan.

John L. B. Walker (M'71-S'73-M'74) was born in Birmingham, England, UK, on January 11, 1949. He received the B.Sc. degree in electronic engineering in 1970, the M.Sc. degree in microwaves and communications in 1971, and the Ph.D. degree in 1976, all from the University of Leeds, England, U.K.

Since 1974 he has been with the Hirst Research Center of The General Electric Company, Ltd., at Wembley, England, U.K., where he has worked on microwave transistor amplifiers. He is currently on their Senior Scientific Staff and is engaged on work with Q-band IMPATT oscillators.