

# Contributors



**Yoshihiko Akaiwa** was born in Nagasaki, Japan, on October 14, 1945. He received the B.S. degree in electronics engineering from Kyushu University, Fukuoka, Japan in 1968.

In 1968 he joined the Nippon Electric Company Ltd., Central Research Laboratories, Kawasaki, Japan, where he has been engaged in the research and development of microwave circuits such as microwave integrated circuit filters, mixers, ferrite devices and a 60-GHz transceiver.

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

Department of Electronics and Electrical Communication Engineering, Indian Institute of Technology, Kharagpur, where he is currently a Professor.

Dr. Das is a member of the Institution of Electrical Engineers (London).

+



**Ruey-Shi Chu** (S'70-M'71) was born in Taiwan, China, on March 15, 1940. He received the B.S. (1962) degree in electrical engineering from National Taiwan University Taipei, Taiwan, China, and the M.S. (1964) degree in electronic engineering from the National Chiao Tung University, Hsinchu, Taiwan, China, and served as an Instructor there for one year. From 1965 to 1971 he was with the Polytechnic Institute of Brooklyn, Brooklyn, NY, where he obtained the Ph.D. (1971) degree in electrophysics.

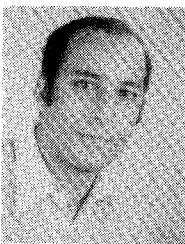
He worked there on research in the area of electromagnetic theory with particular application to optical-acoustic interactions. From November 1971 to October 1972 he was with GTE Sylvania-Communication Systems Division, Needham, MA, where he worked on the analysis and computations of close-in coupling of EMP and IEMP pickups in cables, antennas, and structures of Minuteman Systems under nuclear radiation environments. From October 1972 to August 1974, he was with the Raytheon Company, Equipment Division, Wayland, MA, where he carried out analysis and design on the limited scan antenna systems. In August of 1974 he rejoined GTE Sylvania-CSD as an Engineering Specialist and continued his efforts on the modeling of the nuclear EMP effects on the Minuteman Systems.

Dr. Chu is a member of Sigma Xi.

From 1958 to 1959 he was employed as an Associate Research Engineer with the Boeing Airplane Company, Seattle, WA, where he studied the use of delay lines in control systems. He has been with the University of Utah since 1963, when he was appointed to be Assistant Research Professor in electrical engineering. From 1965 to 1966 he was employed at Bell Laboratories, Holmdel, NJ, while on leave from the University of Utah. During this time he worked in the area of microwave avalanche diode oscillators. Again, in 1971, he was engaged in study and research involving microwave biological effects at the University of Washington while on leave from the University of Utah. He is presently Professor of Electrical Engineering at the University of Utah, where he is engaged in teaching and research in electromagnetics, engineering pedagogy, and microwave biological effects.

Dr. Durney is a member of Sigma Tau, Phi Kappa Phi, Sigma Pi Sigma, Eta Kappa Nu, and the American Society for Engineering Education.

+



**Shimon Coen** (S'75) received the B.A.Sc. degree in electrical engineering from the University of Waterloo, Waterloo, Ont., Canada, in 1975.

Currently, he is doing graduate work at the University of California, Berkeley, leading to the Ph.D. degree in electrical engineering. His current research is on inverse scattering problems and efficient numerical solutions of integral equations.

Osman L. El-Sayed was born in Cairo, Egypt, on October 1, 1942. He received the B.S.E.E. degree from the Faculty of Engineering, Cairo University, Cairo, Egypt, in 1965 and the Docteur-Ingénieur degree from the University de Provence, Aix-Marseille France, in 1974.

From 1965 to 1971 he was a Teaching Assistant at the Faculty of Engineering, Cairo University. He is presently on leave from Cairo University and is currently doing research towards a Docteur ès Sciences

Physiques degree at the University of Provence. He is primarily concerned with microwave semiconductor devices circuitry and EPR spectroscopy.

+

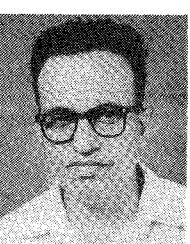


**B. N. Das** received the M.Sc. (tech.) degree in radiophysics and electronics from the University of Calcutta, Calcutta, India, in 1956, and the Ph.D. degree in electronics and electrical communication engineering from the Indian Institute of Technology, Kharagpur, India, in 1967.

From 1956 to 1957 he worked in Philips India Ltd., Calcutta, as a trainee and from 1957 to 1958 he was a Research Scholar in the University of Calcutta. In 1958 he joined the

Graham M. L. Gladwell was born in Sevenoaks, England, on February 21, 1934. He received the B.Sc. degree in mathematics in 1954, and the Ph.D. degree in 1957, both from the University of London, London, England. In 1969 he received the D.Sc. degree from the University of London for work in the theory of vibration.

From 1956 to 1960 he was a Lecturer in Mathematics at University College, London. After two years secondment at the University of the West Indies and a visiting lectureship at the Massachusetts Institute of Technology, he became Lecturer in the Department of Aeronautics and Astronautics, University of



**Carl H. Durney** (S'60-M'64) was born in Blackfoot, ID, on April 22, 1931. He received the B.S. degree in electrical engineering from Utah State University, Logan, in 1958, and the M.S. and Ph.D. degrees in electrical engineering from the University of Utah, Salt Lake City, in 1961 and 1964, respectively.

From 1958 to 1959 he was employed as an Associate Research Engineer with the Boeing Airplane Company, Seattle, WA, where he studied the use of delay lines in control systems. He has been with the University of Utah since 1963, when he was appointed to be Assistant Research Professor in electrical engineering. From 1965 to 1966 he was employed at Bell Laboratories, Holmdel, NJ, while on leave from the University of Utah. During this time he worked in the area of microwave avalanche diode oscillators. Again, in 1971, he was engaged in study and research involving microwave biological effects at the University of Washington while on leave from the University of Utah. He is presently Professor of Electrical Engineering at the University of Utah, where he is engaged in teaching and research in electromagnetics, engineering pedagogy, and microwave biological effects.

Dr. Durney is a member of Sigma Tau, Phi Kappa Phi, Sigma Pi Sigma, Eta Kappa Nu, and the American Society for Engineering Education.

+

**Osman L. El-Sayed** was born in Cairo, Egypt, on October 1, 1942. He received the B.S.E.E. degree from the Faculty of Engineering, Cairo University, Cairo, Egypt, in 1965 and the Docteur-Ingénieur degree from the University de Provence, Aix-Marseille France, in 1974.

From 1965 to 1971 he was a Teaching Assistant at the Faculty of Engineering, Cairo University. He is presently on leave from Cairo University and is currently doing research towards a Docteur ès Sciences

Physiques degree at the University of Provence. He is primarily concerned with microwave semiconductor devices circuitry and EPR spectroscopy.

+

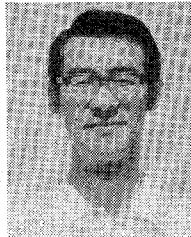
**Graham M. L. Gladwell** was born in Sevenoaks, England, on February 21, 1934. He received the B.Sc. degree in mathematics in 1954, and the Ph.D. degree in 1957, both from the University of London, London, England. In 1969 he received the D.Sc. degree from the University of London for work in the theory of vibration.

From 1956 to 1960 he was a Lecturer in Mathematics at University College, London. After two years secondment at the University of the West Indies and a visiting lectureship at the Massachusetts Institute of Technology, he became Lecturer in the Department of Aeronautics and Astronautics, University of

Southampton, England. In 1964 he transferred to the Institute of Sound and Vibration Research and left in 1969 to become Professor of Civil Engineering at the University of Waterloo, Waterloo, Ont., Canada. His research interests lie in the solution of integral equations, elasticity theory, and numerical analysis.

Dr. Gladwell is a member of the American Academy of Mechanics and a Fellow of the Institute of Mathematics and Its Applications.

the University of Utah as a Professor in the Department of Biophysics and Bioengineering, and as a Director of the Institute for Biomedical Engineering, continuing his research in bioinstrumentation and biological electromagnetic wave effects. He was appointed Chairman of the new Department of Bioengineering in 1974, and also serves as Professor in the new Department of Medical Computing and Biophysics, and Research Associate Professor in the Department of Surgery.



**Masahiro Hashimoto** (S'70-M'73) was born in Osaka, Japan, on February 26, 1943. He received the B.S., M.S., and Ph.D. degrees in electrical engineering from Osaka University, Osaka, Japan, in 1966, 1968, and 1971, respectively.

From 1971 to 1973 he was a Research Assistant on the Faculty of Engineering Science, Osaka University. His research interests were in the field of analytical and numerical analyses on antennas and waveguide scattering problems, and the analysis of electron-beam trajectories. From 1973 to 1974 he worked at Communication Equipment Works, Mitsubishi Electric Corporation, Amagasaki, Japan, where he joined a development group designing microwave linear phase filters. From 1974 to 1976 he was engaged in research on fiber optics at the Communication Research and Development Department, Mitsubishi Electric Corporation. Since 1976 he has been with Osaka Electro-Communication University, Neyagawa, Japan, where he is now an Associate Professor of the Department of Applied Electronic Engineering.



**Jin Au Kong** (S'65-M'69-SM'74) was born in Kiangsu, China, on December 27, 1942. He received the Ph.D. degree in 1968 from Syracuse University, Syracuse, NY, where he continued as a Postdoctoral Research Engineer.

Since 1969 he has been on the faculty of the Massachusetts Institute of Technology, Cambridge, where he is now Associate Professor of Electrical Engineering. From 1969 to 1971 he was also Vinton Hayes Postdoctoral Fellow of Engineering. His recent fields of interest are electromagnetic wave propagation and radiation, geophysical probing, remote sensing, and optics and guided waves. He is the author of *Theory of Electromagnetic Waves* published by Wiley-Interscience.

Dr. Kong is a member of the American Geophysical Union, the Optical Society of America, and the Commission 6 of URSI. He is listed in the American Men and Women of Science, Who's Who in the East, Men of Achievement, Notable Americans of the Bicentennial Era, and the Dictionary of International Biography.



**Tatsuo Itoh** (M'69-SM'74) was born in Tokyo, Japan, on May 5, 1940. He received the B.S. and M.S. degrees in electrical engineering from the Yokohama National University, Yokohama, Japan, in 1964 and 1966, respectively, and the Ph.D. degree in electrical engineering from the University of Illinois, Champaign/Urbana, 1969.

From September 1966 to April 1976 he was with the Electromagnetics Laboratory, University of Illinois. He was associated with the Coordinated Science Laboratory of the same university from August 1974 to April 1976. He joined the Stanford Research Institute, Menlo Park, CA, in April 1976.

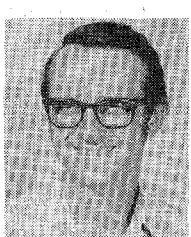
Dr. Itoh is a member of the Institute of Electronics and Communication Engineers of Japan, Sigma Xi, and Commissions B and C of URSI.



**Nobuaki Kumagai** (M'59-SM'72) was born in Ryojun, Japan, on May 19, 1929. He received the B. Eng. and D. Eng. degrees, both from Osaka University, Osaka, Japan, in 1953 and 1959, respectively.

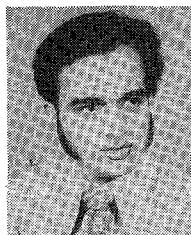
From 1958 to 1960 he was a Visiting Senior Research Fellow at the Electronics Research Laboratory of the University of California, Berkeley, where he was engaged in research on electromagnetic wave scattering and parametric amplifiers. From 1960 to 1970 he was an Associate Professor of Communication Engineering at Osaka University. In 1966 he was invited to the eleventh G-MTT International Symposium as an invited speaker. Since 1971 he has been a Professor of Communication Engineering at Osaka University, Osaka, Japan, where he is engaged in research and education in electromagnetic theory, microwave and millimeter-wave engineering, optical waveguides and devices, and lasers and their applications. He is the coauthor of *Microwave Circuits* (OHM-sha, Tokyo, 1963) and *Introduction to Relativistic Electromagnetic Field Theory* (Corona Publishing Co., Tokyo, 1971).

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



**Curtis C. Johnson** (M'56-SM'63) was born in Long Beach, CA, on November 7, 1932. He received the B.S. and M.S. degrees in electrical engineering from the California Institute of Technology, Pasadena, in 1954 and 1955, respectively, and the Ph.D. in electrical engineering from Stanford University, Stanford, CA, in 1958.

He was employed by the General Electric Microwave Laboratory, Palo Alto, CA, from 1955 to 1958, while on a G.E. Fellowship in Stanford. He was employed by the Hughes Research Laboratory, Malibu, CA, from 1958 to 1961. He was an Assistant and Associate Professor in electrical engineering at the University of Utah, Salt Lake City, from 1961 to 1967, engaged in research on microwave devices and electromagnetic waves. In 1967 he joined the Bioengineering Center at the University of Washington, Seattle, WA, became Assistant Director for the Center and Professor of electrical engineering in 1969, and was involved in research and development of biomedical instrumentation and biological microwave effects. In 1972 he returned to



**Mahesh Kumar** (S'75) was born in Mathura, India, on December 3, 1951. He received the B.Sc. and M.Sc. (physics) degrees from Agra University, Agra, India, in 1969 and 1971, respectively, and the M.Sc. (tech.) degree in electronics from Birla Institute of Technology and Science, Pilani, Rajasthan, India, in 1973.

Since November 1973 he has been with the Department of Electronics and Electrical Communication Engineering, Indian Institute of Technology, Kharagpur, where he is working towards the Ph.D. degree on striplines.

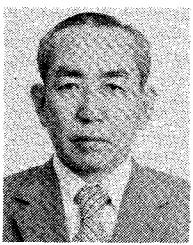


**Son Le-Ngoc** was born in Quang-Nam, Vietnam, on December 16, 1944. He received the B.S. degree in applied science from the University of Saigon, Saigon, Vietnam, in 1966, the M.S. degree in electrical engineering from the University of Texas, Austin, in 1970, and the Ph.D. degree in electrical engineering from McGill University, Montreal, Canada, in 1975.

Since 1968 he has been engaged in research on plasma diagnostics using microwaves, at the University of Texas, and then electromagnetic wave propagation in anisotropic media, at McGill University. He is presently working for Pratt and Whitney Aircraft, Montreal, Canada.

Dr. Le-Ngoc is a member of Order of Engineers of Quebec, Canada.

+

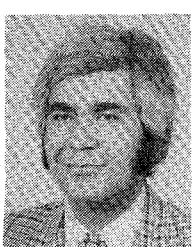


**Toshio Makimoto** (M'56) was born in Hiroshima, Japan, on August 30, 1916. He received the B. Eng. and Ph.D. degrees in electrical engineering from the Tokyo Institute of Technology, Tokyo, Japan, in 1941 and 1956, respectively.

In 1941 he entered the Mitsubishi Electric Corporation, Amagasaki, Japan. During 1942-1945 he served in the Army. In 1946 he joined the Institute of Scientific and Industrial Research, Osaka University, Osaka, Japan, and became a Professor in 1960. Since 1964 he has been with the Faculty of Engineering Science, Osaka University, as a Professor of Electrical Engineering, and since 1974 has also been the Dean of the Faculty. He has worked on microwave and millimeter-wave circuits, antennas and radars, ferrite applications, Esaki-diode amplifiers, laser applications, and microwave acoustics. He is the author of four books on microwave electronics and high-frequency measurements.

Dr. Makimoto is a member of the Institute of Electrical Engineers of Japan, the Institute of Electronics and Communication Engineers of Japan, the Institute of Television Engineers of Japan, and the Physical Society of Japan.

+



**Habib Massoudi** (S'74-M'76) was born in Nishabour, Khorassan, Iran, on July 23, 1940. He received the B.Sc. degree from Teacher's Training College, Tehran, Iran, in 1964, and the M.S. degree from the University of Tehran, Tehran, Iran, in 1970, both in physics. He worked as a physics teacher in Iran from 1964 to 1970. Continuing his graduate studies at the University of Utah, Salt Lake City, he obtained the Ph.D. degree in electrical engineering in 1976.

He currently holds a postdoctorate fellowship at the University of Utah in the Department of Electrical Engineering. His research interest includes the electromagnetic radiation, scattering, and interaction with biological systems.

+



**Malcolm McColl** received the B.S. degree from Wayne State University, Detroit, MI, in 1957 and the M.S. and Ph.D. degrees from the California Institute of Technology, Pasadena, in 1958 and 1964, all in electrical engineering.

Since 1962 he has been associated with the Electronics Research Laboratory of The Aerospace Corporation, and presently holds the position of Staff Scientist. During 1964-1966 he held a part-time appointment as a Research Fellow in Electrical Engineering at Caltech. His efforts have concentrated on the physics and fabrication of metal-semiconductor contacts to III-V compounds for applications as Schottky-barrier mixer diodes at wavelengths extending from the

microwave to the submillimeter. He is coinventor of the super-Schottky diode which in both the video and mixing modes of operation has been established as the most sensitive detector of microwaves.

Dr. McColl is a member of the American Physical Society, Tau Beta Pi, Eta Kappa Nu, and Sigma Xi.

+



of Japan.

**Katsumi Morishita** (S'74) was born in Fukui, Japan, on February 24, 1949. He received the B.E. and M.E. degrees in electrical communication engineering from Osaka University, Osaka, Japan, in 1972 and 1974, respectively.

Presently, he is working for the Ph.D. degree at the graduate school of Osaka University, studying in the area of electromagnetic field problems.

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

+



**Shojiro Nemoto** was born in Nagoya, Japan, on March 9, 1944. He received the B. Eng., M. Eng., and Ph.D. degrees in electrical engineering from Osaka University, Osaka, Japan, in 1966, 1968, and 1972, respectively.

Since 1971 he has been a Research Associate in the Faculty of Engineering Science, Osaka University, where he worked on the propagation and diffraction of beam waves in the millimetric-wave region. From 1973 to 1975 he was a Postdoctoral Research Fellow in the Department of Electrical Engineering, McGill University, Montreal, Canada. His current research interests are in the areas of integrated and fiber optics.

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

+



Sunnyvale, CA.

Mr. Rudokas is a member of Tau Beta Phi.

**Ronald S. Rudokas** (S'76) was born in Chicago, IL, on October 11, 1953. He received the B.S.E.E. and M.S.E.E. degrees, both from the University of Illinois, Champaign/Urbana, in 1975 and 1976, respectively.

At the University of Illinois he was a staff member of the millimeter-wave group of the Coordinated Science Laboratory, where he was engaged in the development of low-loss dielectric waveguides. He is currently with the Electromagnetic Systems Laboratory Inc.,

+



**Leonard L. Tsai** (S'66-M'69) was born in Chungking, China, on February 12, 1943. He received the B.E.E., M.S., and Ph.D. degrees from Ohio State University, Columbus, in 1965, 1966, and 1970, respectively.

From 1965 to 1970 he was with the Electroscience Laboratory, Ohio State University. He joined the Department of Electrical Engineering, University of Mississippi, University, in 1970, where he is now an Associate Professor. From January to August 1973 he was on leave and a Visiting Professor at the University of Arizona, Tucson. His areas of interest are in applications of numerical methods and diffraction techniques to antenna, scattering, and EMP problems. He

has also been a consultant to governmental and industrial organizations in these problem areas.

Dr. Tsai is a member of Eta Kappa Nu, Tau Beta Pi, and Sigma Xi. He has also received two special recognition awards for papers published in the IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION.

+



**Te-Kao Wu** (S'74-M'76) was born in Taiwan, China, on October 12, 1948. He received the B.S.E.E. degree from National Taiwan University, Taiwan, China, in 1970, and the M.S.E.E. and Ph.D. degrees from the University of Mississippi, University, in 1973 and 1976, respectively.

He was a Research Assistant in the Department of Electrical Engineering, University of Mississippi, from 1971 to 1976, and is now a Research Associate. His areas of interest are in the applications of numerical methods to scattering, antenna, EMC, and EMP problems as well as microwave circuits.

Dr. Wu is a member of Eta Kappa Nu, Phi Kappa Phi, and Sigma Xi.



**Gar Lam Yip** (S'63-M'67-SM'75) was born in Shanghai, China, on December 18, 1937. He received the B.Sc.(Hon.) degree from the Imperial College of London University, London, England, in 1960, the M.Sc. degree from Queen's University, Kingston, Ont., Canada, in 1963, and the Ph.D. degree from the University of Toronto, Toronto, Ont., Canada, in 1967, all in electrical engineering.

He was a Teaching Assistant in the Department of Electrical Engineering, Queen's University, from 1961 to 1963, and then at the University of Toronto from 1963 to 1967, in the areas of electronics and electromagnetic theory. In September 1967 he was appointed Assistant Professor. Since September 1973 he has been an Associate Professor of Electrical Engineering at McGill University, Montreal, P.Q., Canada, where he is teaching and doing research in electromagnetic theory, microwaves, and optical waveguides. He spent the summer of 1968 at the Plasma Physics Laboratory, RCA Victor Company, Montreal, and in the summers of 1970 and 1971 he held a research appointment at Communications Research Centre in Ottawa. In 1969 he initiated research in optical waveguides for optical communications at McGill University in Canada.