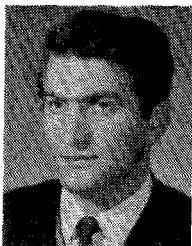
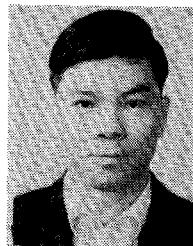


## Contributors



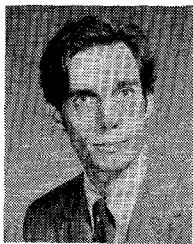
**Ali M. B. Al-Hariri** was born in Baghdad, Iraq, on January 4, 1948. He received the B.Sc. degree with honors from the Queen Mary College, University of London, London, England, in 1971, where he is currently working towards the Ph.D. degree.

His research activities have been primarily in theoretical investigation of various aspects of the propagation and attenuation characteristics of cylindrical structures supporting guided electromagnetic waves.



**Kai Chang** was born in Canton, China, on April 27, 1948. He received the B.S.E.E. degree from the National Taiwan University, Taipei, Taiwan, in 1970, and the M.S. degree from State University of New York at Stony Brook, Stony Brook, in 1972.

From 1970 to 1971 he served in the Chinese Air Force, receiving training as a Reserve Communication Officer. From 1971 to 1972 he studied at SUNY at Stony Brook under an NSF Fellowship. In 1972 he joined the Cooley Electronics Laboratory of the University of Michigan, Ann Arbor, as a Research Assistant. He is also a Teaching Assistant in the Department of Electrical and Computer Engineering and is working toward his Ph.D. degree in microwave solid-state circuits.



**Jacques A. Arnaud** (SM'66) was born in Paris, France, in 1932. He graduated from the Ecole Supérieure d'Electricité, Paris, France, in 1953, and received the Dr. Ing. and Dr. es Sci. degrees from the University of Paris, Paris, France, in 1963 and 1972, respectively.

For two years he was an Assistant at the Ecole Supérieure d'Electricité. In 1955 he joined the Compagnie Générale de Télégraphies sans Fil, where he was engaged in research on high-power traveling-wave tubes and noise generators. In 1967 he joined Bell Laboratories, Holmdel, N. J., where he studied laser amplifiers and optical resonators. He is currently Supervisor of a group studying quasi-optical devices and is doing theoretical work on optical fibers and classical electrodynamics.



**Edward G. Cristal** (S'58-M'61-SM'66) was born in St. Louis, Mo. He received the B.S. and A.B. degrees in electrical engineering and mathematics and the M.S. degree in electrical engineering from Washington University, St. Louis, Mo., in 1957 and 1958, respectively, and the Ph.D. degree in electrical engineering from the University of Wisconsin, Madison, in 1961.

From March 1961 to January 1972 he was with the Electromagnetic Techniques Laboratory, Stanford Research Institute (SRI), Menlo Park, Calif. At SRI he participated in programs of applied research and development of microwave and UHF components, including filters, multiplexers, directional couplers, impedance matching networks, equalizers, and multipliers. From January 1972 to June 1973 he was Associate Professor of Electrical Engineering, McMaster University, Hamilton, Ont., Canada. He joined the Hewlett-Packard Laboratories, Palo Alto, Calif., in June 1973 where he is currently working in the area of telecommunications.

Dr. Cristal is a member of the IEEE Communications, Circuits and Systems, and Microwave Theory and Techniques Societies.



**C. T. M. Chang** (S'62-M'72) was born in Nanking, China, on April 2, 1936. He received the B.S. degree in engineering from the National Taiwan University, Taipei, Taiwan, China, in 1957, and the M.S. and Ph.D. degrees in electrical engineering from the University of Southern California, Los Angeles, in 1962 and 1968, respectively.

In 1962 he was with the Applied Research Laboratory, Glendale, Calif., where he was engaged in the development and design of the first ARL computer console for on-line spectrochemical analysis. From 1963 to 1968 he was a Research Assistant in the Department of Electrical Engineering, University of Southern California, where his research interest was in the study of nonideal type II superconductors. He joined the Argonne National Laboratory, Argonne, Ill., in 1968 and was involved in the development of several microwave devices for high-energy-physical experiments. He is currently with the Physical Sciences Research Laboratory, Texas Instruments Incorporated, Dallas, Tex.

Dr. Chang is a member of the American Physical Society and the Scientific Research Society of America.



**Nabil H. Farhat** (S'58-M'63-SM'72) received the B.Sc. degree from the Technion-Israel Institute of Technology, Haifa, Israel, in 1957, the M.Sc. degree from the University of Tennessee, Knoxville, in 1959, and the Ph.D. degree from the University of Pennsylvania, Philadelphia, in 1963, all in electrical engineering.

In 1964, he joined the faculty of the Moore School of Electrical Engineering, University of Pennsylvania, where he is now the Alfred G. and Meta A. Ennis Associate Professor in Electrical Engineering. His current research interests are in the areas of imaging radars, microwave holography, and electrooptics in which he has numerous publications. He is teaching courses in EM theory, electrooptics, and

holography on both graduate and undergraduate levels. His past research included the study of the interaction of EM radiation with plasma and solids in the context of laser output energy measurement and photodetachment of negative ions. He is currently engaged in the preparation of two texts: *An Introduction to Electro-Optics and Longwave Holography—Principles and Applications*.

Dr. Farhat is a recipient of the University of Pennsylvania Christian R. and Mary F. Lindback Foundation award for distinguished teaching. He is a member of Sigma Xi, Eta Kappa Nu, the American Institute of Physics, the American Society for the Advancement of Science, the Franklin Institute, and has served on the National Board of Directors of Eta Kappa Nu. He is an RCA Consultant and has participated in the IEEE Regional Distinguished Lecturer tours.



**Josef L. Fikart** (S'70—M'72) was born in Dvorce, Czechoslovakia, on April 3, 1939. He received the Ing. (M.Sc.) degree in electrical engineering from the Czech Technical University, Prague, Czechoslovakia, in 1966, and the Ph.D. degree in electrical engineering from the University of Alberta, Edmonton, Alta., Canada, in 1972. From 1964 to 1969 he was associated with the Institute of Radioengineering and Electronics of the Czechoslovak Academy of Sciences in Prague, where he worked on the research and design of microwave parametric devices, especially varactor multipliers. From 1969 to 1972 he was a Ph.D. student at the University of Alberta, studying noise in IMPATT oscillators under large-signal conditions. In 1973, after a short period of postdoctoral research on BARITT oscillator noise at the same university, Dr. Fikart joined GTE Lenkurt Electric (Canada) Ltd., Burnaby, B. C., Canada, where he is engaged in the development of microwave communication circuits.



**Ulrich H. Gysel** (S'68—M'70) was born in Schaffhausen, Switzerland, on November 1, 1940. He received the Diploma in electrical engineering, and the Ph.D. degree with honors, in 1964 and 1971, respectively, both from the Swiss Federal Institute of Technology, Zurich, Switzerland. From 1965 to 1971 he was with the Microwave Laboratory, Swiss Federal Institute of Technology, as an Assistant and Research Associate, where he was engaged in research on tunnel-diode amplifiers and mixers. He held a Postdoctoral Fellowship from the Swiss National Science Foundation from 1971 to 1973, and spent this time at the Electromagnetic Techniques Laboratory of the Stanford Research Institute, Menlo Park, Calif. Presently, he is a Staff Member at the same laboratory. His current research interests are in the area of microwave filters, microwave semiconductor applications, and computer-aided design.



**Peter J. Khan** (M'61) was born in Bowral, Australia, on November 12, 1936. He received the B.S. degree in mathematics and physics, and the B.E. and Ph.D. degrees in electrical engineering, all from the University of Sydney, Sydney, Australia, in 1957, 1959, and 1963, respectively.

From 1953 to 1959 he was employed by the Weapons Research Establishment at Salisbury, South Australia, carrying out research and development in electronic circuits. After

completion of his doctoral studies in parametric amplification, he came to the University of Michigan, Ann Arbor, in 1963 as a Fulbright Postdoctoral Fellow. He is now an Associate Professor in the Department of Electrical and Computer Engineering, and head of the Microwave Solid-State Circuits Group at the Cooley Electronics Laboratory. His research interests include solid-state oscillators, field analysis of microwave structures, varactors, and biological effects of microwave radiation.

Dr. Khan is a member of Sigma Xi.



**Leonard Lewin** (A'69) was born in Southend-on-Sea, England, on July 22, 1919.

During World War II he was with the British Admiralty doing research on antenna design, waveguides, and radar. In 1946, he joined Standard Telecommunication Laboratories, Harlow, England, where he became Head of the Microwave Laboratory in 1950 and Assistant Manager of the Transmission Laboratory in 1962. Currently he is Professor of Electrical Engineering, University of Colorado, Boulder, on leave in 1973 at the Department of Electrical Engineering, Queen Mary College, University of London, London, England. He is the author of many papers and patents in the field of antennas and waveguides, as well as author of three research books.

Mr. Lewin is a member of the Institute of Electrical Engineers (London) and a fellow of the British Interplanetary Society. He won the Microwave Prize for a paper on singular integral equations applied to waveguides in 1962. In 1967 he was awarded an honorary degree of Doctor of Science from the University of Colorado.



**Charles A. Liechti** (M'70) received the M.S. degree in physics and the Ph.D. degree in electrical engineering from the Swiss Federal Institute of Technology, Zurich, Switzerland, in 1962 and 1967, respectively.

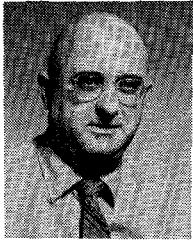
While at the Swiss Institute of Technology, he was engaged in applied research on microwave solid-state circuits with emphasis on varactor-controlled wide-band phase shifters. In 1968 he joined the Hewlett-Packard Company, Palo Alto, Calif., where he has been concerned with the design and development of IMPATT oscillators and frequency converters with Schottky-barrier diodes. Since 1971 he has been in charge of GaAs field-effect transistor devices, microwave amplifiers, and GaAs digital integrated-circuit developments at the Solid State Laboratory.

Dr. Liechti received outstanding contributed paper awards at the International Solid-State Circuits Conference in 1973 and 1974.



**Thorsten Nygren** was born in Stockholm, Sweden, in 1940. He received the M.S. degree in electrical engineering from the Royal Institute of Technology, Stockholm, Sweden, in 1963.

From 1963 to 1968 he was with the Microwave Department, Royal Institute of Technology. In 1968 he joined the Microwave Institute Foundation, Stockholm, Sweden, where he has since been engaged in research and development of microwave components and circuits.



**Joseph T. Ruscio** was born in New Rochelle, N. Y., in 1924. He received the B.S. degree from Monmouth College, West Long Branch, N. J., in 1962.

In 1957 he joined Bell Laboratories, Holmdel, N. J., where he was engaged in satellite communication projects Echo and Telstar, phase locking of lasers, and microwave link experiments. Currently, he is engaged in research on quasi-optical systems.



**Adel A. M. Saleh** (S'65-M'70) was born in Alexandria, Egypt, on July 8, 1942. He received the B.Sc. degree in electrical engineering (communications) from the University of Alexandria, Alexandria, Egypt, in 1963, and the M.S. and Ph.D. degrees in electrical engineering from the Massachusetts Institute of Technology, Cambridge, in 1967 and 1970, respectively.

From 1963 to 1965 he worked as an Instructor and Demonstrator at the University of Alexandria. In 1970 he joined Bell Laboratories, Holmdel, N. J.

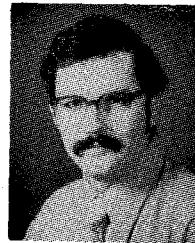
Dr. Saleh is a member of Sigma Xi.



**Anders Sjölund** was born in Örnsköldsvik, Sweden, in 1940. He received the M.S. degree in technical physics engineering from the University of Uppsala, Uppsala, Sweden, in 1965, and the Ph.D. degree from the Royal Institute of Technology, Stockholm, Sweden, in 1971.

From 1965 to 1968 he was with the Microwave Department, Royal Institute of Technology. In 1968 he joined the Microwave Institute Foundation, Stockholm, Sweden,

where he has since been engaged in research on plasma physics, infrared semiconductor detectors, and microwave semiconductor components.



**Robert L. Tillman** was born September 9, 1947, in El Paso, Tex. He received the S.B.(E.E.) degree from the Massachusetts Institute of Technology, Cambridge, in 1969, and the M.S.E.E. degree from Stanford University, Stanford, Calif., in 1971.

In 1969 he joined Texas Instruments Incorporated, Dallas, where he worked in the development of integrated power amplifiers in the 1-3-GHz frequency range. In 1971 he joined the Microwave Division, Hewlett-Packard Company, Palo Alto, Calif., and worked in the area of wide-band amplifiers and YIG-tuned oscillators. He transferred in 1972 to the Solid-State Laboratory, Hewlett-Packard Company, to study microwave application of GaAs FET's. As a result of this work, low-noise FET amplifiers were developed covering the frequency bands 7-8.5 GHz and 8-12 GHz. At present, he is with the Microwave Technology Center, Hewlett-Packard Company, where his interests include microwave power transistors and GaAs FET's.

Mr. Tillman is a member of Eta Kappa Nu. He received an outstanding contributed paper award at the International Solid-State Circuits Conference in 1974.



**Peter C. Wang** received the B.Sc. degree from National Taiwan University, Taipei, Taiwan, the M.Sc. degree from the University of Missouri, Rolla Rolla, in 1964, and the Ph.D. degree from the University of Pennsylvania, Philadelphia, in 1972, all in electrical engineering.

He worked in the computer engineering industry for several years and is currently with the IBM Corporation, San Jose, Calif.