# 1988 Microwave Career Award

## Leo Young

"For a career of meritorious achievement and outstanding technical contributions in the field of microwave theory and techniques."

The Microwave Career Award is the highest award given by the Microwave Theory and Techniques Society. It is given to an individual for a career of meritorious achievement and outstanding technical contribution in the field of microwave theory and techniques. The eligibility requirements are publication in technical journals, presentations of lectures and a distinguished career of contributions to the microwave field. This award is given only to those individuals who have distinguished themselves over a long period of time.

The award consists of a suitable certificate, a plaque, a cash sum of two thousand dollars and a feature publication in the **IEEE Transactions on Microwave Theory and Techniques.**

**Leo Young** came to the United States from England in 1953, to join the Westinghouse Electric Corporation in Baltimore, Maryland.

Leo had been trained as a physicist at Cambridge University, England, where he also attended a few courses in electronics. He had become excited by the new field of microwaves which had recently proved so important in winning the war. He turned his attention to the latest applications of radar and began to design antennas and waveguides in the research laboratories of A. C. Cossor and Decca Radar in London. The MIT Rad. Lab. series of books were just being published and each one was awaited eagerly by the small microwave community. The latest developments were still coming from the U.S., and so he set sail from Southampton with his new bride to continue his research here.

Westinghouse encouraged its engineers to continue their academic education, and Leo was fortunate in having his first American course on antennas given by the late Don King at The Johns Hopkins University, where he also studied microwave networks under Bill Huggins. He received the Westinghouse Electric Corporation's B.G. Lamme Graduate Scholarship in 1958, and the Doctor of Engineering degree from Johns Hopkins in 1959. His dissertation kindled his interest in microwave and optical filters, and a year later he joined Seymour Cohn, George Matthaei, Ted Jones and others at Stanford Research Institute in Menlo Park, California, to continue this work and co-author a book on microwave filters, then in the planning stage. He remained at SRI for more than twelve years, and during that time became active in the Microwave Theory and Techniques (MTT) Group (now Society) of IEEE, receiving the Microwave Prize in 1963 (right here in New York just 25 years ago). He was elected IEEE Fellow in 1968, became Chairman of the MTT Administrative Committee in 1969, and Director of Division IV on the IEEE Board of Directors from 1971 to 1974.

The MTT Group (Society) has always shown a strong interest in professional activities, and Leo carried that message to the IEEE Board, helping in 1972 and 1973 to institutionalize a framework of professional activities within the largest engineering society in the world. He became chairman of the new United States Activities Committee (later, USAB) in 1974. He continued to take a specific interest in IEEE pension activities, and remained chairman of the IEEE Pension Committee under USAB from 1974–1978. During that period, and as a result of these IEEE activities, he co-authored with his late wife, Fay, a popular book on pension plans. He was elected in 1979, Executive Vice-President of IEEE, and (by petition) in 1980, IEEE President.

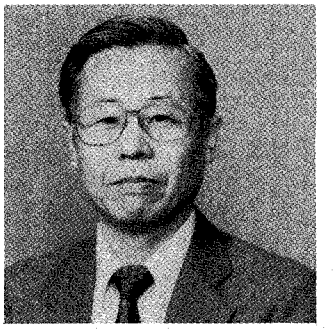
In 1973 he joined the U.S. Naval Research Laboratory (NRL) in Washington, D.C. where he remained until 1981, at which time he came to the Office of Secretary of Defense (OSD) as Director for Research and Laboratory Management. At NRL he continued to work in microwaves and electronics, and played an advocacy role for millimeter waves. At OSD, Leo has had responsibility for basic research, university relations, and laboratory management policy, set up under the direction of Under Secretary Richard DeLauer, the DoD-University Forum to improve the quality of the dialog with universities, organized the DoD Small Business Innovation Research program, chaired the IR&D Technical Evaluation Group, provided oversight to the Defense Technical Information Center, and has had many other assignments. His current interests are mainly in the area of technology transfer, design and manufacturing processes, and computer aided logistics support.

Leo was married in Sunderland, England, in January 1953, to Fay Lilian Merskey, who passed away in May 1981. They had three children, Philip, an economist, Sarah, a computer scientist, and Joe, a medical student. In 1983 Leo married Ruth Breslow, also widowed and with three grown children. They had lived only a few miles apart for many years, but never met until introduced through an IEEE connection.

Leo has authored or edited fourteen books, mainly on microwave subjects, and about one hundred papers, holds over twenty patents, is an honorary life member of the Microwave Theory and Techniques Society, was a member of the Board of Governors of the American Association of Engineering Societies, is a Fellow of the American Association for the Advancement of Science, has served on numerous Committees of the National Academy of Sciences and National Academy of Engineering, was chairman of NSF's first Engineering Advisory Committee, and has served on committees of NASA, OSTP, and several universities (Johns Hopkins, University of California, MIT). He has traveled extensively abroad, spent a Sabbatical year at the Technion in Haifa, Israel, was Distinguished Microwave Lecturer at the IEEE summer school at Leeds University, England, NATO/AGARD lecturer at the University of Bologna, Italy, and has given talks at universities in India, Egypt, Europe, as well as in the United States. He believes that the way to peace and prosperity is through education and the scientific disciplines, particularly the professional application of engineering knowledge, which is so well exemplified by the members and charter of IEEE.

L. S. Napoli

# 1988 Microwave Application Award



M. Fukuta

"For recognition and demonstration of the potential of GaAs Field Effect Transistors for power applications."

The Microwave Application Award is presented periodically for an outstanding application of microwave theory and techniques. The eligibility requirements are creation of a new device, component or technique, novel use of components, or both.

The award consists of a certificate, a cash sum of one thousand dollars, and a feature publication in the IEEE Transactions on Microwave Theory and Techniques

**L. S. Napoli** graduated from Rutgers University with a BS and MS degrees in Electrical Engineering in 1959 and 1961 respectively. During that period he was elected to several of the Engineering and Scientific honor societies. In April 1986, the Engineering Society of the Rutgers Alumnae Association honored him for "Distinguished Achievement in the Field of Engineering".

During his career as a Member of the Technical Staff at RCA Laboratories, (Now David Sarnoff Research Center, a subsidiary of SRI International), Mr. Napoli specialized in research related to microwave phenomena in electron devices, most notably wave propagation in gaseous plasmas, transferred electron devices, avalanche transit-time devices, and GaAs Schottky-barrier FETs. RCA Laboratories issued him 4 Achievement Awards for unique contributions in these areas. He has been granted more than 25 U.S. patents and has written more than 30 technical articles.

In 1963, Mr. Napoli was appointed Head of the Microwave Components Group that developed a variety of avalanche transit-time devices for phased-array radar and satellite communications applications. He then headed a research group and later became engineering manager in the area of concentrator photovoltaics, laying the engineering and manufacturing base for a solar-electric concentrator business. Subsequently, he acted as engineering manager of a variety of radiation-hardened microprocessor components which culminated in a family of 4K and 16K radiation-hardened CMOS/SOS memories, gate arrays, and other logic products for the Solid State Division of RCA.

In 1983, Mr. Napoli was appointed Head, LSI Memories and Devices Research, in the Integrated Circuit Technology Laboratory where he was responsible for the design and development of advanced CMOS random access memory, nonvolatile memories, SOS CCD memories, and radiation-hardened CMOS/SOS memories, and for short-channel MOS modeling and device development

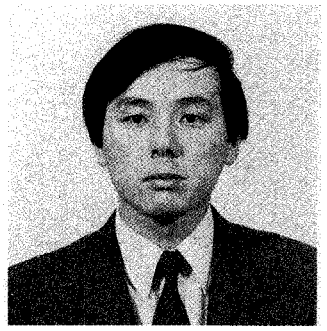
Presently, Mr. Napoli is Director of the Integrated Circuit Research Laboratory. He is responsible for the development of technology, devices, and circuits for CMOS ICs including gate arrays, nonvolatile IC products, radiation-hardened IC products and power MOS.

**M. Fukuta** was born in Gifu, Japan on Christmas day in 1940. He received the B.S. degree in electrical engineering from Nagoya Institute of Technology, Nagoya, Japan in 1963 and the Ph.D degree in electrical engineering from Nagoya University, Nagoya, Japan in 1977. In 1963 he joined Kobe Industries Co. which later merged with Fujitsu Ltd. Since joining the company he has been working in the field of semiconductor devices including Si RF power Transistors, Si ICs, and Si MOSFETs. In 1967 he invented "the mesh emitter transistor" and made a series of products.

Since 1972 he has been engaged in developing low-noise and power GaAs FETs and GaAs integrated circuits in Fujitsu laboratories. At ISSCC '73 he presented the first paper on power GaAs FET's titled "Mesh Source Type Microwave Power FET". From 1979 to 1980, he supervised development of HEMT devices. He moved from Fujitsu Laboratories to Compound Semiconductor Division, Fujitsu in 1980. In the division, he promotes the product development of many semiconductor devices including power GaAs FETs, HEMTs, GaAs ICs, laser diodes and detectors.

He is now deputy general manager of Compound Semiconductor Division, Fujitsu. He holds 20 patents on semiconductor devices.

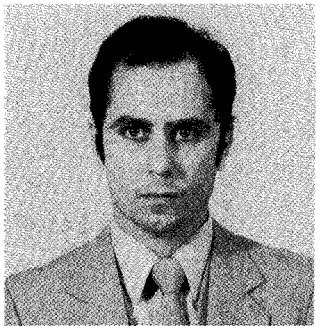
Dr. Fukuta received a medal from the Minister of Science and Technology in Japan in 1975 for outstanding contributions to the development of power GaAs FETs.



Kazuhiko Honjo

# 1988

# MTT-S Microwave Prize



Mohammad Madihian

The *Microwave Prize* is awarded annually to the author(s) of that paper, published in the *IEEE Transactions on Microwave Theory and Techniques, Proceedings of the IEEE,* or other official IEEE publication, which is judged to be the most significant contribution in the field of interest of the Society.

The 1988 Microwave Prize is awarded to Drs. Kazuhiko Honjo and Mohammad Madihian for their paper "GaAs-Monolithic IC's for a X-Band PLL-Stabilized Local Source," IEEE MTT-S Transactions, Vol. MTT-34, No. 6, pp. 707–713, June 1986.

**Kazuhiko Honjo** (M'82) was born in Saitama, Japan, on October 28, 1951. He received the B.E. degree from the University of Electro-communication, Tokyo, Japan, in 1974. He received the M.E. and D.E. degrees in electronic engineering, from the Tokyo Institute of Technology, Tokyo, Japan, in 1976 and 1983, respectively.

He joined the Central Research Laboratories, NEC Corporation, Kawasaki, Japan, in 1976. He has been involved in the research and development of TRAPATT oscillators, GaAs FET circuit technology for high-power, low-noise, broad-band amplification, oscillation, mixing, and frequency division, GaAs MMIC technology including device design, process, and testing. Presently, he is engaged in the research and development of the heterojunction bipolar transistor (HBT) and the integrated circuits both for digital and microwave applications. He is now Research Manager of the Ultra-high-speed Device Research Laboratories, NEC, and is leading a HBT research group.

Dr. Honjo is a co-recipient of the 1983 Microwave Prize granted by the MTT Society. He also received the Young Engineer Award from the Institute of Electronics, Information and Communication Engineers of Japan, in 1980.

**Mohammad Madihian** (S'78–M'83) was born in Tehran, Iran, on January 3, 1954. He received the B.Sc. degree from the Iran College of Science and Technology, Tehran, Iran, in 1976, and the M.Sc. and Ph.D. degrees from Shizuoka University, Hamamatsu, Japan, in 1980 and 1983, respectively, all in electronic engineering. During graduate study, he worked on research and development of phase-sensitive detectors, phase filters, microwave solid-state oscillators, and power combiners.

In 1983, he joined the Central Research Laboratories, NEC Corporation, where he worked on research and development of GaAs HIC's and MMIC's, and is currently involved in research and development of analog and digital AlGaAs/GaAs HBT circuits. He is the Supervisor of the Ultra-high-speed Device Research Laboratories, NEC Corporation.

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

# 1988

# Distinguished Service Award

## Fred J. Rosenbaum

"For his outstanding and dedicated service to the Society."

The Distinguished Service Award is presented to honor an individual who has given outstanding service over a period of years for the benefit and advancement of the Microwave Theory and Techniques Society.

Dr. Rosenbaum's long and productive career within MTT-S includes: Administrative Committee Member, 1971–84, Transactions Editor 1971–73, MTT-S Vice President, 1980 and MTT-S President, 1981. His committee service has included Awards, Publications Evaluation, Nominations, Education, Standards Coordination, the President's Advisory Committee and Long Range Planning. He has served on numerous Symposium Technical Committees and the Transactions Editorial Board. He has represented MTT-S with the Journal of Lightwave Technology and helped to formulate the GaAs Integrated Circuits Symposium. He was Steering Committee Chairman of the 1985 International Microwave Symposium held in St. Louis.

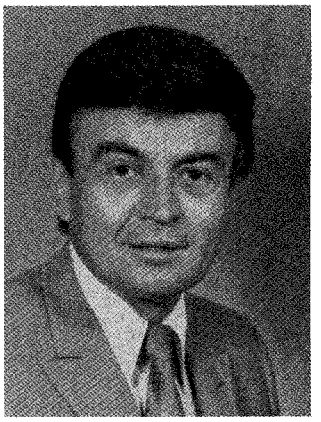
**Fred J. Rosenbaum** (S'57—M'63—SM'70—F'79), Professor of Electrical Engineering at Washington University, St. Louis, was born in Chicago, Ill. on 15 February, 1937. He was educated at the University of Illinois and received the Ph.D degree in 1963. He joined the faculty at Washington University in 1965 after two years as a research scientist at the McDonnell Aircraft Co. Research Laboratory. At the University he established the Microwave Laboratory and through the years has trained many undergraduate and more than 35 MS and DSc. students on microwave topics. He is a consultant to industry and from 1983 to 1985 served as Chief Scientist of Central Microwave Co.

He has worked on ferrite circulators and phase shifters, Gunn effect oscillators and amplifiers, integrated optics, microwave bio-effects, FET devices, circuits, and oscillators. Recent activities have been devoted to the study of nonlinear microwave circuits, scattering from three dimensional discontinuities in transmission lines, and packaging design for microwave components. He and his students have published some 50 papers and has presented a comparable number of talks at professional meetings.

Professor Rosenbaum has been honored with the U. of I. Electro-Physics Laboratory Alumni Award, the U. of I. Electrical Engineering Alumni Association Distinguished Alumnus Award, the University of Queensland D.E. Evans Visiting Fellowship, Washington University School of Engineering Outstanding Professor of the Year award (1978) and the IEEE Centennial Medal. In 1979 he was a member of the IEEE delegation to the USSR Popov Society meeting in Moscow.

# 1988–89
# MTT-S Distinguished Microwave Lecturer

# Lightwave Communications



Reinhard H. Knerr


## Abstract

Lighwave communications technology has now reached a fairly sophisticated level of maturity. Applications range from multi-mode short wavelength LED systems, which can transmit at kilobits per second and are used primarily for short range applications, to long-haul single-mode laser systems, which can transmit at the rate of gigabits per second.

This talk will touch on the full range of lightwave communications applications. A short introduction to basic fiber technology will be given. Applications to optical data links and interfaces for point to point data networks, will be discussed as well as the extension of such technologies to lightwave local area networks (LANs). Different network architectures for lightwave LANs will be discussed, including the fiber distributed data interface (FDDI), and the manufactured automatic protocol (MAP). Long haul digital systems will be mentioned, with special emphasis on the microwave aspects of gigabit systems, such as stripline and low noise GaAs preamplifier technology.

Coherent lightwave systems will be reviewed with emphasis on the equivalence between such systems and the older microwave technology. We will detail problems which have been addressed in microwave systems and which are now being encountered in coherent lightwave systems and being solved by analogy to the older microwave technology. These include techniques such as isolation, internal and external modulation schemes, low noise amplification and phase lock techniques. Emphasis will be placed on heterodyne rather than homodyne systems.

Because of the wide range of topics covered, the talk will be more in the nature of a review than an in-depth presentation of any given topic. Some theoretical discussion will be included, but hardware will be emphasized. We will conclude with a short look into the future, and a discussion of the fundamental problems that have yet to be solved in order to make certain exploratory systems practical.


**Reinhard H. Knerr** is a native of Pirmasens, Germany. He received a PhD and an MS in EE from Lehigh University, Bethlehem, PA and Dipl. Ing. degree from the Ecole Nationale Superieure d'Electrotechnique et d'Hydraulique in Toulouse, France and a BS degree from the Technical University of Aachen, Germany.

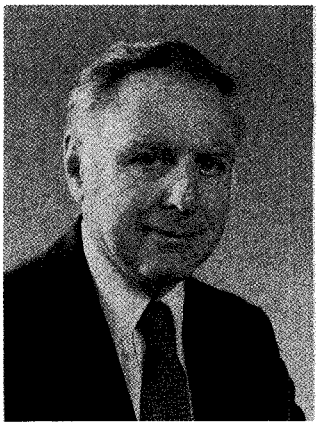
He joined AT&T Bell Laboratories as a Member of the Technical Staff in 1968. He was involved in R&D on circulators, IMPATT power amplifiers, low noise and power GaAs FET amplifiers and satellite receivers. He has published extensively in the field and holds six patents.

Knerr has supervised work in lightwave-passive components, integrated optics, lightwave local area networks and lightwave data interfaces.

He is a Fellow of the IEEE and was editor of the Transactions on MTT from 1980 to 1982. He served as president of the MTT Society in 1986.

# 1988–89 MTT-S Distinguished Microwave Lecturer

# Microwave and Gigabit Superconductive Electronics



Arnold H. Silver


## Abstract

Superconductive electronics is an integrated circuit technology which can provide the highest performance detection and signal processing circuits from dc to the submillimeter-wave region and the fastest digital logic and memory. This performance is achieved by combining the fundamental properties of superconductors, the superconducting Josephson tunnelling diode, and the cryogenic environment required for superconductivity.

This lecture will review the fundamental and historical development of superconductive electronics. It began with the successive discoveries of flux quantization, the Josephson effect, and the SQUID (Superconducting Quantum Interference Device) in the early 1960's; its application is a direct consequence of the development of a thin film integrated circuit technology for computer applications. From a lead alloy technology in the 1970's, we now have a highly developed niobium circuit technology which is capable of operating at picosecond speeds and into the submillimeter-wave region.

We will discuss the performance and application of such components as quantum-noise limited microwave and milimeter-wave amplifiers, mixers, and video detectors, voltage-controlled oscillators, analog correlators and convolvers, and analog-to-digital converters. The recent discovery of superconductivity at temperatures as high as 95 Kelvin may herald the widespread use of superconductive circuits. Prospects for development and application of high temperature superconductive electronics, and its possible impact on semiconductor devices will be explored.


**Arnold H. Silver** joined TRW Space & Technology Group in 1981 after serving as Director of the Electronics Research Laboratory at the Aerospace Corporation for 10 years. Prior to that, he was with the Scientific Laboratory of the Ford Motor Company at Dearborn, MI for 12 years. He is a Member of the IEEE, a Fellow of the APS, and has been active in the superconductive electronics community, including service as Technical Program Chairman of the 1976 Applied Superconductivity Conference, a member of the Organizing Committees of the Workshop on Superconductive Electronics, and the US–Japan Workshop on Josephson Electronics.

Silver has been active in the development and application of superconductive electronics since his invention of the SQUID at Ford in the early 1960's. At Aerospace, his laboratory pioneered the development of low noise millimeter wave mixers and detectors, including the superconducting-Schottky diode and the quantum theory of Superconductive Electronics Research. At TRW, his group has pioneered the development of low noise microwave amplifiers and oscillators, analog-to-digital converters, a niobium-based integrated circuit technology, and now the development of a high-temperature superconductive technology.

Silver received the BS, MS, and PhD degrees in Physics from Rensselaer Polytechnic Institute. His dissertation was on the application of nuclear magnetic and quadrupole resonance effects in the study of the structure of solids. He continued that research at Ford until beginning his work on superconductive devices. He has authored more than 50 publications and holds numerous patents.

# 1988 IEEE Fellow Awards

Ten senior members of IEEE whose nominations were evaluated by the Society were elected to Fellow Grade as of January 1, 1988. We extend congratulations to this group.

| | |
|---|---|
| **Robert W. Bierig** | *For leadership in the research of GaAs device and MMIC technology.* |
| **Berthold G. Bosch** | *For contributions to microwave electronics and gigabit circuits.* |
| **Walter R. Curtice** | *For contributions to the modeling and simulation of GaAs field-effect transistors.* |
| **Kuldip C. Gupta** | *For contributions to microstrip circuits and antennas.* |
| **David B. Leeson** | *For contributions to the theory and practice of stable microwave signal sources for communications and radar.* |
| **Yoshiyuki Naito** | *For contributions to microwave components, absorbers and nonreciprocal devices, and for leadership in education.* |
| **Song-Tsuen Peng** | *For contributions to the scattering and guidance of electromagnetic waves by dielectric structures.* |
| **Saul W. Rosenthal** | *For scientific and leadership contributions to the interactions between microwave radiation and biological systems.* |
| **James J. Whelehan, Jr.** | *For contributions toward the development of low-noise microwave and millimeter-wave receivers.* |
| **Ingo Wolff** | *For contributions to the analysis and design of microwave and millimeter-wave components.* |

Fifteen additional MTT-S members, whose Fellow nominations were evaluated by the Society other than MTT-S, were also elected to Fellow Grade. They are:

| Name | *Evaluating Society* |
|---|---|
| **Hamilton W. Arnold** | *Antennas and Propagation* |
| **Joseph A. Calviello** | *Electronic Devices* |
| **Harry M. Cronson** | *Instrumentation and Measurement* |
| **John B. Damonte** | *Antennas and Propagation* |
| **Kenneth R. Foster** | *Engineering in Medicine and Biology* |
| **Russell H. Logan** | *Aerospace and Electronic Systems* |
| **Felix K. Schwering** | *Antennas and Propagation* |
| **Dipak L. Sengupta** | *Antennas and Propagation* |
| **Lotfollah Shafai** | *Antennas and Propagation* |
| **Sadakuni Shimada** | *Lasers and Electro-Optics* |
| **Bruce M. Thomas** | *Antennas and Propagation* |
| **Gerasimos N. Tsandoulas** | *Antennas and Propagation* |
| **Malcolm R. Ufelman** | *Aerospace and Electronic Systems* |
| **Herman van de Vaart** | *Ultrasonics, Ferroelectrics and Frequency Control* |
| **Pei-da Ye** | *Laser and Electro-Optics* |