

1994 Microwave Application Award

Martin V. Schneider

The Microwave Application Award is presented aperiodically to individuals 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 plaque, certificate, and a check for \$1000.

The 1993 recipient of the award is Dr. Martin V. Schneider, AT&T Bell Laboratories. The award citation reads: "FOR OUTSTANDING CONTRIBUTIONS TO THE DEVELOPMENT AND IMPLEMENTATION OF SUBHARMONICALLY PUMPED HOMODYNE AND HETERODYNE MIXERS."

Dr. Martin V. Schneider (M'56, SM'71, F'76) received the M.S. in Physics in 1955 and the Ph.D. (Dr. sc.nat) in 1959 from the Swiss Federal Institute of Technology in Zurich, Switzerland. At the Institute, where he had Wolfgang Pauli as a teacher, he was involved in research on the properties of thin metallic films and their applications at microwave frequencies.

In 1961 he joined the group of John Pierce and Rudolf Kompfner at AT&T Bell Laboratories in Holmdel, New Jersey, and began work on active microwave devices and circuits needed for short hop radio systems at 11 and 18 GHz. Subsequently, he made contributions to the emerging area of microstrip components and planar transmission line elements which he applied to the realization of compact filters and heterodyne mixers at microwave and millimeter-wave frequencies ranging up to 230 GHz. As a member of the research team of Arno Penzias and Robert Wilson, he developed low-noise mixer diodes which were introduced into microwave systems, used for radio-astronomical experiments, and later successfully flown on the space shuttle ATLANTIS. In this NASA mission, performed jointly with the University of Bern, Switzerland, both his devices and circuits served as sensitive detectors and low-noise receivers for mapping the concentration and distribution of trace molecules and regular constituents (H₂O, O₃ and ClO) in the upper atmosphere.

Dr. Schneider expanded his work into the optical field by devising and constructing the first high-speed photodiode consisting of a thin film Schotky diode with an optimized dielectric matching layer. He also analyzed the noise characteristics of lightwave receivers and found that the spectral noise density of optical receivers can be computed directly from the physical parameters of the photodiode and the HEMT device which performs the preamplification of the signal.

He extended his work on microwave frequency converters devising a subharmonically pumped homodyne mixer which he and his team used for Gigabit rate digital modulators and demodulators in the LuckyNet system, a wide area network pioneered by Robert Lucky. He is currently a supervisor in the Wireless Technology Research Department at AT&T Bell Laboratories in Holmdel, New Jersey. With his team members, he is presently working on modulated RF backscatter technology using communications principles originating with Carl Friedrich Gauss and Alexander Graham Bell.

His technical and professional leadership has been recognized by a number of awards including the Microwave Prize in 1979, the IEEE Centennial Medal in 1984, the IEEE Region I Award in 1984, and the IEEE/MTT Meritorious Service Award in 1989. He served on the IEEE Board of Directors in 1991/92, where he was in charge of the Electromagnetics and Radiation Division and where he led the IEEE Committee on New Technology Directions. As a member of the MTT Adcom from 1984 to 1990, he made contributions to improved membership services and to publications and was instrumental in organizing a number of scientific workshops.

