

The Gunn oscillator normally supplied with the parametric amplifier performed slightly better than the best adjusted IMPATT. It is anticipated that the use of IMPATT pumps for parametric amplifiers will usually be restricted to the range of pump frequencies above 50 GHz, where inadequate power is obtainable from Gunn oscillators and more than enough power can be obtained from IMPATT oscillators. In this range of pump frequencies the added cost and complexity of pumps using Gunn oscillators and frequency multipliers can be saved by substitution of GaAs IMPATT pumps with little or no penalty in noise performance in the presence of strong input signals.

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Between college graduation and 1971 he was employed in industry as a Design Engineer, Program Director, and Branch Manager. His field of endeavor has been primarily

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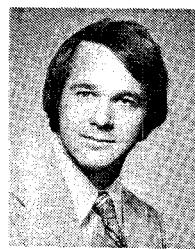
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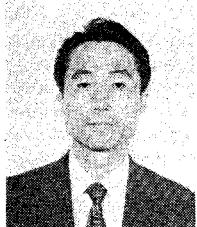
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and characteristics of light-emitting diodes. During the last several years he has been involved with the development and testing of both single- and double-drift silicon IMPATT diodes. His recent activity has been concerned with double-drift IMPATT diodes for high-power pulsed applications.



Allen Podell was born in Wilmington, Del., on January 24, 1938. He received the B.S. degree in engineering physics from Cornell University, Ithaca, N. Y., in 1960.

He was founder of Anzac Electronics in July 1960, where he worked on the development of multidecade microwave components, including single-balanced and double-balanced mixers, magic T and quadrature hybrids, directional couplers, impedance transformers, phase shifters, and power combiners. He went to Tanzania for two years in the U. S. Peace Corps as a Road Engineer. He returned to work on MIC components, including low-distortion and high-power amplifiers, high directivity couplers, attenuators, switches, and phase shifters. In 1970 he went to SRI, where he designed and constructed wide-band 5-20-GHz MIC components, e.g., a 3-dB quadrature hybrid, a 20-dB high-directivity coupler, digital phase shifters, and transfer switches. Also at SRI he helped design two new types of microwave acoustic transducer, and a nondispersing acoustic variable delay line. At SRI he designed a limited-bandwidth negative-impedance converter for microwave applications. In 1972 he went to Hewlett-Packard, Palo Alto, Calif., where he has been working on matching networks for IMPATT diodes and microwave transistors. He holds about 20 patents.



Industries, Sunnyvale, Calif., where he served as Engineering Section Manager and was involved in the design of microwave signal processing networks and microwave frequency converters. In April 1972 he joined the Hewlett-Packard Company, Palo Alto, Calif., and is currently Project Supervisor for the portable microwave repeater.

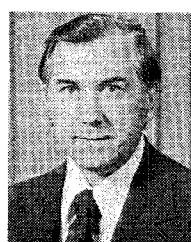
Mr. Raukko is a member of the Microwave Theory and Techniques Society and the Engineering Management Society. He is a founder of the Professional Activities Committee of the San Francisco Section of the IEEE, and has been elected chairman for the coming year. He is a member of the United States Activities Committee of the IEEE.



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From 1957 to 1959, he was a Senior Research Fellow at the Polytechnic Institute of Brooklyn. In 1960, he became a Senior Graduate Assistant at the Microwave Research Institute of the Polytechnic Institute where he was engaged in research on wave propagation and scattering in the multimode waveguides and other related topics in electromagnetic theory. He was also a Lecturer in the Department of Electrical Engineering at the same institute. Since 1965, he has been with the Bell Telephone Laboratories, Inc., North Andover, Mass., where he has been concerned with the theory and development of microwave filters and solid-state components for the microwave radio as well as the millimeter wave waveguide transmission system.

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Craig P. Snapp (S'66-M'66) was born in Lima, Ohio, in 1944. He received the B.S. degree in engineering science from Case Western Reserve University, Cleveland, Ohio, in 1966, and the Ph.D. degree in applied physics from Cornell University, Ithaca, N. Y., in 1971.

His thesis and postdoctoral research at Cornell was mainly concerned with the trapped-plasma mode in silicon avalanche diodes. During the spring term of 1971, he

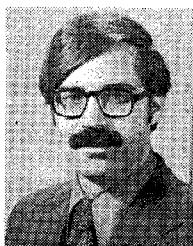


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From September 1965 to November 1967 he was with Westinghouse Electric Corporation, Baltimore, Md., and was engaged in the design of microwave filters, couplers, and frequency converters. In 1967 he joined Aertech

was a part-time Instructor in the Department of Electrical Engineering at Cornell. In the fall of 1971 he joined the Microwave Institute Foundation of the Royal Institute of Technology, Stockholm, Sweden, as a Guest Scientist. His research activities at the Microwave Institute were involved with barrier-injection transit-time devices. In the spring of 1973 he joined the Hewlett-Packard Company, HPA Division, Palo Alto, Calif., and was initially concerned with the design and development of a family of double-drift silicon IMPATT diodes. His present activity is involved with the design and process technology of silicon bipolar microwave transistors. He has recently become an Associate Editor of the *IEEE TRANSACTIONS ON ELECTRON DEVICES*.

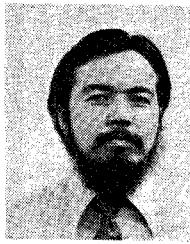
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From 1964 to 1967 he served as a Research Assistant in the Ionosphere Research Laboratory of the Pennsylvania State University.

While studying at Syracuse University he was employed as an Instructor and Research Assistant. Since 1970 he has been employed as a Research Electronics Engineer at the Naval Research Laboratory, Washington, D. C.



Paul G. Tipon received the B.S.E.E. degree from the University of Southern California, Los Angeles, in 1966.

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Robert J. Trew (S'71) was born in Saginaw, Mich., on December 8, 1944. He received the B.E.E. degree from General Motors Institute, Flint, Mich., in 1968, and the M.S.E. degree from the University of Michigan, Ann Arbor, in 1969.

From 1969 to 1970 he was employed by the Space Physics Research Laboratory of the University of Michigan where he was involved in measurement studies of ionospheric radiation. He joined the Electron Physics

Laboratory of the University of Michigan in 1971 where he is presently completing the requirements for the Ph.D. degree in the area of avalanche transit-time devices, specifically in the area of TRAPATT mode oscillators.

Mr. Trew is a member of Tau Beta Pi, Eta Kappa Nu, and Sigma Xi.



Peter V. Tryon was born in Ossining, N. Y., on July 1, 1941. He received the B.S. degree in electrical engineering from Pennsylvania State University, University Park, in 1963, the M.S. degree in electrical engineering from New York University, New York, in 1965, and the Ph.D. degree in statistics from Pennsylvania State University, in 1970.

From 1963 to 1965 he was a Member of the Technical Staff at Bell Laboratories, Whippany, N. J., and from 1965 to 1970 he was a Member of the Technical Staff at the Ordnance Research Laboratory, Pennsylvania State University, where he was engaged in signal processing development for sonar systems. In 1970 he joined the Statistical Engineering Laboratory, National Bureau of Standards, as a statistical consultant at the Department of Commerce, Boulder, Colorado Laboratories. He is also a Visiting Lecturer in mathematics at the University of Colorado, Boulder. He is currently concerned with the application of modern statistical methods in the physical sciences and metrology.



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From 1962 to 1965 he worked at Sylvania Electronics Systems as a Designer of ECM hardware; during this time he was also a part-time Consultant at Sigma Company, Los Altos, Calif., where he participated in the evaluation of the analog and digital guidance system of the first generation Polaris missile. From 1965 to 1966 he was employed by Energy Systems Company. There he was in charge of the design and development of a 191-channel broad-band solid-state telemetry/command data transmitter for the Apollo tracking ship. In 1966 he joined Philco Western Development Laboratories, Philco-Ford Company, Palo Alto, Calif., where he has been employed to date. There he was in charge of the design and development of thick/thin film hybrid circuits in various satellite and deep space programs. These included front ends and other components for microwave receivers, power amplifiers, very linear phase modulators, frequency multipliers, parametric upconverters, and computer aided design techniques applicable to communication circuits and systems. He participated in the development of Mariner Mars '69 and, recently, the Viking 1975 Mars Lander deep space probes. Currently at Philco-Ford he is involved in various study programs and developments of communications transponders for both satellite and deep space applications. His responsibilities are to improve existing hardware and develop new circuitry by utilizing computer aided design and other state-of-the-art techniques for microwave integrated circuits and systems. He has presented and published several papers in the field of communication circuits and has a patent pending.

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From 1956 to 1958, he was with the Chinese Government Radio Administration,

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Gerard T. Wrixon was born in Limerick, Ireland, on May 25, 1940. He received the B.E. degree with honors, from the National University of Ireland, Cork, the M.Sc. degree from the California Institute of Technology, Pasadena, and the Ph.D. degree from the University of California, Berkeley, all in electrical engineering, in 1961, 1964, and 1969, respectively.

From 1961 to 1963, he was with Fokker, the Royal Netherlands Aircraft Factory, Amsterdam, as a Research and Development Engineer, specializing in the field of aircraft navigational systems. From 1964 to 1965, he was an Instructor in the Electrical Engineering Department at Loyola University, Los Angeles, Calif. While a graduate student at the University of California, Berkeley, he served as a Research Assistant in the Radio Astronomy Laboratory and Acting Instructor in the Electrical Engineering Department. From 1969 to 1974, he was a Member of the Technical Staff at the Crawford Hill Laboratory, Bell Telephone Laboratories, Inc., Holmdel, N. J. He is currently Lecturer in Electrical Engineering at University College, Cork, Ireland. His main interests are in the fields of millimeter wave receivers and radio astronomy.

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