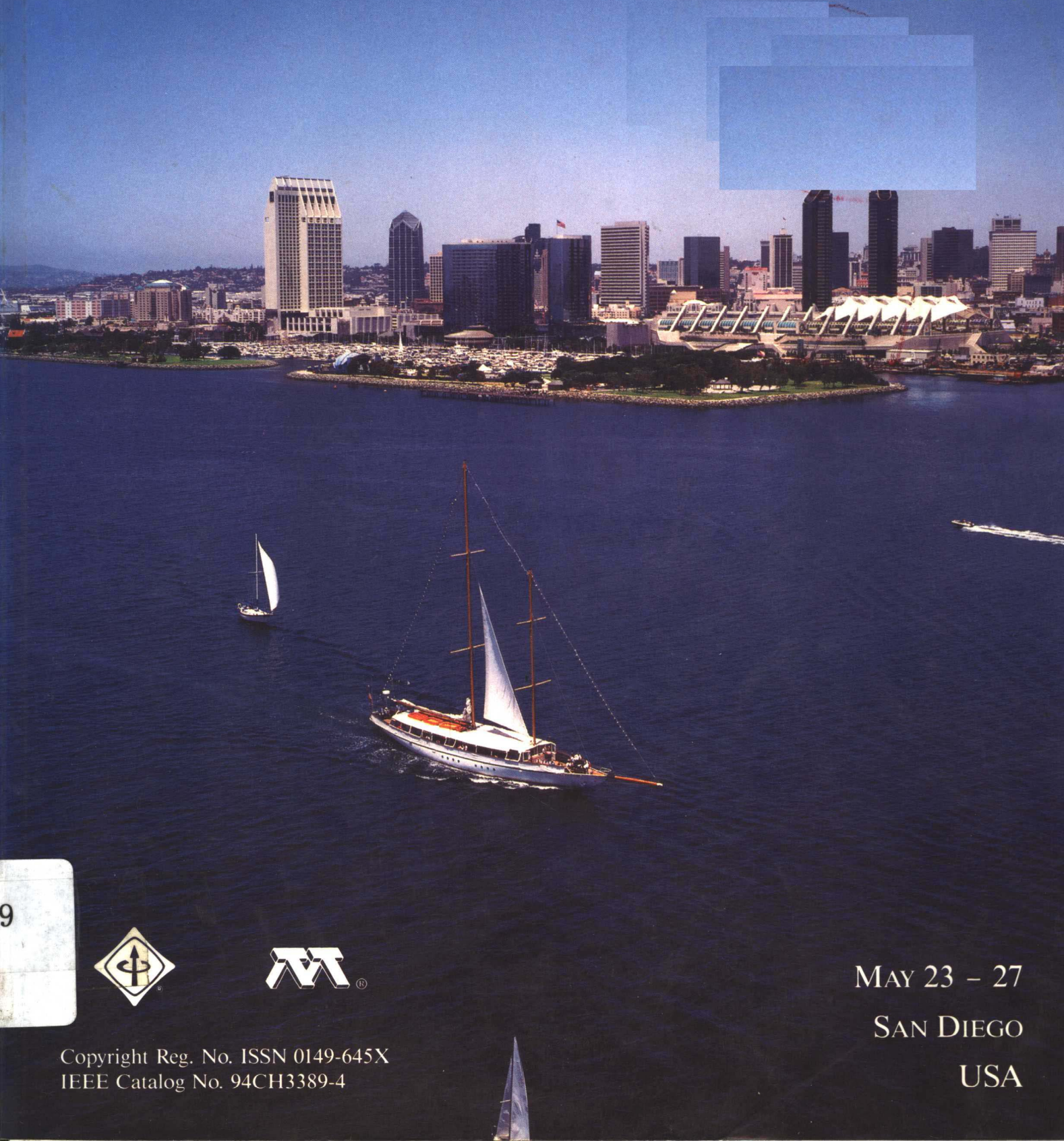




1994 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM DIGEST Volume 1



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DIGEST

Volume 1

May 23-27, 1994

San Diego Convention Center
San Diego, California

H. J. Kuno
Editor

C. P. Wen
Assistant Editor

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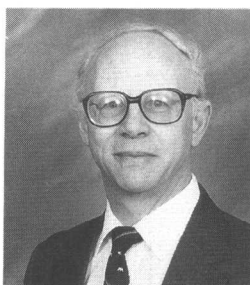
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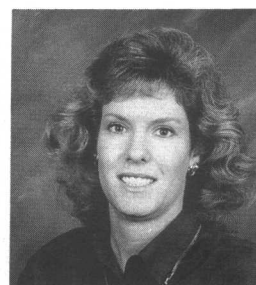
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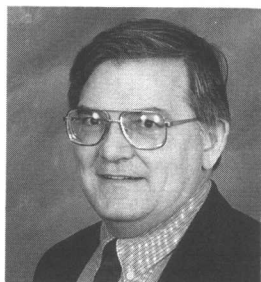


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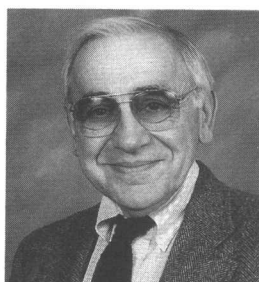


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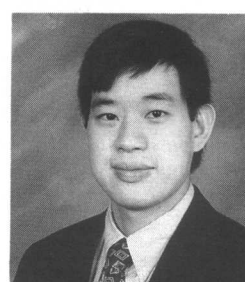
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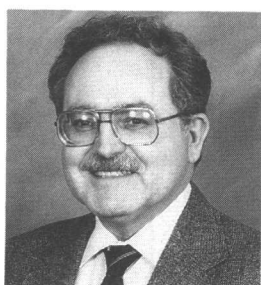


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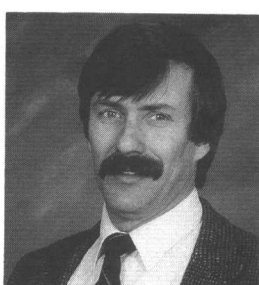


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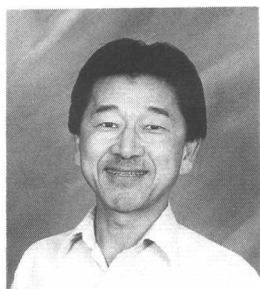
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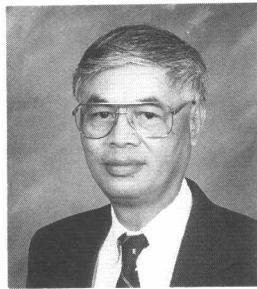
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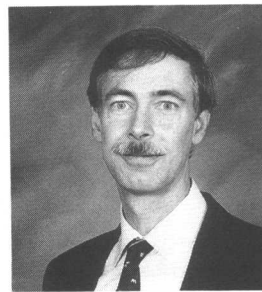


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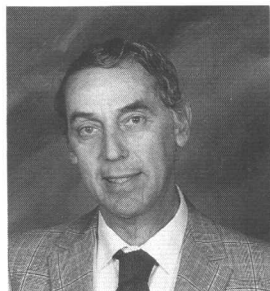


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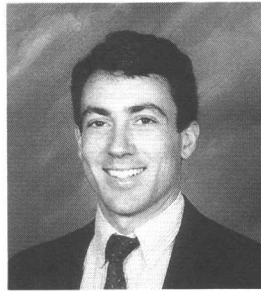
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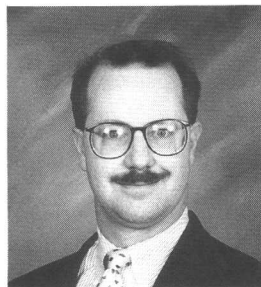
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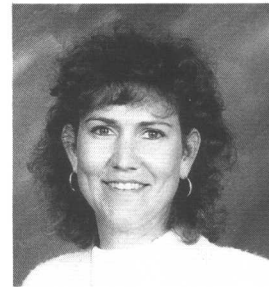


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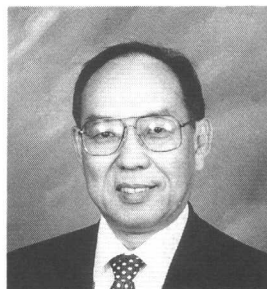
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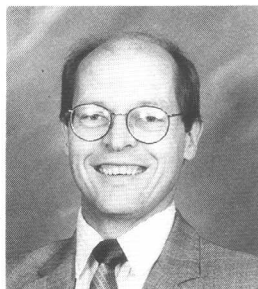


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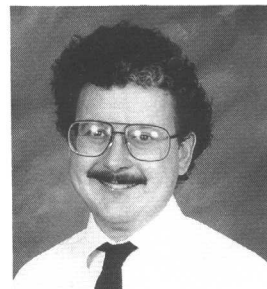
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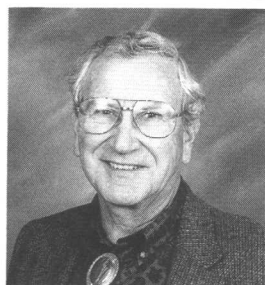
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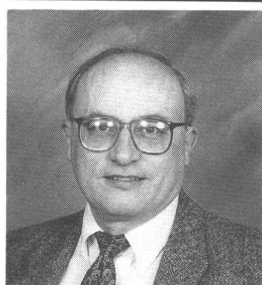
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Special Sessions

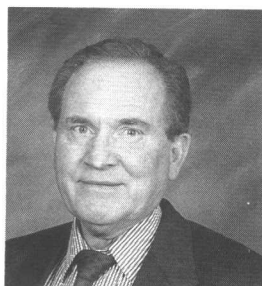


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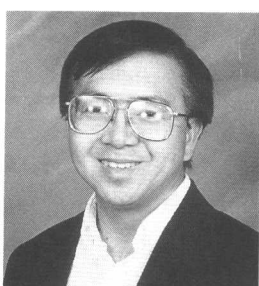


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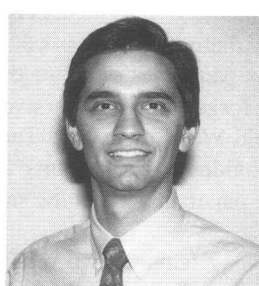
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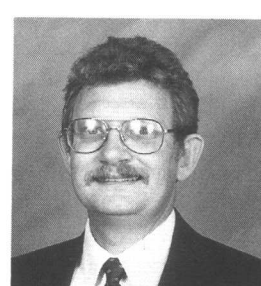
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Louis Liu
MMWMC



Tom Dobrino
ARFTG



John Roussos
Exhibit

Exhibit



Harlan Howe

Conf. Mgt. Asst.



Larry Whicker

Not Pictured:

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Registration—Jodi Bay
Member at Large—George Otman, Jr.
Digest—Nancy Eisenhart
Conf. Mgt. Asst.—Margaret Whicker

Message from the Technical Program Chairmen

The Technical Program for the 1994 IEEE MTT-S International Microwave Symposium (IMS) is the largest and most comprehensive ever presented. We believe that in spite of the present general economic downturn, a combination of two very positive factors came through. First, the *authors*, establishing a record number of 725 contributed papers. The second factor was the independent contributions made by the numerous *organizers and speakers* of the many workshops, rump, focus and panel sessions which fill out the technical content of "Microwave Week." Thanks to all of these individuals for providing so much to the Symposium. (We suspect that the draw provided by the beautiful city of San Diego was a motivator!)

It's time to be more specific about what makes up the Symposium. After considerable review, the Technical Program Committee (TPC) selected a record 426 papers, resulting in a 58 session Program, another new high. These separate into 293 oral and 133 open forum presentations. Five parallel sessions are used all three days (Tuesday–Thursday) of the Symposium for the oral presentations. There are seven focused sessions integrated into the program, each with invited speakers. These discuss topics such as Acoustics, Personal Communications, Dual Use Military/Commercial, Photonic and High Power Applications, all with the microwave slant. The oral presentation sessions are further enhanced by the Open Forum on Tuesday and Wednesday afternoons. In addition there are 16 workshops, placed with nine on Monday and seven on Friday, and six panel sessions, two each on the three mid-week days during the lunch break. Don't forget the Tuesday evening rump session which addresses "Microwaves after the Cold War." A second Tuesday evening event is the student paper competition which provides an opportunity for student authors to win prizes for their presentations. (These papers have met the same TPC review criteria as all others in the program.)

The plenary session Tuesday morning features two renown speakers. Dr. Andrew Viterbi's talk on "The Wireless Personal Communication Revolution" and Prof. Hal Sobol discusses "Advances in High Capacity Fiber Optic Systems: Theoretical Concepts to Practical Realizations." Come and hear about the future of communications.

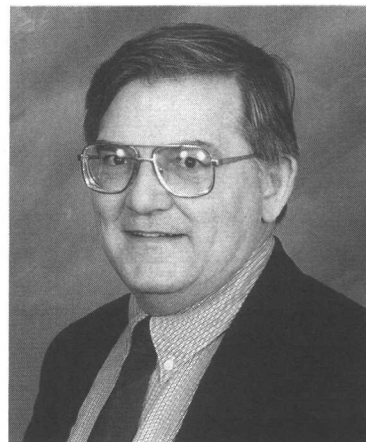
There is also a special session this year honoring the 30 year anniversary of the publication of "Microwave Filters, Impedance-Matching Networks, and Coupling Structures." This standard reference is more commonly referred to as "Matthaei, Young and Jones" after the authors of the book. Honor them with your presence and learn something as well.

To provide more focus in associated areas, three other conferences fill out Microwave Week. The Microwave and Millimeter-Wave Monolithic Circuits (MMWMC) Symposium begins on Monday for two days with joint sessions on Tuesday with IMS. The National Telesystems Conference (NTC) joins in on Thursday with parallel and joint sessions and then continue on Friday. The Automatic Radio Frequency Techniques Group (ARFTG) Conference also meets on Friday.

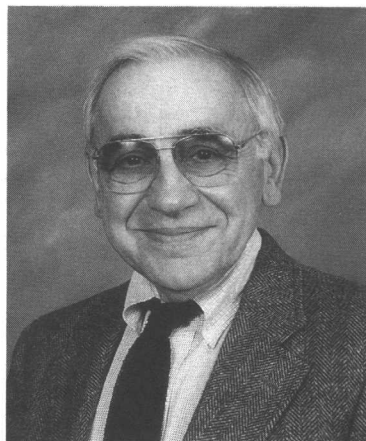
Assembling such a complete program required the efforts of many members who once again demonstrated their dedication to the Society. 198 members of the TPC took time from their busy schedules to support the complex and exhausting paper review process. Our thanks to them all. Special mention is due Roger Pollard and Madhu Gupta for off-line suggestions which improved this process.

We would also like to specifically thank Mario Maury who had overall responsibility for Special Sessions, including Panels and Workshops, Jitendra Goel who so ably handled the Open Forum and Ed Yu who organized and conducted the student paper competition. Special thanks in general go out to all of the members of the San Diego Steering Committee who contributed in any way, no matter how small, in support of the success of the Technical Program.

Our objective with this Symposium is to provide you with a new idea on how to solve a problem or an idea for a new product (dual use no doubt), so that when you get back home you'll be able to say "I'm glad I made it to San Diego!"



Bob Eisenhart
Technical Program Chairman



Gus Tricoles
Vice-Chairman

1994 Technical Program Committee



Symposium Group

Standing (l-r): J. Wassel, K. Huddleston, G. Harrison, Charles Rucker, Glenn Thoren
Front Row (l-r): Larry Brockman, Rudolf Henning, Robert Eisenhart, Daniel Masse



San Diego Steering Committee

Standing (l-r): Robert Welch, Don Parker, Gary Simpson, Dave Rubin
Front Row (l-r): Steve Hart, Gus Tricoles, Alvin Clavin, Harlan Howe



Biological Effects and Medical Applications

Standing (l-r): Kenneth Carr, Anand Gopinath
Front Row (l-r): Rajeev Bansal, Andre van der Vorst, Paul Yu



Passive Components

Standing (l-r): Ralph Levy, Toshio Nishikawa, Jesse Taub
Front Row (l-r): Kawthar Zaki, Tatsuo Itoh, Linda Katehi



Filter and Multiplexers

Standing (l-r): Richard Snyder, S. Jerry Fiedziuszko, Ali Atia, Yi-Chi Shih
Front Row (l-r): Rene Bonetti, George Matthaei, Chandra Kudsia



Ferrite Components

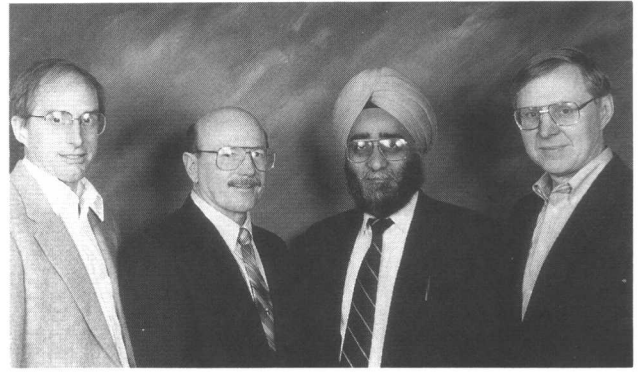
(l-r): Lionel Davis, William Hord, Denis Webb, John Owens

1994 Technical Program Committee (Cont'd.)



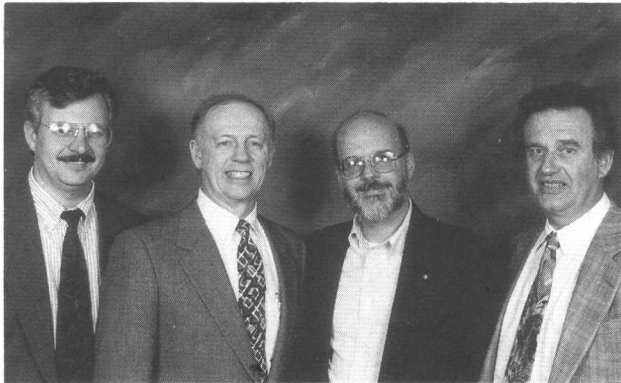
Acoustic and Surface Weave Components

(l-r): Robert Weigel, Bruce McAvoy, Ted Lukaszek, J. Douglas Adam



Sources and Control Components

(l-r): Dean Peteron, Bernard Sigmon, A. P. S. Khanna, Peter Staecker



Nonlinear Modeling and Analysis

(l-r): Mark Calcaterra, Walter Curtice, Stephen Maas, John Bandler



Transistor Power Amplification

Standing (l-r): Bill Wiessman, Peter Asbeck, John Heaton, D. Cohana
Front Row (l-r): R. E. (Slik) Bryan, James Degenford, John Kuno, Lawrence Kushner, Horton Parather



High Power Sources and Control Components

(l-r): M. Lynch, Franco Sechi, Jitendra Goel, Rahul Dixit, Steven Stizer



Low Noise Receivers and Detectors

Standing (l-r): Marian Pospieszalski, Madhu Gupta, Edward Yu, Ed Rezek
Front Row (l-r): Sander Weinreb, James Whelehan, Jr., Kiyo Tomiyasu

1994 Technical Program Committee (Cont'd.)



Microwave Integrated Circuits

Standing (l-r): John Pierro, Mike Harris, Charles Buntschuh, Fazal Ali
Front Row (l-r): Gailon Brehm, C. P. Wen, Frank Sullivan, Derry Hornbuckle



Monolithic Circuits and Modules

Standing (l-r): David Wang, Reynold Kagiwada, Natalino Camilleri, Zaher Bardai
Front Row (l-r): Hing-Loi Hung, Marvin Cohn, Eliot Cohen



Millimeter and Submillimeter Wave Technology

Standing (l-r): J. W. Dees, Edward Niehenke, Phillip Smith, James Wiltse
Front Row (l-r): M. Frerking, Mohammed Asfar, Mehran Matloubian



Field Theory

Standing (l-r): Robert Trew, Abbas Omar, Tsukasa Yoneyama, Cam Nguyen
Front Row (l-r): Roberto Sorrentino, James Mink, Victor Hanna



EM Analytical and Numerical Techniques

Standing (l-r): Ruediger Vahldieck, Hung-Yu Yang, Peter Russer, S. Michael Saad
Front Row (l-r): Wolfgang Hoefer, Nick Alexopoulos, James Rautio



CAD Procedures, Techniques and Modeling

Standing (l-r): Arvind Sharma, Ingo Wolff, Lawrence Dunleavy
Front Row (l-r): Rolf Jansen, Vijai Tripathi, Barry Perlman

1994 Technical Program Committee (Cont'd.)



Guided Waves and Propagation Techniques

Standing (l-r): Song-Tsue Peng, Paolo Lampariello
Front Row (l-r): Samir El-Ghazaly, Arthur Oliner,
Michael Dydyk



Measurement Theory and Techniques

Standing (l-r): John Barr, Roger Pollard
Front Row (l-r): Mario Maury, Jr., David Wait, Ron
Ham



Microwave and Communication Systems

Standing (l-r): David McQuiddy, Jr., J. K. McKinney,
John Horton, B. D. Geller
Front Row (l-r): George Heiter, Klaus Breuer,
Ferdo Ivanek



Phased Arrays

Standing (l-r): David Zimmermann, Terry Cisco
Front Row (l-r): H. George Oltman, Jr., Richark Sparks,
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Lightwave Technology and Techniques

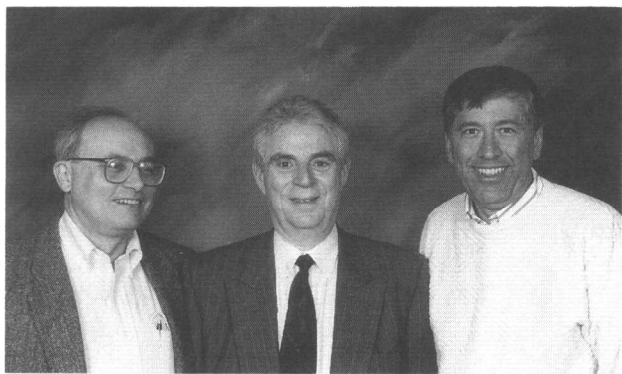
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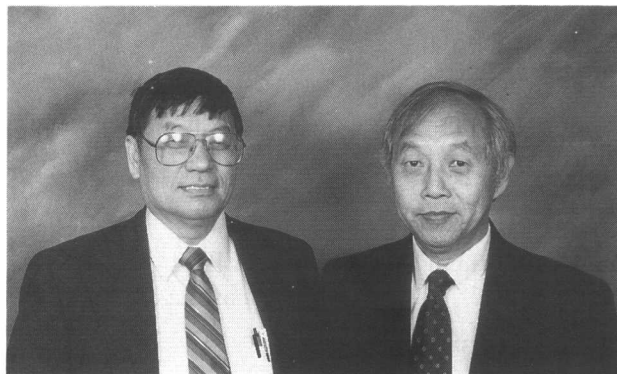
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Standing (l-r): Richard Withers, Barry Spielman,
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(l-r): Terry Cisco, Bert Berson, Robert (Tim) Kemerley



Digital Signal Processing
(l-r): Christopher Chang, J. Tsui



Active and Quasi-Optic Antennas
Standing (l-r): Amir Mortazawi, Gabriel Rebeiz
Front Row (l-r): David Rutledge, Zoya Popovic,
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Front (l-r): G. Oltman, A. Oliner, R. Kagiwada



Adcom (6)

Back (l-r): K. Tomiyasu, C. Rucker, R. Henning
Front (l-r): R. Sparks, P. Staeker, T. Itoh

The Historical Exhibit

Visit the Microwave Theory and Techniques Society Historical Exhibit located conveniently in the midst of the commercial exhibition area at the San Diego Convention Center. Relax and browse through the S-MTT library collection of historical documents and trace the early expositions of microwave theory and important experimental results. Stop by the videotape room for scheduled viewing of tapes like the Public Television NOVA program on the development of the first automatic tracking and gunfire control RADAR system by the Rad Lab. Wander through a portion of the permanent MTT historical exhibit of artifacts covering the development of microwave devices dating back to the early 30s. Trace the development of electron devices from early simple tubes to klystrons, magnetrons, and traveling wave tubes to solid-state MMIC chips and T/R modules. Top off your tour with a peek at new exhibits displaying the latest in flipped MMIC chips and a brief hardware demonstration of the evolution of the traveling wave tube.

The Historical Exhibit is centrally located on the ground floor of the San Diego Convention Center and is open Tuesday through Thursday from 9:00 AM to 4:00 PM.

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**2000—Boston Massachusetts
June 12–16, 2000**

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1994
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DIGEST

1994 Awards



1994 Microwave Career Award

Yoshihiro Konishi

The Microwave Career Award is the highest honor bestowed by MTT-S. It recognizes an individual for a lifetime career of meritorious service and technical excellence in our field. This year's recipient is Dr. Yoshihiro Konishi, recently retired Senior Executive Vice President of Uniden Corporation. Dr. Konishi had a very distinguished career and has been a major contributor to our profession. He had, despite his administrative duties, always stayed close to the technology. He will now transmit his wealth of knowledge to university students who are fortunate to have an outstanding individual like Dr. Konishi as a teacher.

The award consists of a plaque, a certificate and a check for \$2,000. The Career Award Citation reads: FOR A CAREER OF MERITORIOUS ACHIEVEMENT AND OUTSTANDING CONTRIBUTIONS TO THE FIELD OF MICROWAVE THEORY AND TECHNIQUES.

Yoshihiro Konishi was born in Nara, Japan on September 28, 1928. He received his B. Engr. and Ph.D. in engineering from Kyoto University, Japan, in 1951 and 1961, respectively.

He joined Nippon Hoso Kyokai (NHK, Japan Broadcasting Corporation) in 1951. In 1953, he began working at NHK Technical Research Laboratories, where he was engaged in research on microwave field theory as well as microwave filter and microwave ferrite components. He invented a mesh type lumped element circulator, which is widely used in broadcasting and communications at present. He was also engaged in research on microwave receivers such as parametric amplifiers and low noise receivers for satellite broadcasting. He invented the planar circuit mounted in wave guide and he was successful in developing a low noise, low cost satellite receiver using the circuit. When he was project leader, NHK and NASA conducted joint experiments for the development of a Satellite Earth Station, using the newly developed receiver.



From 1962 to 1963 he was a visiting scholar at the Microwave Research Institute of the Polytechnic Institute of Brooklyn (now Polytechnic University of New York). In 1983, he retired as Director of NHK Technical Research Laboratories and joined Uniden Corporation as Senior Executive Vice President. In September of 1993, he retired from Uniden Corporation. He is now Professor in the Department of Electrical Engineering of Tokyo Institute of Polytechnics and the Chief Technical Advisor to Uniden Corporation. He is a senior editor for Asia for the IEEE Society on Broadcast Technology. He is also a member of the editorial board of the IEEE Transactions on Microwave Theory and Techniques.

Dr. Konishi received the Medal with Purple Ribbon from the Emperor of Japan in 1982. Among other awards, he has received the Award of the Minister of the Post Office in 1978, the Award of the Minister of the Patent Bureau in 1977, the Award of the Minister of State for Science and Technology in 1979.