

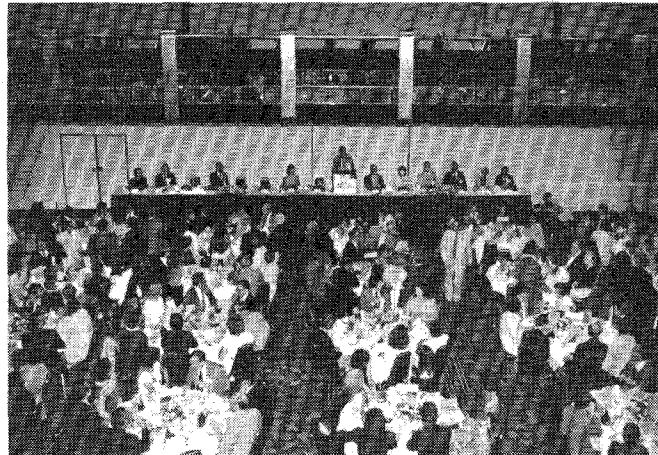
# The 1983 MTT-S International Microwave Symposium

HARLAN HOWE, JR., FELLOW, IEEE

THE 1983 MTT-S International Microwave Symposium and Workshops were jointly held with the 1983 IEEE Microwave and Millimeter-Wave Monolithic Circuits Symposium during the week of May 31 to June 3, 1983 at the Sheraton-Boston Hotel in Boston, MA. In addition to the regular sessions of the two Symposia there were two panel discussions in the first evening and four workshops including the ARFTG meeting, which was held on Monday and Tuesday, June 6th and 7th the following week at a nearby location. A joint session of both Symposia was held on Wednesday morning, the opening day of the MTT-S International Microwave Symposium. To complement the Technical Program, there was a full range of social activities throughout the week including a lavish Awards Banquet held on Thursday evening June 2nd. A Commercial Exhibition by companies engaged in microwave activities was held in conjunction with the MTT Symposium. This year's exhibition turned out to be the largest in MTT-S history.

The week's activities began on Monday morning, May 30, with the opening of the workshop on Broad-Band Matching. This was followed on Tuesday with workshops on Mixer Technology and Microwave Hyperthermia, as well as the first day of the Microwave and Millimeter-Wave Monolithic Symposium. Tuesday evening the *Microwave Journal*, in celebration of its 25th birthday, hosted a complimentary reception at the Boston Museum of Fine Arts. The unexpectedly large crowd had a unique opportunity to enjoy the elegance of this fine museum. The MTT Symposium opened Monday morning with welcoming addresses by Harlan Howe, Steering Committee Chairman, Charlie Rucker, MTT Administrative Committee President, and Ralph Levy, the Technical Program Committee Chairman for the Symposium. This was followed by a joint session on Monolithic Amplifier papers from both Symposia. Symposium activities continued through Friday afternoon. During this time, besides the regularly scheduled sessions, there were two evening panel discussions and the MTT-S Historical Exhibit, which was open on a daily basis. The last workshop was the Automatic RF Techniques Group meeting which was held the following week on Monday and Tuesday, June 6 and 7, at the Holiday Inn on Route 128 in Burlington, MA.

The attendance at the Boston Symposium broke all records. The final count showed a total attendance of 5168 people. Interestingly enough, 2448 came from the five New England States with an additional 952 from California.



A view of the head table as Harlan Howe delivers welcoming remarks at the 1983 Awards banquet.

There were 333 attendees from outside the United States. 1523 registered for the Main Symposium with 587 in attendance at the Microwave and Millimeter-Wave Monolithic Circuit Symposium. 222 people came early for the Workshop on Broad-Band Matching, and 180 people attended the Workshop on Mixers. The Hyperthermia workshop attracted 46 specialists, and 132 people stayed over the weekend for the ARFTG meeting the following week. These figures cannot be added directly because of the many overlaps of people who attended more than one function. However, when those duplicates are eliminated, it turns out that 2306 individuals participated in some aspect of the Technical Program.

## TECHNICAL SESSIONS

The Technical Program consisted of 126 papers which were presented in regular sessions, plus 40 additional papers which were presented in two Open Forum Sessions held in the late afternoon. The Parallel Sessions were reduced from four to three this year in order to permit the attendees to hear more of the papers and to minimize conflicts. There were an additional 16 papers presented on Tuesday at the Microwave and Millimeter-Wave Monolithic Symposium for a grand total of 182 technical papers not including those presentations in the Workshops and the Panel Sessions.

We were all gratified by the outstanding success of the Open Forum Sessions. Every effort had been made to pick papers which would be enhanced by this form of presen-

tation, and the quality of papers and the overwhelmingly positive response from the large number of people who attended these sessions should certainly be an encouragement to continue this form of presentation.

The Technical Sessions and their Chairman are listed below.

- Session A:** A joint session with the Monolithic Symposium on Monolithic Amplifiers  
—Chairman: R. Decker, Lehigh University, Lehigh, PA.
- Session B:** Filters and Passive Networks I  
—Chairman: H. C. Bell, Wavecom, Inc., Northridge, CA.
- Session C:** Near Millimeter-Wave Techniques  
—Chairman: K. Button, National Magnet Lab, M.I.T., Cambridge, MA.
- Session D:** Millimeter-Wave Solid-State Sources  
—Chairman: S. Dixon, ERADCOM, Fort Monmouth, NJ.
- Session E:** Filters and Passive Networks II  
—Chairman: P. Rizzi, Southeastern Massachusetts University, North Dartmouth, MA.
- Session F:** Microwave Biological Effects  
—Chairman: K. Carr, M/A-COM, Inc., Burlington, MA.
- Session G:** Open Forum Session I  
—No Chairman.
- Session H:** GaAs FET Amplifiers and Oscillators  
—Chairman: Y. Ayasli, Raytheon Company, Lexington, MA.
- Session I:** Millimeter-Wave Integrated Circuits  
—Chairman: E. C. Niehenke, Westinghouse D.E.S.C., Baltimore, MD.
- Session J:** Acoustics and Ferrites  
—Chairman: R. Kagiwada, TRW, Inc., Redondo Beach, CA.
- Session K:** Systems Applications of GaAs FET's  
—Chairman: D. J. Hoft, M/A-COM, Inc., Burlington, MA.
- Session L:** Microwave Measurements  
—Chairman: S. Adams, Hewlett-Packard Company, San Jose, CA.
- Session M:** New Effects in Guided Wave Structures  
—Chairman: J. W. Mink, Army Research Office, Research Triangle Park, NC.
- Session N:** Open Forum Session II  
—No Chairman.
- Session O:** Microwave Systems  
—Chairman: J. Osepchuk, Raytheon Company, Lexington, MA.
- Session P:** IMPATT Diode Power Combiners  
—Chairman: M. Hines, M/A-COM, Inc., Burlington, MA.
- Session Q:** Microwave Measurements for MIC  
—Chairman: H. Stinehoffer, Sr., Made-it Associates, Burlington, MA.

**Session R:** Semiconductor Control  
—Chairman: J. White, M/A-COM, Inc., Burlington, MA.

**Session S:** Microwave Integrated Circuits  
—Chairman: S. March, COMSAT General Integrated Systems, Austin, TX.

**Session T:** Microwave Communication Systems  
—Chairman: J. B. Horton, TRW, Inc., Redondo Beach, CA.

**Session U:** Low-Noise Receiver Technology  
—Chairman: J. J. Taub, Eaton Corp., AIL Division, Melville, NY.

**Session V:** Field Theory  
—Chairman: C. M. Krowne, Naval Research Laboratories, Washington, DC.

#### SYMPOSIUM DIGEST

The Symposium Digest of the Technical Sessions was edited and prepared by Frank J. O'Hara and Glenn R. Thoren of Raytheon Company, Bedford, MA. Additional copies of the Digest are available from the Institute of Electrical and Electronic Engineers Incorporated, Publication Order Department, 445 Hoes Lane, Piscataway, NJ 08854. The IEEE catalogue number is 83CH1871-3. The Library of Congress catalogue card number is 77-645125.

#### HISTORICAL EXHIBIT

Ted Saad and George Jerinic put together an outstanding Historical Exhibit, with help from many people, including a generous contribution from the Raytheon Company. So many people attended the Historical Exhibit this year it was impossible to keep track of the actual attendance. This event has grown annually and is now achieving a level of recognition and status which encourages additional contributions to the collection. Anyone with Historical Artifacts who would like to contribute them or make them available for exhibition at future Historical Exhibits should contact Ted Saad at Sage Laboratories, 3 Huron Avenue, Natick, MA 01760

#### SOCIAL PROGRAM

The Social Program kept pace with the success of the Technical Program. Approximately 800 people attended the Museum of Fine Arts Reception hosted by the *Microwave Journal* on the evening before the opening of the Main Symposium. It was a nice way to start. The following day 82 people went on the daytime tour to Newport, RI, and 100 more went on the Evening Dessert Tour of Boston. Seventy-six people participated in the daytime Tour of Boston, and 60 people went out to visit Lexington and Concord on the last day of the Symposium.

#### AWARDS BANQUET

On Thursday evening we set another record when 766 people attended the Banquet to honor the recipients of this year's awards and to hear an outstanding presentation from Dr. Carl Sagan. This year the Microwave Career Award was presented to Mr. Marion Hines "For a career



Marion Hines with the 1983 Microwave Career Award which has just been presented by the ADCOM President, Charlie Rucker.



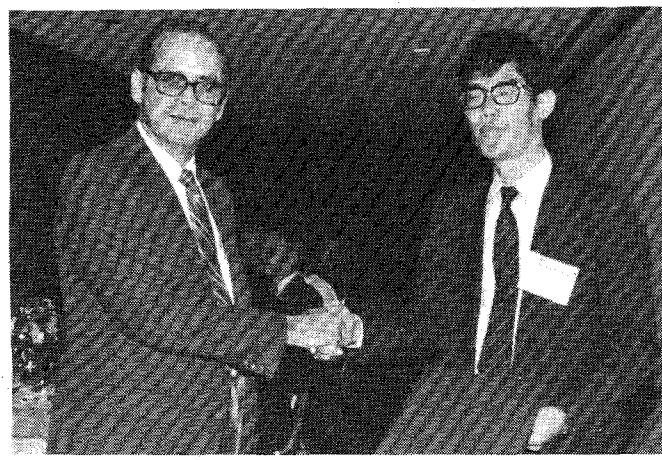
Les Besser accepts the 1983 Microwave Applications Award from ADCOM President, Charlie Rucker.



Kiyo Tomiyasu congratulates Marion Hines for his selection as the 1983 Microwave Career Award winner and the 1983 IEEE Lamme Medal winner.



Ted Saad accepts the Distinguished Service Award for his many years of dedication and contribution to the MTT-S.



Dr. Yoichiro Takayama accepts the 1983 Microwave Prize on behalf of himself and his co-author, Mr. Kazuhiko Honjo.



Dr. Joseph A. Giordmaine receives his Distinguished Microwave Lecturer Award for his lecture on integrated optics.

of meritorious achievement and outstanding technical contribution in the field of microwave theory and techniques." After the award was presented, Kiyo Tomiyasu made a brief acknowledgement in which he pointed out that Mr.

Hines was also the winner of this year's IEEE Lamme Medal for his work in the field of electron devices. The Microwave Prize was then presented to Mr. Kazuhiko Honjo and Dr. Yoichiro Takayama for their paper, "GaAs



Robert Wenzel receives his Fellow Certificate from Pete Rodrique.



George Oltman accepts congratulations after receiving his Fellow Certificate from IEEE Vice-President, Pete Rodrique.



Dr. Carl Sagan discusses his presentation "In Search of Extraterrestrial Intelligence" with Harlan Howe during the banquet.



Dick Sparks receives the Past President's Pin from the 1983 ADCOM President, Charlie Rucker.



Dr. Sagan answers questions from the floor with Joe White serving as Master of Ceremonies.

FET Ultra-Broad-Band Amplifiers for GBIT/S Data Rate Systems," which was published in this TRANSACTIONS in July of 1981. The Applications Award this year was presented to Mr. Les Besser, "For development and application of COMPACT, a microwave design program." The

Distinguished Service Award was presented to Ted Saad for his many years of activity and contributions to the benefit of the MTT-S. Following these awards Pete Rodrique, who is now Vice-President of the IEEE for publication activities, made the presentation of Fellow

Certificates to George Oltman and Robert Wenzel. The Distinguished Lecturer Award was then presented to Dr. Joseph A. Giordmaine for his lecture on Integrated Optics. A number of certificates of achievement and recognition, as well as the Past President's Pin, which was presented to Dick Sparks, rounded out the evening of awards.

Our banquet speaker, Dr. Carl Sagan, told us that the search for extraterrestrial life was worth it, even if there is only an infinitesimal chance in a billion that someone is there. He enthralled the audience with his polished narrative and color slides of space exploration and paid tribute to the microwave people for making it all possible, since microwave communication technology is the basis for all vehicular space exploration. Much of his talk was concerned with the techniques used to attempt to determine whether extraterrestrial life exists and the program which has currently been started to accelerate that search. He finished off the evening with a lively session of questions and answers from the floor.

#### EXHIBITION

In recent years, the exhibition portion of our annual symposium has been growing, just as the technical portion has. This year was no exception. 241 companies exhibited in 268 booths in the adjacent Hynes Auditorium. The exhibition was under the skillful management of Howard Ellowitz, of the *Microwave Journal*, who did his usual, smooth, professional job.

#### 1983 SYMPOSIUM STEERING COMMITTEE

The success of the Symposium was made possible by the outstanding work performed by the members of the Steering Committee. They did their jobs cheerfully, professionally, and well. I cannot thank them enough. Below is a list of the members and their employers.

Chairman:	Harlan Howe, Jr., M/A-COM, Inc.
Technical Program:	Ralph Levy, Microwave Development Laboratory
	Gordon Riblet, Microwave Development Laboratory
Special Events:	Joseph White, M/A-COM, Inc.
Publications:	Frank O'Hara, Raytheon Co.
Finance:	Glenn Thoren, Raytheon Co.
Local Arrangements:	W. Alan Davis, Raytheon Co.
	Richard Sparks, Raytheon Co.
	Apostle Cardiasmenos, Raytheon Co.
	John Putnam, Raytheon Co.
	Richard Jerome, SDI, Inc.
Publicity:	L. Pihl, BBS, Inc.
	Steven Temple, Raytheon Co.
Registration:	Arthur Blaisdell, M/A-COM, Inc.
Workshops:	Frank Leith, Alpha Industries
	Peter Staeker, MIT Lincoln Laboratories
Historical Exhibit:	Theodore Saad, Sage Laboratories
	George Jerinic, Raytheon Co.
	Clifford Drubin, Raytheon Co.

#### Exhibits:

#### Guests Program:

#### Secretaries:

#### Liason to Monolithic Symposium:

Howard Ellowitz, Horizon House  
Eloise White, Chairwoman  
Bette Rose, Co-Chairwoman  
Claire Alterio, M/A-COM, Inc.  
Karen Goodburn, M/A-COM, Inc.

James G. Oaks, Raytheon Co.  
Ralph A. Murphy, MIT Lincoln Laboratories  
Roger Sudbury, MIT Lincoln Laboratories

#### 1983 TECHNICAL PROGRAM COMMITTEE

Since the major purpose of the Symposium is the dissemination and exchange of technical information, the Technical Program is all important. The quality of this year's Technical Program is a tribute to the work done by the Technical Program Committee, under the leadership of Ralph Levy. The Committee was:

S. F. Adam	Hewlett-Packard Co.
A. E. Atia	Comsat Laboratories
Y. Ayasli	Raytheon Co.
J. Barrera	Harris Microwave Semiconductor
H. C. Bell	Wavecom
E. F. Belohoubek	RCA Laboratories
B. Berson	Consulting in Technology
D. M. Bolle	Lehigh University
C. R. Boyd	Microwave Applications Group
C. Buntschuh	Narda Microwave Corp.
K. J. Butler	Southern Methodist University
K. J. Button	National Magnet Laboratory
A. G. Cardiasmenos	Raytheon Co.
R. Camisa	RCA Laboratories
K. Carr	M/A-COM, Inc.
P. H. Carr	RADC/EEAC
M. Caulton	RCA Laboratories
W. S. C. Chang	University of California, San Diego
H. Chapell	Sage Laboratories, Inc.
A. Clavin	Hughes Aircraft Co.
G. D. Cohen	Naval Electronics Syst. Command
J. Crescenzi	Watkins-Johnson Co.
H. M. Cronson	Sperry Research Center
J. E. Degenford	Westinghouse Electric Corp.
G. J. Denlinger	RCA Laboratories
N. R. Dietrich	Bell Telephone Laboratories
S. Dixon	USA/ERADCOM
G. F. Engen	National Bureau of Standards
O. P. Gandi	University of Utah
V. G. Gelnovatch	USA/ERADCOM
H. Goldie	Westinghouse Electric Corp.
E. L. Griffin	ITT Corp.
B. R. Hallford	Rockwell International
G. R. Harrison	Georgia Institute of Technology
M. E. Hines	M/A-COM, Inc.
D. J. Hoft	M/A-COM, Inc.
J. B. Horton	TRW Defense & Space Systems
T. Itoh	University of Texas at Austin

F. Ivanek	Farinon, Harris Co.	Vice President:	H. G. Oltman, Jr., Hughes Aircraft Co.
G. Jerenic	Raytheon Co.	Secretary-Treasurer:	N. Walter Cox, Georgia Institute of Technology
R. S. Kagiwada	TRW Defense & Space Systems	Members:	N. Walter Cox, Georgia Institute of Technology
R. H. Knerr	Bell Telephone Laboratories		J. E. Degenford, Westinghouse Electric
J. B. Knorr	Naval Postgraduate School		V. G. Gelnovatch, USA/ERADCOM
C. M. Krown	Naval Research Laboratory		P. T. Greiling, Hughes Aircraft Co.
C. M. Kudsia	COMDEV Ltd.		R. B. Hicks, Rockwell International
T. Lukaszek	USA/ERADCOM		H. Howe, Jr., M/A-COM, Inc.
S. L. March	Microwave Division, C.G.I.S.		T. Itoh, University of Texas
M. Maury	Maury Microwave Corp.		F. Ivanek, Harris Corp.
P. Mercer	M/A-COM, Canada		G. Jerinic, Raytheon Co.
J. Mink	US Army Research Office		R. H. Knerr, Bell Laboratories
E. C. Niehenke	Westinghouse		Y. Konishi, Nippon Hoso Kyokai
H. Okean	LNR Communications Co.		J. H. Kuno, Hughes Aircraft Co.
A. A. Oliner	Polytechnic Institute of New York		S. L. March, Comsat General
H. G. Oltman	Hughes Aircraft Co.		D. N. McQuiddy, Jr., Texas Instruments
J. Osepchuk	Raytheon Co.		E. C. Niehenke, Westinghouse Electric
J. M. Owens	University of Texas Arlington		H. G. Oltman, Jr., Hughes Aircraft Co.
D. Parker	Hughes Aircraft Co.		J. M. Roe, McDonnell Douglas
S. Peng	Polytechnic Institute of New York		C. T. Rucker, Georgia Institute of Technology
B. Perlman	RCA Laboratories		B. E. Spielman, Naval Research Laboratory
R. A. Pucel	Raytheon Co.		
J. Raue	TRW Defense & Space Systems	Ex-Officio Members:	
P. Rizzi	Southeastern Mass. University	<i>1980 President</i>	S. F. Adam, Hewlett-Packard Co.
G. P. Rodrigue	Georgia Institute of Technology	<i>1981 President</i>	F. J. Rosenbaum, Washington University
A. Rosen	RCA Laboratories	<i>1982 President</i>	R. A. Sparks, Raytheon Co.
F. Rosenbaum	Washington University		
C. T. Rucker	Georgia Institute of Technology	Honorary Life Members:	
M. B. Schneider	Bell Telephone Laboratories		A. C. Beck
R. Snyder	RS Microwave Co., Inc.		S. B. Cohn
H. Sobol	Rockwell International		D. D. King
P. Staeker	MIT Lincoln Laboratories		W. W. Mumford
H. E. Stinehelfer	Made-It Associates		A. A. Oliner
R. Swartley	General Electric Co.		T. S. Saad
J. J. Taub	AIL Division, Eaton Ind.		K. Tomiyasu
S. Temple	Raytheon Co.		L. Young
G. R. Thoren	Raytheon Co.		
J. J. Whelehan	Airborne Instrument Laboratories		
L. R. Whicker	Naval Research Laboratories		
J. White	M/A-COM, Inc.		
A. E. Williams	Comsat Laboratories		
R. Williamson	MIT Lincoln Laboratories		
J. C. Wiltse	Georgia Institute of Technology		

## 1983 MTT-S ADMINISTRATIVE COMMITTEE

President: C. T. Rucker, Georgia Institute of Technology



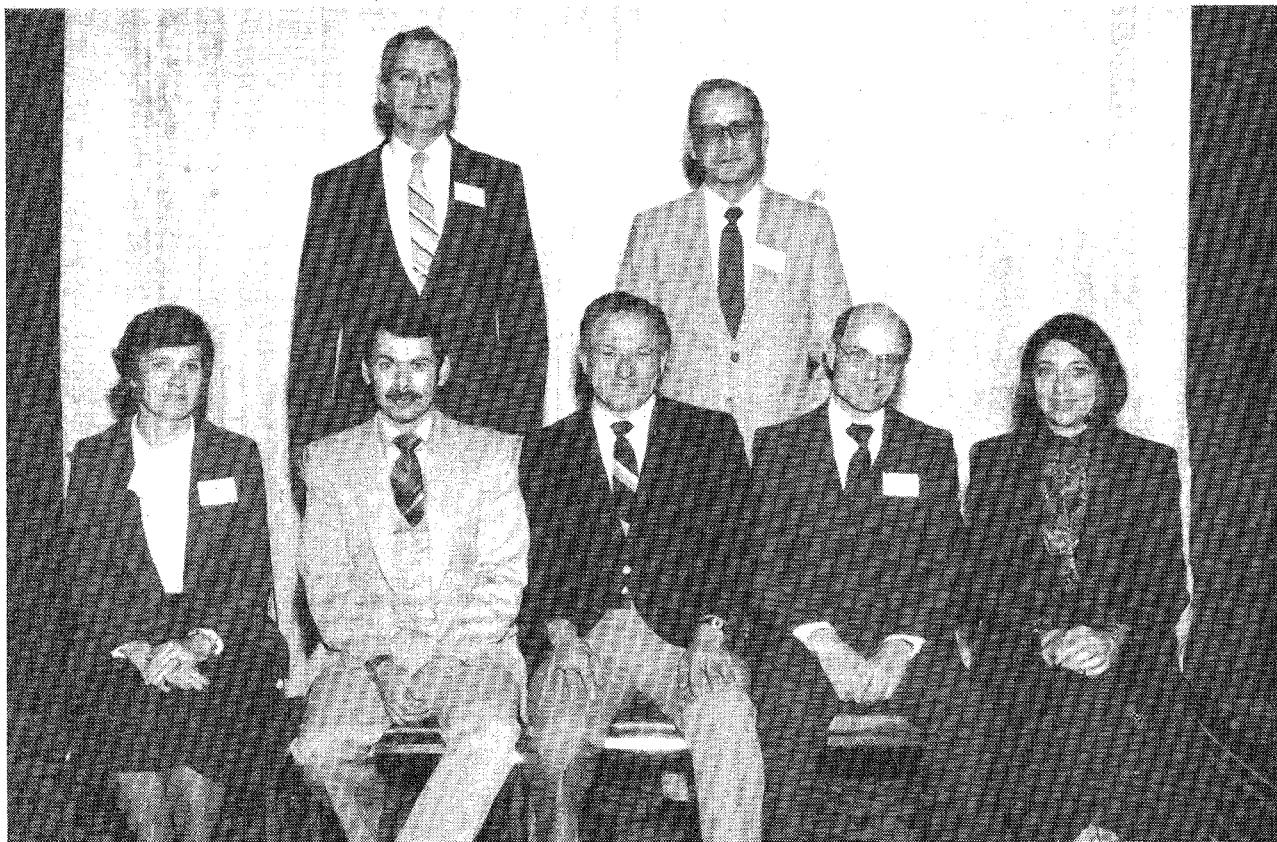
Symposium Steering Committee

(Left to right seated): J. Oaks, K. Goodburn, C. Alterio, E. White, B. Rose, A. Murphy.  
(Left to right standing): S. Temple, J. White, P. Staeker, F. O'Hara, G. R. Thoren.



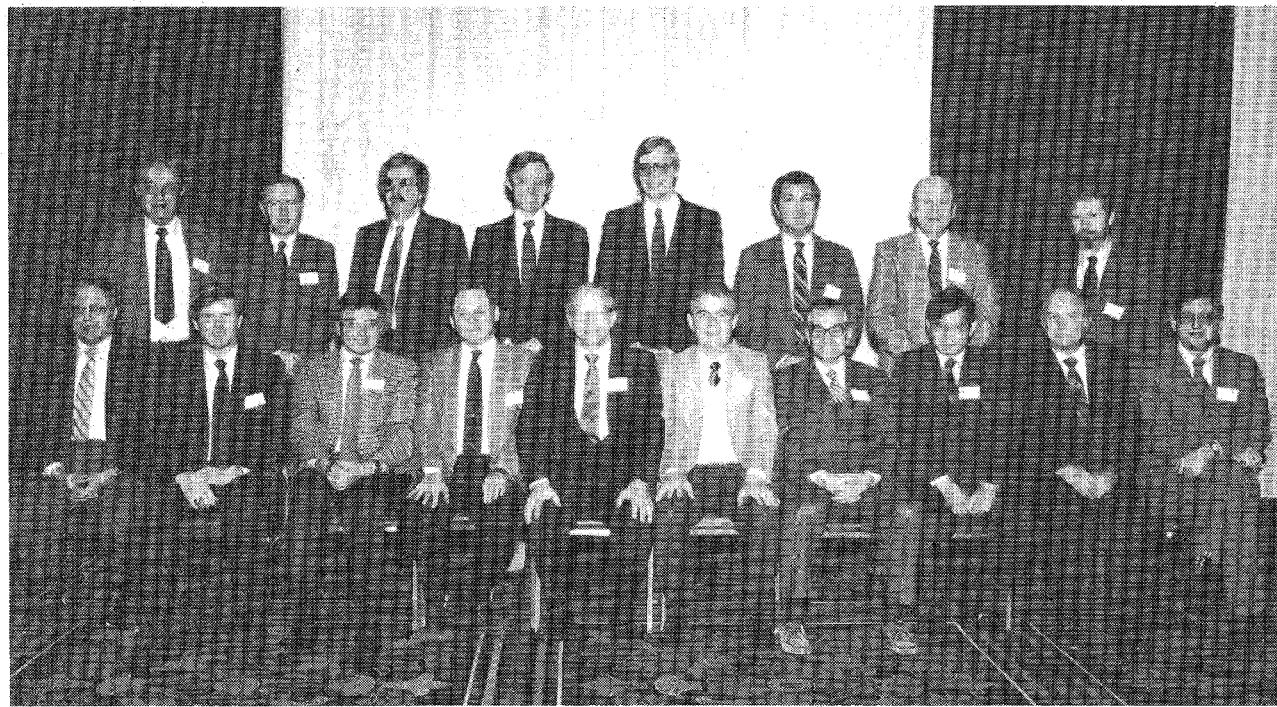
Symposium Steering Committee

(Left to right seated): H. Ellowitz, R. Levy, H. Howe; Chairman, F. Leith, G. Jerinic, L. Pihl.  
(Left to right standing): J. Putnam, A. Blaisdell, A. G. Cardiasmenos, R. A. Sparks, W. A. Davis, R. Jerome.



Technical Program Committee

(Left to right seated): G. Jackson, S. L. March, R. A. Pucel, B. R. Hallford, B. Levy.  
(Left to right standing): R. A. Sparks, C. T. Rucker.



Technical Program Committee

(Left to right seated): J. E. Raue, G. R. Thoren, R. H. Knecht, J. E. Degenford, Jr., R. Levy, B. E. Berson, A. A. Oliner, S. Peng, C. R. Boyd, Jr., Y. Ayasli.  
(Left to right standing): S. F. Adam, F. Ivanek, T. J. Lukaszek, P. Staeker, S. J. Temple, J. Barrera, N. R. Dietrich, F. J. Rosenbaum.



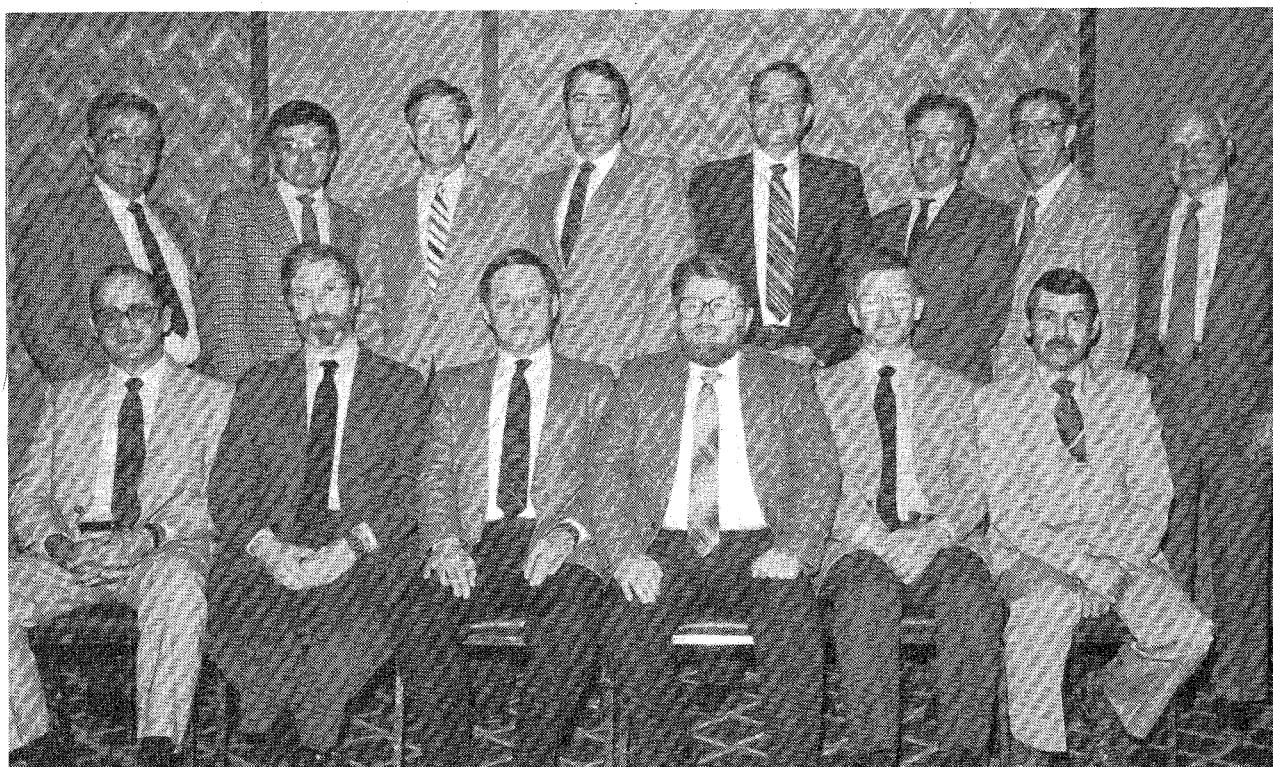
Technical Program Committee

(Left to right seated): M. E. Hines, R. S. Kagiwada, J. J. Taub, J. White, K. J. Button, C. Kudsia, A. E. Williams, R. V. Snyder, P. Carr, T. Itoh.  
(Left to right standing): J. M. Owens, S. Dixon, J. J. Whelan, Jr., A. G. Cardiasmenos, E. C. Niehenke, A. E. Atia, H. C. Bell, P. Rizzi, K. Carr,  
G. P. Rodrique.



Technical Program Committee

(Left to right seated): A. Rosen, H. E. Steinhelfer, J. W. Mink, V. G. Gelnovatch, B. Perlman, E. J. Crescenzi, Jr., G. Riblet, H. Goldie, C. M. Krowne.  
(Left to right standing): E. Cohen, E. F. Belohoubek, H. Cronson, G. Engen, H. G. Oltman, Jr., J. B. Horton, J. M. Osepchuk, H. Chapell,  
M. A. Maury, Jr., R. Swartley, L. R. Whicker, M. Caulton.



Administrative Committee

(Left to right seated): C. T. Rucker, F. J. Rosenbaum, J. E. Degenford, Jr., G. Jerinic, P. T. Greiling, S. L. March.  
(Left to right standing): S. F. Adam, R. H. Knerr, N. W. Cox, J. M. Roe, E. C. Niehenke, H. Howe, Jr., D. Parker, W. C. Brown.



Administrative Committee

(Left to right seated): H. G. Oltman, Jr., T. S. Saad, A. A. Oliner, R. A. Sparks, D. N. McQuiddy, Jr..  
(Left to right standing): G. R. Thoren, B. E. Spielman, T. Itoh, H. J. Kuno, F. Ivanek.