

1997 IMS Technical Program

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THE technical program of the 1997 IEEE MTT-S International Microwave Symposium was a great success. The technical program consisted of 55 technical sessions, six panel sessions, one rump session, three student-paper sessions, and 24 workshops spread over the week of June 8–13, 1997.

The core of the technical program was 55 technical sessions over three days (Tuesday through Thursday). These included five focused sessions with the themes: Millimeter Waves over Fiber Systems, Microwave Applications of Silicon Carbide, Electromagnetic Wave Interactions with Electron Devices and Circuits, Acoustic Wave Devices for Portable Communications, and Microwave Meteorology and Standards: A Historical View. The latter session (consisting of five invited papers) was a unique presentation of the historical account of microwave measurement techniques and physical standards developed at the Boulder Laboratories of the National Institute of Standards and Technology (NIST), Boulder, Colorado [formerly the National Bureau of Standards (NBS)]. Another session related to history was “J. C. Bose Centennial Session on Millimeter and Sub-Millimeter Waves,” which was arranged to commemorate the centennial of J. C. Bose’s pioneering experiments on millimeter waves. Two invited papers in this session, one from the National Radio Astronomy Observatory, Tucson, Arizona, and another from Calcutta University, Calcutta, India, reviewed the contributions of Bose in the late 19th century to quasi-optical millimeter-wave research developments including a 60-GHz source, a semiconductor detector, dielectric lenses, absorbers, waveguides, and horn antennas. Some of Bose’s original equipment (still in working condition) was brought from the J. C. Bose Institute Museum, Calcutta, India, and was demonstrated by scientists from India as a part of this year’s IMS Historical Exhibition.

The total number of IMS papers presented this year was 413. These papers were carefully selected by our Technical Program Committee out of a total of 752 papers received. This put the paper acceptance rate at 54.9%, which ensured a high quality technical program. Our 237 dedicated MTT-S volunteers on the Technical Program Committee reviewed an average of 30 papers each (most during the last Christmas holiday season) to select the best papers for inclusion in the program.

Thirty-two percent of the IMS technical papers (a total of 132) were presented in two interactive forum sessions on Wednesday and Thursday afternoons. This mode of presentation allows maximum one-on-one interaction with the authors and was immensely popular with the Symposium participants. Out of the regular sessions, three sessions on Tuesday were jointly arranged with the RFIC Symposium and another one (on Thursday) was jointly organized with the ARFTG Conference. These joint sessions helped to integrate

the three segments of the microwave week into a more coherent technical program.

Six lunch-time panel sessions presented discussions on exciting topics, such as Device Technology Choices for Commercial Portable Power Amplifier Products, Transceiver Technology for Multi-Mode Wireless Personal Networks, IC Reliability Needs for Commercial Applications, Packaging Techniques for Optical/Microwave Modules, Balancing the Trade-offs between Thermal Management and Electrical Performance in Microwave Packaging, and Radio Frequency Identification Tags and Data Cards. Six technical committees of the MTT Society co-sponsored a lively rump session on “HF to UHF Designs and Applications” on Tuesday evening. Another highlight of the technical sessions was the Tuesday morning Plenary Session with keynote addresses on “LMDS as the Broadband Solution” and “Will the Real PCS Please Stand Up?,” the two telecommunication infrastructures that are revolutionizing the microwave/RF industry.

In addition to these sessions, an outstanding and very popular part of our technical program was the collection of 24 workshops arranged on Sunday, Monday, and Friday. This year, IMS recorded the largest ever workshop participation with 2775 attendees in these workshops. We had 10 full-day workshops and 14 half-day workshops with a diverse range of topics selected to provide an exciting and timely program to augment the continuing education of microwave-engineering professionals. The workshop topics were selected, by a subcommittee of the IMS Technical Program Group, out of the 35 proposals received. To ensure a systematic participant feedback that will help to improve the workshop program in future IMS Symposia, we introduced a system of electronically processed “workshop questionnaires” for all workshop attendees. This year’s workshops’ topics are listed below.

- The emergence of multipoint distribution systems (MMDS, LMDS).
- Low-voltage, low-power consumption RFIC’s for wireless communications products.
- Measurements for silicon and GaAs telecommunication IC’s.
- State-of-the-art filter design using EM and circuit simulation techniques.
- Microwave and millimeter-wave optoelectronic integrated-circuit modules: manufacturing and applications.
- Nonlinear measurement and modeling.
- Cryogenic packaging of electronic subsystems and their applications.
- System requirements for ferrite components.
- Ferrite measurements and device applications.

- Next-generation high-speed mixed signal testing.
- EM waves in artificial structures (PBG's).
- Millimeter-wave opportunities for automotive and radio applications.
- Digital-frequency synthesizers: technology and applications.
- Emerging business issues in microwave technology.
- Telecommunications and spectrum policy for the microwave engineer.
- Low-cost millimeter-wave products: Design and manufacturing issues.
- Power amplifier design for digital wireless systems.
- Interconnects and packaging for RF wireless communications systems;
- Nonlinear frequency-domain device modeling and circuit simulation.
- Optical amplifiers in microwave systems;
- Applications of artificial neural networks to microwave design.
- Epitaxial materials manufacturing for HEMT's and HBT's.
- Quasi-optical power combining.
- World-wide-web site basics.

Another noteworthy activity in this year's technical program was an enhanced Student-Paper Competition, in which 31 en-

tries were received. In addition to presentation of these papers in the regular IMS program, these papers were presented on Wednesday in three special "student paper" sessions. These sessions were attended by a panel of judges for selection of the outstanding student papers. This year, all the Student-Paper Competition participants were offered financial assistance toward travel expenses. Funding for this new initiative was supported by a grant from the National Science Foundation.

Organization of such a comprehensive technical program is a major undertaking. We would like to thank all 237 volunteers of the IMS 1997 Technical Program Committee. In addition, special thanks are due to the Steering Committee Technical Group. Don DeGroot (along with John Meredith and Ajay Sreenivas) did a terrific job on the workshops, Moto Kanda handled focus, panel, and rump sessions, and Stoyan Ganchev handled the Student-Paper Competition. Roger Marks arranged an excellent plenary session. John Norgard organized the interactive-forum sessions. Gerhard Koepf headed the Symposium Digest publication, and Chris Jelks headed the CD-ROM effort. Gifts for technical contributors were arranged by Dick Booton. Roger B. Marks and Dylan Williams were our ARFTG and RFIC liaisons, respectively. We thank all the Steering Committee members for their involvement and tremendous help in making the technical program such an outstanding success.



Kuldip C. Gupta (M'62–SM'74–F'88) received the B.S. and M.S. degrees in electrical communication engineering from the Indian Institute of Science, Bangalore, India, in 1961 and 1962, respectively, and the Ph.D. degree from Birla Institute of Technology and Science, Pilani, India, in 1969.

From 1969 to 1975, he was with the Indian Institute of Technology (IITK), Kanpur, India, where he was a Professor of electrical engineering. While on leave from IITK, he has been a Visiting Professor at the University of Waterloo, Waterloo, Ont., Canada, the Ecole Polytechnique Federale de Lausanne, Switzerland, the Technical University of Denmark, Lyngby, Denmark, the Eidgenossische Technische Hochschule, Zurich, Switzerland, and the University of Kansas, Lawrence. From 1971 to 1979, he was the Coordinator for the Phased Array Radar Group, Advanced Center for Electronics Systems, IITK. Since 1983, he has been with the University of Colorado at Boulder, as a Visiting Professor and Professor. His current research interests are in the area of CAD techniques for microwave and millimeter-wave integrated circuits and integrated antennas. He has authored or co-authored six books: *Microwave Integrated Circuits* (New York: Wiley, 1974, New York: Halsted Press, 1974); *Microstrip Lines and Slotlines* (Norwood, MA: Artech House, 1979, 1996); *Microwaves* (New York: Wiley, 1979, New York: Halsted Press, 1980; Editorial Limusa Mexico, 1983), *CAD of Microwave Circuits* (Norwood, MA: Artech House, 1981, Chinese Scientific Press, 1986, Radio i Syvaz, 1987), *Microstrip Antenna Design* (Norwood, MA: Artech House, 1988), and *Analysis and Design of Planar Microwave Components* (Piscataway, NJ: IEEE Press, 1994). He has also contributed chapters to the *Handbook of Microstrip Antennas* (Stevenage, U.K.: Peregrinus, 1989), *Handbook of Microwave and Optical Components, Vol. 1* (New York: Wiley, 1989), *Microwave Solid State Circuit Design* (New York: Wiley, 1988), and *Numerical Techniques for Microwave and Millimeter Wave Passive Structures* (New York: Wiley, 1989). He has published over 160 research papers and holds three patents in the microwave area.

Dr. Gupta is a fellow of the Institution of Electronics and Telecommunication Engineers (IETE), India. He is on ADCOM of IEEE MTT Society, is vice-chair of MTT-S Publications Committee, co-chair of the MTT-S Technical Committee on CAD (MTT-1), a member of the Technical Committee on Microwave Field Theory (MTT-15), and on the Technical Program Committee for MTT-S International Symposia. He was the technical program chair for 1997 MTT-S International Symposium. He is on the editorial boards for IEEE MTT-S TRANSACTIONS FOR MICROWAVE THEORY AND TECHNIQUES, *Microwave and Optical Technology Letters*, *International Journal of Numerical Modeling*, and for three journals of IETE. He is the founding editor for *International Journal of Microwave and Millimeter-wave Computer Aided Engineering*. He is listed in *Who's Who in America*, *Who's Who in the World*, *Who's Who in Engineering*, and *Who's Who in American Education*.



Zoya Basta Popović (S'86–M'90) was born in Belgrade, Yugoslavia, in 1962. She received the Dipl.Ing. degree from the University of Belgrade, Serbia, Yugoslavia, in 1985, and the Ph.D. degree from California Institute of Technology, Pasadena, in 1990.

She is currently an Associate Professor of electrical engineering at the University of Colorado at Boulder. Her research interests include microwave and millimeter-wave quasi-optical techniques, microwave and millimeter-wave active antennas and circuits, and electromagnetic modeling of antennas and circuits.

Dr. Popović received the IEEE Microwave Theory and Techniques Microwave Prize, the URSI Young Scientist Award, and the National Science Foundation Presidential Faculty Fellow Award in 1993. She was awarded the International URSI Isaac Koga Gold Medal in 1996.

Microwave Theory Tech., 45, no. 9, pp. 1563-1571, Sept. 1997. [17] D. E. Root, S. Fan, and J. Meyer, "Technology independent large signal non quasi-static FET models by direct construction from automatically characterized device data," in Proc. 21st European Microwave Conf., Stuttgart, Germany, Sept. 1997. [60] J. F. Sevic, M. B. Steer, and A. M. Pavio, "Large-signal automated load-pull of adjacent-channel power for digital wireless communication systems," in IEEE MTT-S Int. Microwave Symp. LT1997-3 Precision, Wide Voltage Range Gain Selectable. Amplifier DESCRIPTION. The LT 1997-3 combines a precision operational amplifier with highly-matched resistors to form a one-chip solution for accurately amplifying voltages. Gains from -13 to +14 with accuracy of 0.006% (60ppm) can be achieved using no external components. The LT1997-3 is particularly well suited for use as a difference amplifier, where the excellent resistor matching results in a common mode rejection ratio of greater than 91dB. The amplifier features a 60 $\frac{1}{4}$ V maximum input offset voltage and a -3dB bandwidth of 1.1MHz (... \hat{A} LT1997IMS-3#PBF. LT1997IMS-3#TRPBF 19973. In the United States Department of Defense, the Integrated Master Plan (IMP) and the Integrated Master Schedule (IMS) are important program management tools that provide significant assistance in the planning and scheduling of work efforts in large and complex materiel acquisitions. The IMP is an event-driven plan that documents the significant accomplishments necessary to complete the work and ties each accomplishment to a key program event. The IMP is expanded to a time-based IMS to produce a The IMS constitutes a program schedule of the entire required scope of effort, including the effort necessary from all government, contractor, and other key parties for a program's successful execution from start to finish (the period of performance). The IMS is developed from the IMP, major contractor events, accomplishments, entrance criteria, exit criteria, and the WBS, which defines the program work structure and work packages. Like the IMP, the IMS is maintained, under configuration control, through disposal or program termination. An IMS may be made up of several individual schedules tha