1995 International Microwave Symposium

Workshops

Sunday, May 14, 1995

(Convention Center, Hall A1)

Number	Time/Room	Title
WSFA	8:00 am–5:00 pm (CC, Hall A1)	ICs for Wireless Communications

Monday, May 15, 1995

(Convention Center)

WMFB	8:00 am–5:00 pm (CC, Room 20B)	System Applications of High Temperature Superconductors and Cryogenic Electronics
WMFC	8:00 am–5:00 pm (Room 20C)	Advances in Traveling Wave Tube Technology
WMFD	8:00 am–5:00 pm (Room 20E)	Modeling of Microwave Filters and Passive Components
WMHE	8:00 am–5:00 pm (Room 20F)	Automated Circuit Design Using Electromagnetic Simulators
WMHF	8:00 am-5:00 pm (Room 20G)	Photonic Guided Wave Structures
WMHG	8:00 am-5:00 pm (Room 21)	Field Theoretical Problems for Wireless Technology
WMHH	8:00 am–12:00 noon (Room 23A)	Recent Advances in Microwave and mm-Wave Oscillator Design
WMHA	1:00 pm–5:00 pm (Room 20A)	Chaos in Microwave Systems
WMHI	1:00 pm–5:00 pm (Room 20D)	Packaging Technology

1995 International Microwave Symposium

Workshops

Friday, May 19, 1995

(Convention Center)

Number	Time/Room	Title
WFFA	8:00 am–5:00 pm (Room 10C)	Silicon RF Technologies
WFFB	8:00 am–5:00 pm (Room 12A)	GaAs HBTs: Devices, Circuits and Reliability
WFFC	8:00 am–5:00 pm (Room 11A)	Microwave Vehicular Technology
WFFD	8:00 am–5:00 pm (Room 11B)	Advances in Microwave and mm-Wave Synthesizer Technology
WFFE	8:00 am–5:00 pm (Room 12B)	CAD Design Methodology for Commercial Applications
WFFF	8:00 am–5:00 pm (Room 12C)	Design Approaches for IC Antenna Modules
WFFG	8:00 am–5:00 pm (Room 11C)	Power Devices and MMICs for Wireless and Military Applications
WFFH	8:00 am–5:00 pm (Room 10A)	MIMIC Hardware Description Language and Standards
WFHI	8:00 am–12:00 noon (Room 10B)	Microwave Applications of Ferroelectric Ceramics

Workshops

WSFA: ICs for Wireless Communications: Design, Packaging and Test Issues

Date:	Sunday, May 14, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Hall A1
Sponsors:	MTT-6 Microwave and Millimeter-Wave ICs TPC-1995 MMWMC Symposium MTT-16 Microwave Systems
Organizer & Moderators:	Fazal Ali, Westinghouse—ATD Bernie Geller, David Sarnoff Research Center Mike Golio, Motorola
Speakers:	Peter Bachert, RF Micro Devices Richard Koyama, Triquint Semiconductor Kevin Negus, Hewlett-Packard Phil Wallace, Anadigics David Halcin, Motorola Peter Bacon, Raytheon Finbarr McGrath, M/A-COM Sarjit Bharj, David Sarnoff Research Center Ed Campbell, AT&T Christian Kermarrac, Analog Devices Mark McDonald, National Semiconductor David Smith, GEC-Marconi Shinji Hara, Sharp Corp. Tsueno Tokumitsu, NTT H. Wang, France Telecom

Abstract:

This workshop will present specific IC design, packaging and test requirements for the emerging wireless communication applications. Application areas to be covered include cellular/personal communication systems (PCS), wireless local area networks (WLAN), satellite communications and navigation. IC designs based on silicon bipolar, BiCMOS, CMOS, SiGe and GaAs technologies will be covered. Invited speakers will also discuss modeling, simulation and manufacturing issues related to low cost, high volume commercial markets.

Workshops

WMFB: Systems Applications of High-Temperature Superconductors and Cryogenic Electronics

Date:	Monday, May 15, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Room 20B
Sponsors:	MTT-18 Superconducting Microwave Applications
Organizers:	Salvador H. Talisa, Westinghouse Science and Tech. Center Arnold Silver, TRW
Speakers:	M. Nisenoff, Naval Research Laboratory W.G. Lyons, MIT Lincoln Laboratory W.A. Phillips, GEC-Marconi Hirst Research Center R. Withers, Conductus P. Polakos, AT&T Z.Y. Shen, DuPont R.R. Mansour, COM DEV T.L. Miller, Westinghouse Electric C.M. Jackson, TRW J. Hodge, Illinois Superconductor

Abstract:

High-temperature superconductivity (HTS) has already completed the initial phase of component-level demonstrations required of any new technology. Results on key components, such as filters, delay lines and resonators, have been impressive enough to prompt studies that show that significant improvements in system performance are possible. Some of these systems may also require cryogenically cooled semiconducting electronics, which will take advantage of the cooling needed for the superconductive devices. Several groups, acting upon the results of their studies, are already preparing the first level of systems demonstrations, working at the same time on the necessary technology development. This workshop addresses systems issues from the point of view of their overall architecture, projected performance and cryogenic packaging. A number of commercial, military and space systems that are under study or already in development are described.

Workshops

WMFC: Advances in Traveling Wave Tube Technology

Date:	Monday, May 15, 1995
Time:	8:00 am to 5:00 pm
Location:	Convention Center, Room 20C
Sponsor:	MTT-5 Microwave High-Power Techniques
Organizers:	Allen Katz, Trenton State College Herbert Wolkstein, Martin Marietta Astro Space
Chairman:	Allen Katz, Trenton State College
Speakers:	Carter Armstrong, Northrop Grumman Electronics Sys. Div. Louis D'Angelo, Martin Marietta Astro Space George Fleury, Thomson Tubes Electroniques Gary Groshart, Northrop Grumman Electronics Sys. Div. Allen Katz, Trenton State College Gunter Kornfeld, AEG—Microwave and High Voltage Devices Gordon Lange, HEDD Robert Parker, Naval Research Laboratory Gunter Palz, AEG—Microwave and High Voltage Devices Bob Shunken, Spectrum Communications Systems Herb Wolkstein, Martin Marietta Astro Space

Abstract:

Traveling Wave Tube Amplifiers (TWTAs) have experienced a period of unparalleled advancement. Efficiency has increased dramatically and is projected to exceed 70% by the end of the decade. Reliability has been extended significantly. The combining of TWTA power capabilities with solid state electronics is producing new TWTAs of smaller size and weight, and greater linearity than comparable all solid state designs. This workshop will begin with a review of TWTA fundamentals. It will then focus on the status and future of TWTA technology. Among the developments to be cover will be: efficiency, cooling, mini tubes and the Microwave Power Module (MPM), linearization, millimeter wave tubes, high power tubes, power supply technology, and special applications as phased arrays.

Workshops

WMFD: Modeling of Microwave Filters and Passive Components

Date:	Monday, May 15, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Room 20E
Sponsor:	MTT-S Microwave Network Theory
Organizers & Chairmen:	Marco Guglielmi, ESTEC, European Space Agency Richard Snyder, RS Microwave Co.
Speakers:	Prof. Zaki, University of Maryland Prof. Wolf, University of Duisburg, Germany Prof. Baudrand, ENSEEIHT Marco Guglielmi, ESTEC Prof. Arcioni, University of Pavia, Italy Prof. Sorrentino, University of Perugia, Italy Prof. Oliner, Polytechnic University Prof. Rozzi, University of Ancona, Italy

Abstract:

Microwave filters and passive components are frequently used in a large variety of microwave systems, ranging from telecoms to earth observation, both for ground and space applications. Of key importance for modern implementations are the miniaturization of all hardware and the reduction of the development time and cost. Substantial improvement in this direction can only be achieved with the development of advanced computer-aided design tools. To this end, equivalent network representations appear particularly attractive for their proven computational efficiency. In this workshop the latest developments in the equivalent network representation of waveguide discontinuities will be discussed, including advantages/disadvantages with respect to other techniques, and intrinsic limitations. Specific application examples will be described in the area of microwave filters design and optimization.

Workshops

WMFE: Automated Circuit Design using Electromagnetic Simulators

Date:	Monday, May 15, 1995
Time:	8:00 am to 5:00 pm
Location:	Convention Center, Room 20F
Sponsors:	MTT-1—Computer-Aided Design MTT-15 Microwave Field Theory
Organizers & Chairmen:	John W. Bandler, Optimization Systems Associates Inc. Roberto Sorrentino, Universitat degli studi di Perugia, Italy
Speakers:	Fritz Arndt, Technische Universitat Bremen, Germany Shaohua Chen, Optimization Associates Inc., Canada Wolfgang J.R. Hoefer, University of Victoria, Canada Nitin Jain, M/A-COM Rolf H. Jansen, University of Aachen, Germany Tony M. Pavio, Motorola Robert A. Pucel, RCP Consultants Roberto Sorrentino, Università degli studi di Perugia, Italy Colin B. Sinclair, Symbionics Limited Dan G. Swanson, Jr., Watkins-Johnson

Abstract:

Recent advances in microwave CAD technology, the availability of powerful workstations and massively parallel systems indicate the feasibility of interfacing electromagnetic (EM) simulators into optimization systems or CAD frameworks for direct application of powerful optimizers. With the increasing availability of fast, robust, commercial EM simulators, it is tempting to include them both in performance-driven and yield-driven circuit optimization, to combine the advantages of yield-driven design with the accuracy of electromagnetic simulation for first-pass success.

Thus, the push is to go beyond traditional uses of EM simulators for validation, for generation of equivalent circuits or look-up tables. It is to integrate EM simulations directly into the linear/nonlinear circuit design process in a manner transparent to the designer. The EM simulators, whether stand-alone or incorporated into CAD frameworks, may not realize their full potential to the designer unless they are driven by optimization routines to adjust automatically some designable parameters.

This workshop will address the evolution of the state of this novel art. Expectations of using EM simulators as effective tools in an automated design environment have been raised, based on the considerable and excellent work currently in progress.

Workshops

WMFF: Photonic Guided-Wave Structures

Date:	Monday, May 15, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Room 20G
Sponsor:	MTT-3 Lightwave Technology
Organizer & Chairman:	Anand Gopinath, University of Minnesota
Speakers:	F. Arndt, University of Bremmen, Germany G.R. Hadley, Sandia National Laboratory J.B. Davies, University College Z. Cendes, Carnegie-Mellon D. Yevick, Queens University N. Dagli, University of California R. Pregla, Fern University, Germany A. Taflov, Northwestern University S.K. Chaudhuri, University of Waterloo L. Katehi, University of Michigan W. Yang, University of Minnesota R. Amantea, David Sarnoff Research Center

Abstract:

With current interests in the microwave optical devices and systems, the design of photonic devices that work at microwave and millimeter-wave frequencies is of importance. Most photonic devices are dielectric guides, some with gain and/or loss, some that are anisotropic and others that are isotropic. A variety of numerical techniques have been used to solve the two-dimensional guide problem, ranging from the simple effective index method, to the full wave vector solver using finite elements. The three-dimensional problems have been solved using beam propagation methods, finite difference time domain codes and the three-dimensional finite element solver. There is also work on using the Green's function integral equation approach to these problems. Dielectric guides show considerable differences to RF guides. They tend to be weakly guiding structures as opposed to strongly guiding RF guides. Their discontinuities radiate with virtually no stored energy in evanescent fields, their bends are lossy, their active guides have small gain coefficients compared to the propagation constants and the lossy guides are spectacularly lossy. There is also considerable interest in modeling nonlinearities in these guides using a variety of techniques.

Workshops

WMFG: Field Theoretical Problems for Wireless Technology

Date:	Monday, May 15, 1995
Time:	8:00 am–5:00 pm
Location:	Convention Center, Room 21
Sponsor:	MTT-15 Microwave Field Theory
Organizers:	Ingo Wolff, Gerhard-Mercator-University Duisburg, Germany Tatsuo Itoh, University of California
Speakers:	I. Wolff, Duisburg University H. Bertoni, Polytechnic University E. Zollinger, ETH Zurich K. Wakino, Murata K. Kagoshima, NTT J. Lin, University of Illinois, Chicago H. Meinel, Deutche Aerospace (Panelist) P. Sass, Army Research Lab. (Panelist)

Abstract:

Wireless communication is a new interdisciplinary subject in which the radio frequency (RF) and microwave technologies are essential parts. In addition, since a substantial commercial aspect is included, this subject is essential for the future of the RF and microwave industry. Because the wireless communications rely heavily on the electromagnetic fields and waves, there is a significant opportunity in the research, development and commercialization in the topics related to wireless technology from the point of view of microwave field theory. This workshop identifies or revisits the electromagnetic issues of which the specialists in microwave field theory can play a vital role in the future of the wireless technology. The workshop is organized to be a forum for both microwave engineers, particularly those specialized in microwave field theory and related subjects, and leaders in the wireless industry. An overview on the electromagnetic problems related to digital wireless communication is provided, and such system aspects as TDMA and CDMA are described. The microwave field theoretical points of view on various subjects are given. An essential task of the microwave field theory community to study the wave propagations in different environments is discussed, as are field theoretical approaches for filter designs and antenna design and characterizations. The biological effect of the RF and microwave is reviewed. The workshop concludes with panel presentations and audience participation in discussions.

Workshops

WMHH: Recent Advances in Microwave and Millimeter-Wave Oscillator Design

Date:	Monday, May 15, 1995
Time:	8:00 am–12:00 noon
Location:	Convention Center, Room 23A
Sponsor:	MTT-7 Microwave and Millimeter-Wave Solid-State Devices
Organizers & Chairmen:	R.J. Trew, Case Western Reserve University A. Beyer, Duisburg University
Speakers:	C.M. Snowden, University of Leeds H.L. Hartnagel, Technical University of Darnstadt M. Odyniec, Hewlett-Packard B. Roth, IMS, Kamp-Linfort J.R. East, University of Michigan A.N. Riddle, Macallan Consulting M.B. Steer, North Carolina State University J.W. Mink, North Carolina State University

Abstract:

Microwave oscillators, while a fundamental component of virtually all RF systems, have traditionally been one of the most difficult components to design and fabricate, especially in IC environments. An oscillator by definition is a large-signal device that requires nonlinear design techniques. This workshop reviews and discusses recent advances in the design of microwave and millimeter-wave oscillators. Emphasis is placed on modeling and simulation, noise behavior and measurement techniques. Both traditional and quasi-optical techniques will be discussed. Discussions of short attendee presentations are included.

Workshops

WMHA: Chaos in Microwave Systems

Date:	Monday, May 15, 1995
Time:	1:00 pm to 5:00 pm
Location:	Convention Center, Room 20A
Sponsor:	MTT-16 Microwave Ssystems
Organizer:	Roger Kaul, Army Research Laboratory
Chairman:	Tom Carroll, The Naval Research Laboratory
Speakers:	Mohamed Sobhy, The University of Kent Christopher Silva, Aerospace Corporation Michal Odyniec, Hewlett-Packard Company Dieter Jaeger, Universitat Duisburg Hsuing Hsu, The Ohio State University Scott Hayes, Army Research Laboratory Chance Glenn, Army Research Laboratory Robert York, University of California, Santa Barbara

Abstract:

Chaotic processes, frequently mistaken as noise, are being observed in nonlinear devices even at microwave and optical frequencies. These processes occur in deterministic dynamical systems that are sensitive to small pertubations in their state-space trajectories. Examples include sources, amplifiers, limiters and nearly any nonlinear microwave device connected to a linear circuit having certain reactive characteristics. This workshop presents examples of chaotic processes, method of chaos observation and the prevention/control of these processes to maintain/enhance system performance.

Workshops

WMHI: Packaging Technology Workshop

Date:	Monday, May 15, 1995
Time:	1:00 pm to 5:00 pm
Location:	Convention Center, Room 20D
Sponsors:	MTT-12 Microwave and Millimeter Wave Interconnection and Packaging
Organizers & Co-Chairmen:	Jeanne Pavio, Motorola Tim Kemerley, U.S. Air Force, Wright Laboratory
Speakers:	John Bedinger, Texas Instruments John Bugeau, Lockheed Sanders Paul Cooper, Martin Marietta James Rhein, Raytheon Rick Sturdivant, TRW

Abstract:

This workshop session focuses on the key aspects of packaging technology which address cost-effective manufacturing whether in the commercial arena or for dual-use applications. The strong emphasis on cost which now encompasses both commercial and defense systems has spurred the development of a number of new technologies as well as novel methods of chip to circuit interconnections.

Materials for packaging and guidelines for dual use will be investigated as well as the flexible manufacturing necessary for a cost-competitive production line. Burgeoning technologies have begun to come the forefront. Among these, C4 (controlled collapse Chip Connection) and high density interconnect for multichip modules will be reviewed and discussed. Finally, implications for dual use from the system and design aspects will be reviewed.