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## Contributions Welcome

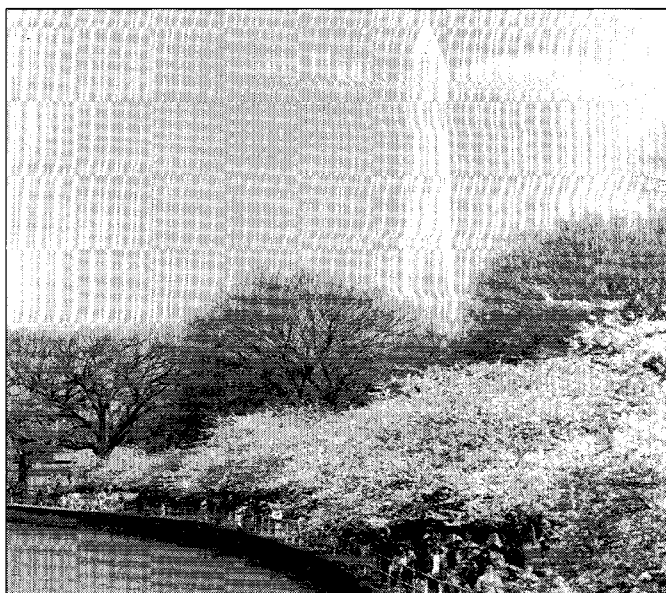
Readers are encouraged to submit news items concerning the Society and its members. Please send your ideas/articles directly to either the Editor-in-Chief or appropriate Editor. All contact information is listed on the back cover page. Whenever possible, e-mail is the preferred form of submission.

### Newsletter Deadlines

<u>Issue</u>	<u>Due Date</u>
January	October 1st
April	January 1st
July	April 1st
October	July 1st

# IEEE Electron Devices Society Newsletter

## 1997 International Electron Devices Meeting (IEDM)



Photograph courtesy of the Washington, D. C. Convention & Visitors Association

The premier technical conference of the Electron Devices Society will be in Washington, D.C. this year when the 43rd annual IEEE International Electron Devices Meeting (IEDM) comes to the Washington Hilton and Towers on December 7 - 10, 1997.

The IEDM is the world's leading international forum for reporting advances in the technology, design, manufacturing, physics and modeling of electron devices, ranging from deep submicron MOSFETs to flat-panel displays, from compound semiconductor materials to new memory architectures, and from novel microelectromechanical (MEMs) devices to smart-power technologies.

The conference attracts authors, attendees and guest speakers from around the world and provides an excellent opportunity to meet colleagues and to keep up with the state-of-the-art in a broad range of interrelated disciplines.

### IEDM 97 Technical Program

The heart of any IEDM is the technical program, and no other meeting presents as much leading work in so many different areas of electronics. The IEDM offers scientists and engineers an opportunity to hear about the best work being done in their own disciplines and in related areas, and to talk with the people doing it.

*(continued on page 3)*

## Your Comments Solicited

Your comments are most welcome. Please write directly to the Editor-in-Chief of the Newsletter at the address given on the back cover page.

## Electron Devices Society

### President

Louis C. Parrillo  
Motorola  
Tel: (512) 928-6802  
E-Mail: l.parrillo@ieee.org

### Vice President

Bruce F. Griffing  
General Electric Company  
Tel: (518) 387-6207  
E-Mail: b.griffing@ieee.org

### Treasurer

Lucian A. Kasprzak  
Sterling Diagnostic Imaging, Inc.  
Tel: (302) 451-0230  
E-Mail: l.kasprzak@ieee.org

### Secretary

James L. Merz  
Univ. of Notre Dame  
Tel: (219) 631-9177  
E-Mail: j.merz@ieee.org

### Sr. Past President

Michael S. Adler  
General Electric Company  
Tel: (518) 387-5882  
E-Mail: m.adler@ieee.org

### Jr. Past President

W. Dexter Johnston, Jr.  
Lucent Technologies Inc.  
Tel: (908) 582-7247  
E-Mail: w.johnston@ieee.org

### EDS Executive Director

William F. Van Der Vort  
IEEE Operations Center  
445 Hoes Lane  
P.O. Box 1331  
Piscataway, NJ 08855-1331  
Tel: (732) 562-3926  
Fax: (732) 235-1626  
E-Mail: w.vandervort@ieee.org

### Awards Chair

H. Craig Casey, Jr.  
Duke University  
Tel: (919) 660-5250  
E-Mail: c.casey@ieee.org

### Educational Activities Chair

Jerry M. Woodall  
Purdue University  
Tel: (765) 494-0732  
E-Mail: j.woodall@ieee.org

### Meetings Chair

Richard D. Sivan  
Motorola, Inc.  
Tel: (512) 933-6735  
E-Mail: r.sivan@ieee.org

### Membership Chair

T. Paul Chow  
Rensselaer Polytechnic Institute  
Tel: (518) 276-2910  
E-Mail: p.chow@ieee.org

### Publications Chair

Steven J. Hillenius  
Lucent Technologies Inc.  
Tel: (908) 582-6539  
E-Mail: s.hillenius@ieee.org

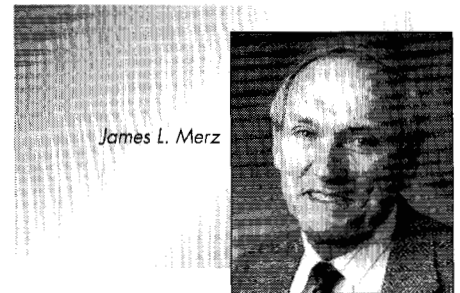
### Regions/Chapters Chair

Cary Y. Yang  
Santa Clara University  
Tel: (408) 554-6814  
E-Mail: c.yang@ieee.org

### IEEE Newsletter Coordinator

Robin Edwards  
IEEE Operations Center  
445 Hoes Lane  
P.O. Box 1331  
Piscataway, NJ 08855-1331  
Tel: (732) 562-3945  
Fax: (732) 981-1855  
E-Mail: r.edwards@ieee.org

## Summary of the May 1997 AdCom Meeting



James L. Merz

### Globalization and Growth Stressed at AdCom Meeting

The Administrative Committee (AdCom) of the Electron Devices Society met on Sunday, May 4, 1997, at the Westin Hotel in the Santa Clara Convention Center, prior to the Custom Integrated Circuits Conference.

In the President's Report, Lou Parrillo opened the discussion by expressing the gratitude of the Society to Tak Ning and Bruce Griffing for their valued services as Awards Chair and Meetings Chair, respectively. He then announced the appointment of Steve Knight of NIST to the Publications Committee, H. Craig Casey of Duke University as Awards Chair, Toshiro Hiramoto of the University of Tokyo to the Membership Committee and Mohamed Arafa, student at the University of Illinois to the Regions/Chapters Committee.

Revitalization of the technical committees of the EDS was then extensively discussed, starting with a summary of the discussion which took place at the Executive Committee Meeting (ExCom) the previous day. ExCom felt that the technical committees could be made considerably more active, and that it would be appropriate to fold other functions into these committees. It was also felt that the membership of the technical committees could be significantly expanded, and made more transnational. The technical committees should provide leadership to the Society, injecting new ideas into our sphere of activity. Instead of simply reporting a number of technical activities to AdCom, they could report on the significant breakthroughs in technology that come out of EDS sponsored conferences and workshops. In this way, long-range planning within the AdCom could accommodate "hot" new areas of technology and insure that the Society is involved. Existing Society publications could be modified and new publications started to allow these "hot areas" to emerge. It should also be possible to fold the society liaison responsibility into these revitalized technical committees, instead of having a separate position to serve as liaison to each technically-related IEEE society.

These ideas led to an in-depth discussion about the relationship between the EDS and other societies, both in the IEEE and elsewhere. Should these relationships be cooperative or competitive? AdCom provided numerous examples of both kinds of relationships. It was generally felt that we should open up a dialogue with as many appropriate societies as possible, because the community of electronic engineers drives the technology, and EDS should pro-

(continued on page 11)

### EDS ADCOM ELECTED MEMBERS-AT-LARGE

Term Expires:

<u>1997</u>	<u>1998</u>	<u>*1999</u>
H.S. Bennett (1)	S. Asai (2)	R.G. Adde (1)
J.T. Clemens (2)	A.S. Brown (1)	J.J. Brown (1)
H. Iwai (1)	T.P. Chow (1)	B.F. Griffing (2)
J.L. Merz (2)	M.A. Shibib (1)	R.P. Jindal (2)
K. Tada (1)	R.D. Sivan (1)	J.B. Kuo (2)
R.J. Temkin (1)	J.M. Woodall (2)	J.K. Lowell (2)
S. Verdonckt-Vandebroek (1)	C.Y. Yang (2)	I. Mojzes (2)
		K. Shenai (1)

Number in parenthesis represents term.

\* Members elected 12/96

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# Upcoming Technical Meetings

## IEDM (continued from page 1)

IEDM 97 will feature an increased emphasis and a greater number of papers in the areas of device manufacturing, MEMs and RF devices. Reliable manufacturing techniques to control yield loss and factory flow are critical for the \$1 billion fabrication industry. MEMs (microelectromechanical) systems hold the promise of extending familiar silicon processing technology to integrated electronics with on-chip mechanical structures, making possible new types of sensors and motion control devices. RF (radio frequency) devices are becoming critical for many advanced communications systems.

IEDM 97 will feature more than 200 invited and contributed papers by authors from throughout the world on the latest advances in several areas, including:

- CMOS Devices and Reliability: Topics include device physics, performance and reliability of MOS structures, scaling, low and high temperature operation, SPI and device isolation.
- Detectors, Sensors and Displays: Reports on advances in theory, performance, modeling and fabrication processing of detectors, sensor devices and displays.
- Device and Interconnect Technology: Features advances in process integration, interconnect technology and process modules for the fabrication of CMOS, bipolar and BiCMOS devices.
- Integrated Circuits: Covers advances in device integration, circuit applications and related technologies. Areas of interest include process architecture for manufacturing, reliability, performance and testing.
- Modeling and Simulation: Topics include analytical, numerical and statistical approaches to modeling all types of electron devices, their isolation and interconnection.
- Solid State Devices: Reports on the theory and operation of smart-power ICs, bipolar, discrete power, high-voltage, DMOS, IGBT, superconducting, novel devices, SiGe and SiC devices and ICs.
- Quantum Electronics and Compound Semiconductor Devices: The areas of

compound semiconductor electronic and photonic devices and materials.

### Short Courses

A popular feature of the IEDM is the program of short courses held the Sunday before the conference formally begins. This year, the courses will be offered on Sunday, December 7. They provide attendees with the opportunity to learn about new and emerging areas and to benefit from the experienced lecturers who are experts in the field. They also include introductory material for general audiences.

This year the two Short Course subjects are "Giga-Scale CMOS Technology" and "Trends in RF Devices for Wireless Application". The courses are held at the same location as the conference and since they take place on Sunday, they offer the opportunity to take advantage of discounted airfares that include a Saturday night stopover. The registration fee for each Short Course is \$350 (for both IEEE members and non-members) and \$50 for students. Advance registration is required.

### Plenary Presentations

In addition to the regular paper sessions, the conference will include three plenary presentations dealing with developing technologies. This year's talks will be: "Chipcards - The Application Revolution" by Ulrich Hamann, Siemens Semiconductor Division, in Munich; "Multimedia - Future Impact for Semiconductor Technology" by Hajime Sasaki, NEC Corporation Sr. Executive Vice President; and "Limits of Optical Lithography" by Tim Brunner, IBM, Fishkill, NY.

### James Early is the Luncheon Speaker

The year 1997 marks the 50th anniversary of the invention of the transistor and this year's invited luncheon speaker will be James Early, one of the early researchers of the transistor. A past IEDM presenter, he will share his memories of the early solid-state technology development efforts.

### Panel Sessions

IEDM 97 will continue the tradition of holding evening panel sessions on important subjects of interest to the electronics community. This year the topics will be:

"Manufacturing in the Next Millennium - Is There a Role for Captive Semiconductor Suppliers?" led by Dr. Paul Fahey, Intel; and "Lithography Solutions for Sub-0.13 Micron - Is There a Place for Optical Lithography?" led by Bill Arnold, Advanced Micron Devices.

### Emerging Technologies

The IEDM also features an Emerging Technologies session where invited papers look at future trends in the industry. This year the topics will include: "Neural Microelectronics" — Professor Tadashi Shibata, University of Tokyo; "Optical Interconnect Technologies for Si ULSI" — Professor David A.B. Miller, Stanford University; and "Organic Polymer Displays and Devices" — Dr. Dago M. de Leeuw, Phillips Research Laboratories Eindhoven.

### Late-News Papers

The submission date for regular papers has already passed but a limited number of late-news papers will be accepted for presentation. If you have very recent developments you wish to publish at the conference, please submit by September 17, one original of your proposed paper (including artwork) and 25 copies to Melissa Widerkehr, IEDM Conference Manager, Suite 270, 101 Lakeforest Boulevard, Gaithersburg, MD, 20877, USA. Accepted late-news papers and accompanying figures will be printed as received in the Technical Digest. Submission of a late-news paper for review will be considered by the review committee as consent from the author for its publication, if accepted.

### Further Information

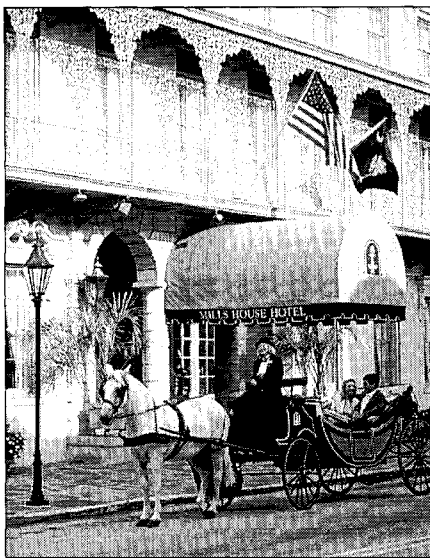
For registration and other information, visit the IEDM 1997 home page on the World Wide Web at <http://www.ieee.org/conference/iedm> or contact Conference Managers Melissa Widerkehr and Phyllis Mahoney, Suite 270, 101 Lakeforest Boulevard, Gaithersburg, MD 20877, USA; TEL: (301) 527-0900; FAX: (301) 527-0994.

Howard Masto  
Masto Public Relations  
Latham, NY

# 1997 Semiconductor Interface Specialists Conference (SISC)

The 1997 IEEE Semiconductor Interface Specialists Conference (SISC) will be held December 4-6, 1997 in Charleston, SC, immediately prior to the IEDM. The SISC provides a unique forum for device engineers, solid-state physicists, and materials scientists to discuss issues of common interest. Principal topics for discussion at SISC are semiconductor interfaces, the physics of insulating thin films, and the interaction among materials science, device physics, and state-of-the-art technology. The conference emphasis is on silicon-based devices, including the Si-Ge and SiC systems. An important goal of the conference is to provide an environment that encourages an interplay between scientific and technological issues. Invited and contributed talks, as well as a lively poster session, are presented in a setting designed to encourage discussion. Conference participants also enjoy numerous opportunities for informal gatherings.

This year will be the twenty-eighth meeting of SISC. The "Interface Specialists Conference" was first held in 1965 and attendance was by invitation. The hot topic of the day was sodium contamination in  $\text{SiO}_2$ . Starting with the fourth meeting held in 1973, the conference has been held annually. By then, the word "Semiconductor" had been added to the conference name. The SISC now alternates between the east and west coasts, and meets just before the IEDM. Abstracts for contributed talks are typically due in early August. While SISC has remained focused on silicon-based technology and the Si/SiO<sub>2</sub> system, topics have evolved as the state-of-the-art has advanced. Invited speakers for this year's conference foreshadow topics at the conference, and are as follows. Various aspects of the characterization of the Si/SiO<sub>2</sub> system will be the topic of three talks. Nelson Saks of Naval Research Labs will discuss electrical measurements in his talk, "Characterizing Individual Interface Traps With Charge Pumping"; H.J. von Bardeleben from the University of Paris will focus on thin dielectrics in "EPR Studies of Interfaces and Volume Defects in Si/SiO<sub>2</sub> Structures with Ultra-thin ( $<40 \text{ \AA}$ ) Oxide Layers"; and an unusual and exciting technique will be presented by J. P. Pelz of the Ohio State University in "Nanometer-Scale Studies of



Oxide Charging And Hot-Electron Effects In MOS Structures Using Ballistic Electron Emission Microscopy". "Experimental and theoretical aspects of Si/SiO<sub>2</sub> structural characterization using XPS" will be presented by Mark Banaszak Holl and Mark Hybertsen (Bell Labs). Dr. Holl will discuss his results in "Soft X-Ray Photoemission And Surface Infrared Studies of Model Silicon/Silicon Oxide Interfaces: Does The Data Support A Fundamental Re-examination of How We Assign XPS Spectra of The Si/SiO<sub>2</sub> Interface?"; Dr. Hybertsen will discuss the theoretical side of this issue in "Theoretical Study of Atomic Scale Processes at Si(001)-SiO<sub>2</sub> Interfaces". The technological side of the conference will be represented by the important and emerging field of SiC-based devices, and by a discussion of "Flash Memory Technology." John Palmour of CREE Research will present a review in "Present Status of Oxides on SiC", and K. Yoshikawa of Toshiba will discuss "Flash Memory Technology and its Reliability Issues Associated with Si/SiO<sub>2</sub> Interface".

The formality of the invited and contributed talks is complemented by several informal settings designed to encourage lively discussion and debate. At the poster reception on Thursday evening, a spread of finger-foods, wine, and cheese will encourage interaction among poster authors and other conference participants. There are no scheduled talks on Friday afternoon, to allow time to meet informally and to explore the historic city

of Charleston. On Friday evening the conference hosts a banquet and awards ceremony, complete with the now-famous (and always riotous) limerick contest. You are sure to be approached for a limerick contribution, so unleash your literary zeal and enjoy the fun! The limericks never fail to give the conference events an entirely new perspective!

This year's SISC will continue the tradition of presenting an award memorializing Prof. E. H. Nicollian. The award will be given for the best student presentation. Ed Nicollian was a pioneer in the exploration of metal oxide semiconductor (MOS) systems. His contributions were important to establishing SISC in its early years, and he served as the Technical Chair in 1982. With John Brews, he wrote the definitive book *MOS Physics and Technology*.

The 1997 SISC will be held at the Mills House Inn, 115 Meeting Street, Charleston, SC 29401. In 1853, the Mills House was considered the finest hotel south of New York City. By 1967, however, it was discovered that the building was not structurally sound, and so the hotel was torn down and a replica was built in its place. Throughout the construction of the Mills House, there was meticulous attention to detail, both exterior and interior. In restoring the hotel to its 1850's antebellum grandeur, over \$250,000 worth of period antiques were purchased. Plaster artisans who still performed the traditions of their grandfathers were brought in to duplicate ceiling, chandelier, and archway moldings. The Inn is located in the heart of the historic district, and is an easy walk from historic landmarks, charming shops, and wonderful restaurants. The Mills House Inn can be reached by TEL: (803) 577-2400; FAX: (803) 722-2112.

For registration information and general inquiries about SISC, please contact the Arrangements Chair, Dan Fleetwood at Sandia National Labs, PO Box 5800, MS 1083, Albuquerque, NM 87185-1083; TEL: 505-844-1825; FAX: (505) 844-2991; E-MAIL: dmfleet@sandia.gov. Also, we invite you to visit our web site at <http://www.coe.uncc.edu/~edwards/sisc97/home.html>.

Len Trombetta  
University of Houston  
Houston, TX

# 1997 GaAs IC Symposium



No matter what the mode of communication - be it digital voice and data over fiber and wireless networks, or television via cable and satellite - today's most advanced systems continue to look to GaAs and related compound semiconductor integrated circuits to deliver the key performance requirements. Wireless telephone, the Internet backbone, satellite TV, and digital cable TV all rely on GaAs IC technology. Already, hundreds of millions of GaAs IC products are put to use providing entertainment and communication to millions of consumers and businesses. The theme for the 1997 IEEE GaAs IC Symposium is "Technology Debate for High-Growth Communication Markets." This conference is the premier conference providing coverage of high speed IC applications and technologies.

Bill Stanchina and the Technical Program Committee have organized an excellent program that will provide a clear view of the present technology capabilities, and stimulate considerable debate about the future. Power Amplifiers for wireless applications, high speed digital communications, high speed computing, and device technology and reliability will be featured in the 61 paper sessions and in the 4 panel sessions. We are especially thrilled with the quality of the sixteen invited papers that form the framework of the twelve technical sessions.

This year's technical sessions reflect the international scope of the Symposium, with nearly 50% of the papers coming from outside the U.S. Some of the subjects featured in the sessions include: III-V compound semiconductor MOSFETs, low distortion

HBT circuits, low noise HBT Circuits, a 77 GHz T/R MMIC chip set for automotive radar, 10 GB/s switching circuits, 40 GB/s optical transmission circuits, and GaAs delta sigma converters. Also represented are GaAs micro-electro-mechanical systems, and flip-chip micro bump bonding technology. Some of the research presented may create major shifts in the way we approach building tomorrow's systems.

For a complete listing of the technical program, please visit the GaAs IC Symposium web site at: <http://www.eecs.umich.edu/VLSI/GAASIC> or contact Bill Stanchina, Hughes Research Laboratories; TEL: (310) 317-5089; FAX: (310) 317-5483; E-MAIL: [wstanchina@msmail4.hac.com](mailto:wstanchina@msmail4.hac.com).

Top industry experts will present the Short Course, "IC Technology for Wireless Communications beyond 2000," offered Sunday, October 12. Organized by Mark Wilson, the course starts off with an overview of technology requirements. The complete course covers ion implanted and epitaxial MESFET, HBT, PHEMT, and silicon RF MOS. Our two Vendor Product Forums have become among our most popular features because they provide technical coverage of the latest products hitting the streets. Both will feature Wireless Integrated Circuits. Here, participants can learn of products too hot to publish!

The four Panel sessions are the place to debate what makes the best linear power amplifier, how to simulate a circuit, what makes the most reliable PHEMT device, or how to build a 40 GB/s communication

system. Expert panelists and controversial topics ensure a lively debate of the critical technology points. Another popular feature that has become a tradition at the Symposium is the Primer Course. This is the perfect introduction to the next three days for those new to GaAs, or for those who just want to get a better grasp of the basics.

To complement the full technical program, we have provided some time for social interactions as well as an opportunity to interact with the exhibitors while catching up with the newest technology available on the market. The Sunday evening Opening Reception is the place to renew friendships and make new acquaintances. The Tuesday night Theme Party will be conveniently held at the hotel; be prepared for lots of great food and entertainment.

Exhibitors will display, and introduce you to new products at the GaAs Technology Exhibition, which opens Monday evening. Vendors of processing equipment, wafers, epitaxial material, packaging, test equipment, simulation software and more will be there. The Technology Exhibition is a perfect complement to the technical program, and will help the participant fully absorb the state of the GaAs Industry.

For the first time this year, we have guaranteed the Exhibition Luncheon held Tuesday. This interaction between the exhibitors and the attendees greatly enhances the Technology Exhibition. To make this possible we have begun a program for corporate benefactors to help support the Symposium. This year, I would especially like to thank Anadigics, and RF Micro Devices for their support. If your company would like to participate in this program next year, please contact Bill Stanchina.

Anaheim is a beautiful place in October, and is an easy drive to many Southern California attractions, including Disneyland, Knotts Berry Farm, and, of course, the beaches. This is the perfect time to bring the family along, extend your stay and have some fun before or after the Symposium. For registration information, please refer to <http://www.eecs.umich.edu/VLSI/GAASIC>, or contact Ms. Jaelene Slaven, Registrar, 1997 IEEE GaAs IC Symposium; TEL: (908) 562-3875; FAX: (908) 981-1203; E-MAIL: [j.slaven@ieee.org](mailto:j.slaven@ieee.org).

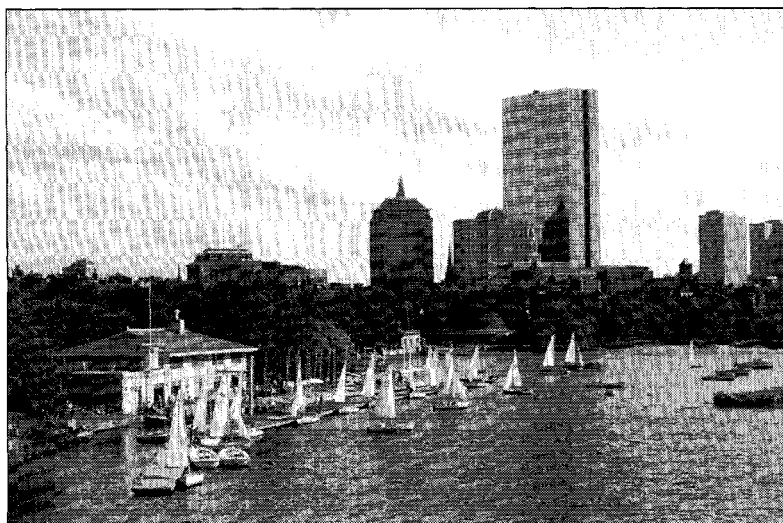
Join us at the 1997 IEEE GaAs IC Symposium. You won't want to miss this one!

*Phillip Wallace, Symposium President  
ANADIGICS, Inc.  
Warren, NJ*



# 1997 Intelligent Transportation Systems Conference (ITSC)

## *Brings A Broad IEEE Participation to Intelligent Transportation Systems*



Photograph supplied by the Greater Boston Convention & Visitors Bureau, Inc.

The Boston Park Plaza Hotel in downtown Boston, MA is the site of the first IEEE Conference on Intelligent Transportation Systems, November 9-12, 1997. The ITSC '97 provides a major milestone in the involvement of the IEEE in the rapidly evolving field of Intelligent Transportation Systems (ITS). Designed as a professional level meeting emphasizing high quality presentations on important ITS technical and system topics, the conference begins on November 9, 1997 with four parallel tutorial sessions. The Opening Session and conference technical sessions will begin November 10th.

The conference features three separate plenary sessions with leading industry speakers. The opening session will feature Mr. Richard Weiland who has been a national leader and focal point for coordinating the development of ITS standards. On Tuesday, a four member panel of international experts will present "A Perspective on Key ITS Technologies," including navigation and position location, communications, automated vehicle control, and in-vehicle information systems. A highlight of Wednesday will be the closing plenary where Dr. Kan Chen will provide a special presentation on "The Past, Present and Future of ITS: A Personal Perspective."

Five parallel technical sessions will be maintained through much of the conference to provide ample opportunity to cover a broad range of ITS technical topics. The sessions will include a mix of both invited sessions on selected ITS technical topics as well as sessions arranged around peer reviewed papers received in the excellent

response to the Call for Papers. Some of these timely and challenging technical issues will include:

- Communication design and system tradeoffs associated with deploying ITS
- Vision technology applications to ITS
- Partial and fully automated vehicle control design
- Microprocessor and computer applications to ITS systems
- Navigation and vehicle location technologies
- Analytic and algorithmic issues in communications and control
- Systems design as influenced by the national architecture
- ITS standards development technical issues

The IEEE has a very successful history in organizing international conferences associated with ITS. These have included the Vehicle Navigation and Information Systems (VNIS) and Intelligent Vehicle Systems (IVS) series of conferences. With ITSC '97, seventeen IEEE societies are cooperating together to host this major conference which will focus on ITS technologies and systems. The seventeen societies comprise the IEEE Intelligent Transportation Systems Committee (ITS) of the Technical Activities Board, representing the broad range of technical and system aspects of ITS. Of these, seven societies advanced the funding to support this first ITSC '97. The seventeen societies are:

- Aerospace and Electronic Systems
- Antennas and Propagation
- Communications

- Consumer Electronics
- Control Systems
- Electron Devices
- Electromagnetic Compatibility
- Industrial Electronics
- Instrumentation and Measurement
- Microwave Theory and Techniques
- Power Electronics
- Professional Communication
- Reliability
- Robotics and Automation
- Signal Processing
- Systems, Man, and Cybernetics
- Vehicular Technology

ITSC '97 is focused on a broad range of technical and system disciplines; not just electronics. This is in keeping with the nature of major systems development that today is strongly interdisciplinary and the wide technical scope of ITS itself. To further assure this perspective, additional international conference supporters were invited. The conference is proud that it has the participation of the following supporters:

- American Association of State Highway and Transportation Officials
- German Institute of Navigation
- International Bridge Tunnel and Turnpike Association
- Institute of Electrical Engineers
- Institute of Navigation
- Institute of Transportation Engineers
- Intelligent Transportation Society of America
- Intelligent Transportation Society of Massachusetts
- University of California, Berkeley PATH Program
- Royal Institute of Navigation
- Society of Automotive Engineers
- US Department of Transportation
- Vehicle, Road and Traffic Intelligence Society (VERTIS)

ITSC '97 is occurring at a significant time in the development, deployment and operational use of ITS. In North America, the program now has over five years of major research and development completed and the experiences gained from over seventy on-going and completed field operational tests. In addition, the program has completed a major multi-year development of a national systems architecture and has launched a major research initiative in automated vehicle control systems. In Europe and

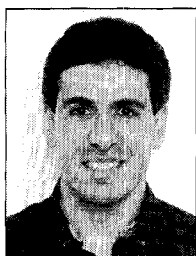
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## Society News

### 1996 Paul Rappaport Award

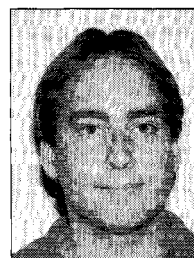
The Paul Rappaport Award is given each year to honor the author(s) of the best paper that has appeared in an EDS publication in the preceding calendar year. The recipient(s) is awarded a certificate and a check for \$1,000, presented at the International Electron Devices Meeting (IEDM).

The paper entitled "A Single-Transistor Silicon Synapse" by C. Diorio, P. Hasler, B.A. Minch, and C.A. Mead was recognized as the best paper appearing in an EDS publication in 1996. The paper was published in the November 1996 issue of *IEEE Transactions on Electron Devices*. The 1996 award will be presented at the IEDM on December 8, 1997 in Washington, D.C. The following are brief biographies of the four winners.



Chris Diorio received his B.A. in physics from Occidental College in 1983, and his M.S. in electrical engineering from the California Institute of Technology in 1984. He is presently employed as a Senior Staff Engineer at TRW, Inc., and has been employed as a Senior Staff Scientist at American Systems Corp., and as a Technical Consultant at The Analytic Sciences Corp. His industrial experience ranges from mixed-signal GaAs/AlGaAs IC design to spacecraft systems engineering. He returned to Caltech in 1992, to study neu-

romorphic microelectronics design with Professor Carver Mead, and he received his Ph.D. in Electrical Engineering in 1997. His doctoral thesis describes a family of single-transistor floating-gate MOS devices useful for analog integrated-circuit design, silicon neural networks, and modeling neurobiology in silicon. In July, 1997, he will join the faculty of the School of Computer Science and Engineering at the University of Washington, Seattle, WA. Dr. Diorio is interested in computation—particularly neuronal computation—and in developing computing systems modeled after neurobiology. He is a member of the IEEE.



Paul Hasler received his B.S.E. and M.S. degrees in electrical engineering from Arizona State University in 1991. He received his Ph.D. in Computation and Neural Systems from the California Institute of Technology in 1997. His doctoral thesis derives a model of the impact-ionization and hot-electron injection processes in MOS devices from the time-varying Boltzmann transport equation, and describes how to use continuously valued oxide currents in adaptive floating-gate MOS circuits. In the fall of 1997, he will join the faculty of the School of Electrical Engineering at The Georgia Institute of Technology. His research interests include using floating-gate MOS transistors to build adaptive systems in silicon, investigating the solid-state physics of floating-gate MOS devices, and modeling high-field carrier transport in Si and SiO<sub>2</sub>. Dr. Hasler is a member of Tau Beta Pi, Eta Kappa Nu, and the IEEE.



Bradley A. Minch received the B.S. degree with distinction in Electrical Engineering from Cornell University in 1991. He received the Ph.D. degree in Computation and Neural Systems from the California Institute of Technology in 1997. His doctoral thesis describes the analysis,

### ITSC '97 (continued from page 6)

Japan, similar major accomplishments including system development and field demonstrations have been completed.

With this base, the ITS program is now transitioning to a much more significant commitment to implementation and deployment. This includes major public and private efforts in systems associated with traffic management, traveler information, transit management and operations, and commercial vehicle operations. It also includes an acceleration of the development of user products and services by private industry for specific ITS markets.

This evolving ITS program direction is now placing considerable emphasis on the development of a very wide range of standards to support the growth in these various markets and to assure the interoperability of systems where needed. The IEEE is a major participant in these standards developments including such areas as data dictionaries, message sets, and vehicle to roadside communications issues.

However, as the ITS program matures and more emphasis is placed on markets and operational use, many substantial technical challenges are found. Significant issues facing the program range from near

term frequency and communications protocol questions to selection of preferred system approaches for longer range automated vehicle control systems. ITSC '97 will provide a professional technical forum for presenting and discussing current views, developments and relevant technical activities associated with the broad spectrum of ITS systems issues.

With this being the first IEEE Intelligent Transportation Systems Conference, a metropolitan area was desired that included a significant scientific and engineering community. Sites were considered throughout the United States and Boston was selected to host ITSC'97. With its major university community, substantial scientific and research community, and active participation in the ITS program, Boston is an excellent setting. ITSC'97 is planned to be held in the future on at least a bi-annual basis, and future conference sites will include both international as well as other US cities.

We hope you will participate in ITSC'97, November 9-12, 1997. We also invite you to visit the ITSC '97 website for further information at <http://www.ieee.org/itsc/itsc97>.

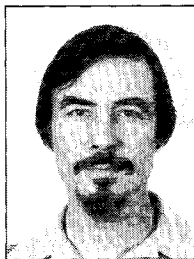
Lyle Saxton  
ITSC'97 General Chairman,  
Broad Run, VA

(continued on page 8)

## Rappaport Award

(continued from page 7)

synthesis, and implementation of a class of translinear circuits that accurately embody product-of-power-law relationships in the current signal domain. In the fall of 1997, he will join the faculty of the School of Electrical Engineering at Cornell University. His research interests include analog and digital integrated circuit design, the use of floating-gate MOS transistors to build adaptive information processing systems, and silicon models of neural computation. Dr. Minch is a member of the Tau Beta Pi, Eta Kappa Nu, and Phi Kappa Phi honor societies. He also is a member of the IEEE.



Carver A. Mead, Gordon and Betty Moore Professor of Engineering and Applied Science, has taught at the California Institute of Technology for more than 30 years. His current research and teachings are in the areas of VLSI design, neuro-morphic systems engineering, and the physics of computation. Dr. Mead has written or co-authored over 100 publications in microelectronics, solid-state physics, and biophysics, including the standard text for VLSI design, *Introduction to VLSI Systems*, which he co-authored with Lynn Conway.

His more recent work is concerned with modeling neuronal structures in silicon. His book on this topic, *Analog VLSI and Neural Systems*, was published in 1989 by Addison-Wesley. Professor Mead is a member of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences, a foreign member of the Royal Swedish Academy of Engineering Sciences, a Fellow of the American Physical Society, a Fellow of the IEEE, and a Life Fellow of the Franklin Institute. He is also the recipient of numerous awards, including the Centennial Medal of the IEEE.

Steven J. Hillenius  
Lucent Technologies, Inc.  
Murray Hill, NJ

## Announcement of the EDS/IEICE "Sister Society" Agreement

Since 1993, the EDS has had a strong initiative to expand its relationships with other electron device related technical societies on an international basis.

In 1994, the EDS negotiated a "sister society" agreement with the Japan Society of Applied Physics (JSAP). Such an agreement allowed for "member" presentation of papers in the other society's meetings, reduced journal subscription rates, and "member rate" registration fees at either JSAP or EDS technical conferences. The EDS and JSAP are presently in the process of renewing their "ground breaking" international agreement.

In 1996, following in the spirit of this first agreement, the Region 10 Technical Representatives of the EDS AdCom, J. Clemens and K. Tada, negotiated a similar "sister society" agreement with the Electronics Society (ES) of the Japanese Institute of Electronics, Information and Communication Engineers (IEICE). The agreement was approved and signed by both societies in the first quarter of 1997.

Effective June 1, 1997, the Electron Devices Society (EDS) members and the Electronics Society (ES) members were granted the same "member" privileges as EDS had negotiated with the JSAP.

With this agreement, members of EDS may subscribe to the *IEICE Transactions on Electronics* (TE) and members of ES may subscribe to *Electron Device Letters* (EDL) and *Transactions on Electron Devices* (TED) at reduced "sister society" rates. The *IEICE Transactions on Electronics* are monthly transactions composed of original research

papers, letters and invited papers in the field of electronics, including the following areas: Integrated Electronics, Electronic Circuits, Semiconductor Materials and Devices, Quantum Electronics, Opto-Electronics, Superconductive Electronics, Ultrasonic Electronics, Electronics Display, Microwave and Millimeter Wave Technology, Vacuum and Beam Technologies, Electron Tubes, Recording and Memory Technologies, Instrumentation and Control and Electromagnetic Theory.

If you would like further information

concerning these agreements or order forms for either the *Japanese Journal of Applied Physics* (JSAP) and/or the *Transactions on Electronics* (ES - IEICE), please contact the EDS Executive Office (contact information listed on page 2). Order forms will also be included in upcoming issues of *Electron Device Letters* and *Transactions on Electron Devices*.

James T. Clemens  
Lucent Technologies, Inc.  
Murray Hill, NJ

Kunio Tada  
University of Tokyo  
Tokyo, Japan

## 1997 EDS Region 10 Chapters Meeting



This is the second Region 10 Chapters Meeting. The first one was held on November 6, 1995 in Hong Kong. This meeting took place on June 8, 1997 in Kyoto, Japan at the same location as the EDS sponsored VLSI Symposia which started a day before the meeting. The meeting began at 4 p.m. The attendees included

representatives from seven chapters, four EDS AdCom members, and two representatives from other IEEE Division I societies. Listed alphabetically by chapter, the representatives were: He Qian (Beijing), Charles Surya (Hong Kong), K.S. Chari (India), M.K. Radhakrishnan (Singapore), C.Y. Lu (Taipei), Chichiro Hamaguchi,



Hisatsune Watanabe, Masao Fukuma, Kenji Taniguchi (Tokyo), and Dao Khac An (Vietnam, formation in progress). The AdCom members present were: Herbert S. Bennett, James B. Kuo, Kunio Tada, and the meeting host, Cary Y. Yang. They were joined by Dennis Olsen from CPMTS and Lewis M. Terman from SSCS.

The meeting began with self-introductions by all participants, followed by a presentation by Cary Yang on EDS chapter statistics, and AdCom activities, structure, and personnel. The participants showed much interest in the new Chapter Partners Program, and each chapter representative was invited to submit his chapter's choice of partners to the Executive Office prior to the final determination by the Regions/Chapters Committee.

The bulk of the meeting was devoted to

presentations by chapter representatives. Each presenter submitted his set of transparencies or notes to the meeting host. These will be compiled by the Executive Office and will be available to any interested parties. Several important issues were raised during these presentations, both by the presenters as well as the audience. These issues are highlighted as follows.

Chapters in India and China, and the representative from Vietnam are concerned about the high cost of IEEE membership and the difficulties encountered in paying in US currencies. Possibilities of membership fee subsidies, at least for the short term, are suggested. There seems to be a good opportunity in forming a student chapter in the Beijing Section, and He Qian is asked to follow-up with the Executive Office on exploring the possibility. Despite the fact that Region 10 is

the fastest-growing region in terms of EDS membership, several chapter representatives are inclined to believe that membership can be further increased by creating additional incentives for professionals to join, especially those working in industry. In Taiwan, many companies provide subsidies for membership fees, but that did not seem to result in significant membership growth in the past five years. A policy to provide travel support for chapter representatives to attend AdCom meetings is suggested. Finally, the possibility of holding this meeting annually instead of biannually is mentioned.

The meeting was adjourned at 6:40 p.m., followed by a Japanese banquet of traditional Kyoto cuisine.

Cary Y. Yang  
Santa Clara University  
Santa Clara, CA

## Changes to the EDS Bylaws

At its May 4, 1997 meeting, the EDS AdCom approved changes to the EDS Bylaws. These changes deal primarily with two areas:

1) EDS should specify a procedure for nomination and election of the Society Officers. Section 5 has been revised, and a new Section 6 has been added (resulting in renumbering of the subsequent sections). Section 6 gives details of the nomination procedure. Nominations for officers may now be made by the Nominations Committee and by members of the AdCom.

2) EDS must also maintain a flow of new electees on to the AdCom each year. AdCom electees can serve two three-year terms, and the terms are staggered so that if everyone serves two terms, about half the slots available at the election each year would be filled by new electees, and half by second term electees. This ensures a continuing flow of new people on to the AdCom. However, the balance can be upset if, for example, a first-term person chooses not to run for a second term. The worst-case scenario is that for three years all slots are filled by people running for their second term, and no new persons get on AdCom. New Bylaw 4.6 allows the AdCom to designate a vacancy to be filled by an electee who cannot run for re-election.

The revised Bylaw sections are included in this article. The complete Constitution and/or Bylaws may be obtained from the EDS Executive Office.

### *Bylaws of the IEEE Electron Devices Society*

(Approved by the EDS Administrative Committee on May 4, 1997)

1 - 3 — No Changes

4. Nomination and Election of AdCom Members-at-Large - The Nominations Chair shall be appointed by the Society President by September 1 from the membership of the AdCom. The slate of candidates shall be determined by consultation with both members and non-members of the AdCom and shall be approved by the elected officers.

4.1 The Nominations Chair shall direct the Editor of the Society publication going to all members to publish a notice of the forthcoming election of AdCom members and the provisions of these Bylaws pertaining to self-nomination of AdCom Members-at-Large. Such notice shall be published at least two months prior to the deadline for self-nominations.

4.2 - 4.5 — No Changes

4.6 In order to restore or maintain a balance between vacancies to be filled at an election by first-term electees and those potentially to be filled by second-term electees, the AdCom may designate one or more of the vacancies to occur on the AdCom at that election as representing seats which are ineligible for re-election; a candidate elected to and accepting such a seat must wait at least one year following the completion of the three year term

before standing for re-election.

5. Officers — Article V, Section 3 of the Constitution provides for the annual election of a President, Vice President, Secretary, and Treasurer, who shall be the officers of the Society.

5.1 - 5.5 — No Changes

6. Nomination and Election of the Society Officers:

Concurrent with the election of incoming AdCom members, the AdCom shall conduct an election to fill the offices of President, Vice-President, Secretary and Treasurer for the succeeding calendar year.

6.1 The Nominations Chair, with the advice and consent of the two Past Presidents, shall put forth a slate of at least one candidate for each position. All candidates must have expressed a willingness to serve if elected, must be members in good standing of the Society, and must meet the eligibility requirements of Article V Section 3 of the Society Constitution.

6.2 Nominations for any of the officer positions may be made by a voting member of the AdCom, seconded by another voting member of the AdCom. Such nominations shall be received by the Nominations Chair at least 45 days prior to the election, and shall be included in the slate of candidates. The origin of all nominations shall be shown on the ballot.

6.3 The Nominations Chair shall cause the slate of candidates for the officer positions to be mailed to each member of the AdCom having full voting privileges at least 30 days before the annual election.

(continued on page 10)

## Bylaws

(continued from page 9)

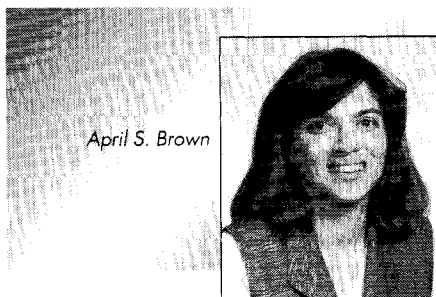
6.4 Concurrent with the election of incoming AdCom members at the annual meeting, the AdCom shall conduct an election to fill the offices of President, Vice-President, Secretary and Treasurer for the succeeding calendar year. A majority of votes shall determine election; if a majority is not attained, the candidate with the lowest number of votes shall be dropped, and a new election held.

Old Section 6 becomes (new) Section 7, etc....

7 - 15 — No Changes

Lewis M. Terman  
IBM Research Center  
Yorktown Heights, NY

## STAR Program Update



April S. Brown

STAR (Student-Teacher and Research Engineer/Scientist) is an educational outreach program founded by the IEEE EDS and MTTs to address the concern that girls develop biases against careers in mathematics, science, and engineering at a

young age. One objective of the program is to make sure that we have access to as large a pool of engineering talent as possible in the future. Another objective is to provide educational activities to the society member. The STAR program is constructed to bring together society members with local junior high and high school teachers and students to inspire a positive image of engineers and their careers. We have had a number of successful STAR programs funded by EDS highlighted in previous issues of this newsletter.

In order to facilitate the initiation of a STAR program by an interested IEEE member, we are planning changes in the program. One significant change is the adoption of the program by the IEEE Women in Engineering Committee. This committee will construct the program so that it can be utilized by any IEEE Society or Chapter (such as Student Chapters) as well as any IEEE Section. The EDS Executive Office supplies information for members participating in the program. The Women in Engineering Committee will continue and expand this practice. In addition, the committee will forge links to educational organizations in order to establish pools of teachers and programs IEEE can partner with under the STAR program.

We have had tremendous interest by members in this program. We hope that these changes will aid members in starting a STAR program. One issue has been finding the schools and teachers interested in partnering with the IEEE. These changes should greatly facilitate this practice.

If you are interested in the STAR program, please contact: April Brown, 212 Pettit Building, School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA 30332; E-MAIL: april.brown@ieee.org; or Karen Moore, Motorola Inc., 2100 East Elliot Road, MD EL508, Tempe, AZ 85284.

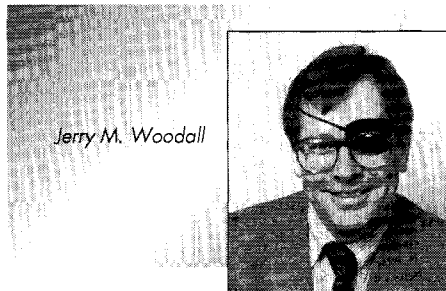
April S. Brown  
Georgia Institute of Technology  
Atlanta, GA

## Engineer Receives Award For Inventions

A Purdue University professor has received national recognition for his invention of components used in cellular phones, mobile computing, TV remote controls and many other consumer electronic devices.

Jerry M. Woodall, the Charles William Harrison Distinguished Professor of Microelectronics, received the Eta Kappa Nu Vladimir Karapetoff Eminent Members' award for 1997. The award recognizes inventions or discoveries that have had significant impact on society and have enhanced public welfare. Woodall received the award, and a \$2,500 honorarium, at a May 5th awards banquet in New Jersey. Eta Kappa Nu is the national honor society for electrical engineers. Woodall's electronic components are called heterostructures or compound semiconductors because they are made from more than one type of material. Previously, semiconductors were made from all one material, such as silicon.

Woodall pioneered the use of a technique called liquid phase epitaxy to invent and fabricate semiconductors using gallium arsenide, and heterostructures using gallium arsenide and gallium aluminum arsenide. The technique allows researchers and manufacturers to build such devices one thin layer at a time. At



Jerry M. Woodall

least half of the estimated \$4 billion compound semiconductor market is based on fabrication methods and devices invented by Woodall.

Woodall said that these types of semiconductors play a central role in lasers, light-emitting diodes and state-of-the-art solar cells. They also are the basis for cellular phones and consumer electronics such as compact disc and laser disc entertainment technology and optical storage technology. The semiconductors also are used in infra-red remote control and signaling devices that not only change TV channels, but also allow data transfer in notebook and laptop computers. You may contact Woodall at TEL: (765) 494-0732; FAX: (765) 494-2706; E-MAIL: j.woodall@ieee.org.

Amanda Siegfried  
Purdue University  
West Lafayette, IN

# 1997 Bipolar/BiCMOS Circuits and Technology Meeting (BCTM) Honors Early Transistor Researchers

## Celebrating the 50th Anniversary of the BJT

The year 1997 marks the 50th anniversary of the invention of the bipolar transistor. In honor of this event, the BCTM, which will be held September 28-30, 1997, has invited a number of pioneers involved in seminal milestones in the development of bipolar/BiCMOS circuits and technologies for a special luncheon on Monday, September 29th. James Early will be the featured luncheon speaker. He will be accompanied by Jack Kilby, John Moll, Tak Ning, Tetsushi Sakai, John Shier, and Ray Warner; all of whom will be invited to give a brief anecdote from the early days.

The BCTM continues with the theme of last year, emphasizing the convergence of the fields of Computers and Communications, as this takes us into the information age and the 21st century. Integrated circuits combining telecommunication and computer applications, using high-speed analog and mixed signal digital circuitry will be a central element of future progress in the electronics industry. With this in mind, the short course and keynote speech this year both deal with the topics of RF technologies and telecommunications ICs. Additionally, as a result of the large number of RF-based design papers submitted last year, the

design committee was split this year into two: RF and an analog/digital.

This year's short course, which is entitled "Process, Packaging and Circuit Technologies for RF Applications" continues this theme. Three well known experts in the areas of RF technology, packaging and design will cover the basic topics and will discuss the issues and challenges in bipolar RF process development, packaging and passive components, and design for manufacturability.

The keynote speech, which will be given by Simon Atkinson of Analog Devices' Communications Division in the UK, is entitled, "The Outlook of Bipolar/BiCMOS for Future Telecom ICs." Mr. Atkinson will discuss future directions of telecommunications integrated circuits, surveying examples from throughout the industry.

There are 13 technical sessions, with three invited and 41 regular session papers. For the second year, there will be several late news papers to bring the latest in technical progress to the conference. As a new feature, there will be a panel discussion at the end of Session 1 on Monday morning, to allow a lively debate of several different techniques of statistical modeling of bipolar transistors. In support of our policy of encouraging student participation in BCTM, the conference participants will

be asked to vote for the best student paper award, which will be awarded at next year's conference.

There are two panel discussions Monday night. The first panel, entitled: "The Top Bipolar Circuit Ideas of All Time" ties in with the 50th anniversary theme. The second panel is called "What the Heck Are Universities Teaching Electrical Engineers?" and there will be a discussion between supervising professors and hiring managers of the state of engineering education. Finally, the 1997 BCTM is featuring an enhanced vendor exhibition, which is highlighted by a reception at lunchtime Tuesday.

Overall, the 1997 BCTM promises to be an exciting international conference. We express our great appreciation to the 1997 BCTM committee members for their outstanding job putting together an exciting program. It is a great pleasure to extend a hearty welcome to the 1997 IEEE Bipolar/BiCMOS Circuits and Technology Meeting in Minneapolis, MN.

For additional information and registration materials, please contact: Jan Jopke, 6611 Countryside Dr., Eden Prairie, MN 55346, TEL: (612) 934-5082; FAX: (612) 934-6741; E-MAIL: jjopke@aol.com.

John Leighton

VTC Inc.

Minneapolis, MN

## AdCom (continued from page 2)

vide leadership.

The site for the 1998 Spring AdCom Meeting was then discussed. A number of options were listed. Bruce Griffing proposed that it be held at the 1998 VLSI Symposia in Honolulu, HI, June 9-13, 1998. Other suggestions, including holding the meeting in Europe, were also discussed. It was generally felt that we should go to Hawaii, because of the strong Asian participation that would result, and that European attendance would probably continue as before.

CD ROM will come to the EDS! Steve Hillenius described a plan for introducing a CD ROM that contains our two primary journals, *Electron Device Letters* (EDL) and the *Transactions on Electron Devices* (TED), as well as the proceedings of the International Electron Devices Meeting (IEDM). The first distribution would be in March of 1998, at a cost estimated to be \$19K. They would be offered to members on both

a single sale and subscription basis at \$25/CD, which would allow EDS to recover its cost if 760 CDs are sold. A yearly CD ROM complements the current availability to member subscribers of accessing each issue of EDL and TED on the World-Wide Web at <http://www.opera.ieee.org>. The CD ROM Package will first be offered this Fall with the start of the 1998 billing cycle. Specifically, a 1997 CD ROM Package will be available which will include all 1997 issues of EDL & TED and the 1997 IEDM proceedings, as well as on-line access for members to all EDL and TED issues for 1997 and 1998. After discussing the issues involved, a motion was made to commit EDS to participate in this project. The motion passed unanimously.

### Treasurer's Report

Lu Kasprzak reported that the surplus for 1996 (\$620.7K) was higher than originally projected, primarily due to a larger than

expected return from conference activity, a good return on long-term investments and a larger surplus for *Transactions on Electron Devices*. This good news offset an absence of an expected \$113K return from the IEEE Book Broker Program.

EDS reserves now total \$3.8 million which is equal to 146% of our annual costs. Considering the amount of the EDS cash flow, it was moved and seconded that we transfer \$600K of our reserves into the IEEE Long-Term Investment Fund. The motion passed and the funds were transferred into the program as of July 1, 1997.

One uncertainty for future income is the option we currently offer for 'permanent' membership in EDS, at a cost of \$25. We currently have about 1,500 'permanent' members. It was moved and seconded that we keep the 1998 EDS membership fee at \$5/year (\$25 for 'permanent'); the motion passed.

(continued on page 16)

## Regional and Chapter News

### USA, Canada & Latin America (Region 1-6, 7 & 9)

#### Activities in Region 1 (Northeastern USA)

**ASMC '97 to Feature Keynote Speakers : MIT Economist, Lester C. Thurow and Dataquest Analyst, Clark J. Fuhs**

"The Quest for Semiconductor Manufacturing Excellence : Leading the Charge into the 21st Century" is the theme of the 8th Annual IEEE/SEMI Advanced Semiconductor Manufacturing Conference and Workshop (ASMC), which will be held on September 10-12, 1997 at the Hyatt Regency, Cambridge, Massachusetts. ASMC continues to be one of the most respected manufacturing conferences in the semiconductor industry, offering practical solutions on improving the semiconductor manufacturing process. In addition to an interactive workshop focusing on the status of 300mm manufacturing, the conference features 95 technical papers representing the world's leading semiconductor, semiconductor-equipment and materials manufacturers. Session themes include: Strategies for Process and Yield Monitoring, Effectively Managing and Modeling Yield, Simulations and Applications, Equipment Efficiency and Productivity, International Perspective, Advanced Processing, Deposition, Etch, RTP and Photoprocessing and Defect Detection.

The Cambridge Hyatt Regency, the site of this year's ASMC, is adjacent to the Charles River, and within a walking distance from MIT and Harvard. For further information, contact Margaret Kindling at SEMI, 805 15th St. N.W., Suite 810, Washington, DC 20005; TEL: (202) 289-0440; FAX: (202) 289-0441; E-MAIL: mkindling@semi.org.

#### The Lehigh Valley ED Chapter adds a Vice-Chairman

The Lehigh Valley ED Chapter added a Vice-Chairman for the remainder of the 97 term. The new Vice-Chairman is Shahriar Moinian of Bell Labs, Lucent Technologies, Reading, PA. Dr. Moinian received the B.S., M.S., and Ph.D. degrees in electrical engineering from the University of Southern

California, Los Angeles in 1982, 1983 and 1987, respectively. From 1987 to 1988, he was with Science Applications International Corporation working on advanced bipolar transistor processing and modeling. In 1988, he joined Bell Laboratories in Reading, PA. where he is presently a member of technical staff. His current interests include Modeling, CAD and simulation in the areas of Complementary Bipolar and BiCMOS. Welcome on board !

— M. Ayman Shibib, Editor

### Europe, Middle East & Africa (Region 8)

#### ED Sweden Chapter

— by Mikael L. Östling

The Spring 1997 activities had primarily been devoted to the co-sponsoring/co-organizing of the two conferences: GigaHertz '97 in Kista-Stockholm, October 23-24, 1997 and the International Conference on Silicon Carbide and III-Nitrides (ICSCIII-N'97) in Stockholm, August 31 - Sept. 5, 1997. The GigaHertz '97 is a Swedish national symposium on radio, telecommunication, radar and automotive electronics applications. The ED Sweden Chapter is sponsoring the best paper award at GigaHertz '97.

For further information, please contact the conference secretariat at: TEL: +46-8-7521405; FAX: +46-8-7527782; or E-MAIL: ghz97@ele.kth.se. The Conference

General Chair is Professor Mikael Östling. The home page can be found at <http://www.ele.kth.se/FTE/giga-hertz97.html>.

The ED Sweden Chapter also sponsored the best student paper award at ICSCIII-N'97. A technical seminar was held on June 11, where Professor Krishna Shenai, Editor-in-Chief of the EDS Newsletter and an EDS Distinguished Lecturer, talked about "Emerging Power Electronics Technologies." The day after, Professor Shenai acted as a faculty opponent to a Ph.D. thesis by IEEE student member Tord Karlin who presented his thesis, "Process Integration Issues for High-Performance Bipolar Technology." Tord is the Treasurer of the ED Sweden Chapter. A video short course on rf bipolar issues is planned for the Fall semester.

— Mikael L. Östling, Editor

#### MTT/ED/AP/LEO UK & RI Joint Chapter

— by Terry Oxley

The Chapter has continued with its 1997 program, currently totaling some twenty events. Since its report in the July issue of the EDS Newsletter, the Chapter has enjoyed two more evening lectures. In May, Dr. Steve Cripps presented a talk on "Class E Amplifiers - Facts and Fables" at the University of Wales in Cardiff, and in June, Dr. Joe Riley presented his talk on "The Use of Radar to observe the Flight of



A happy IEEE dominated celebration after a well conducted Ph.D. examination at the Department of Electronics, Royal Institute of Technology, Stockholm Sweden. From left: Prof Sture Petersson (Department Head), Prof. Mikael Östling (ED Sweden Chapter Chair), Prof. Krishna Shenai (EDS Newsletter Editor and EDS Distinguished Lecturer), and Tord Karlin (new Ph.D. and ED Sweden Chapter Treasurer)

Insects at both High and Low Altitudes" at Kings College, London. Activities scheduled to occur during the period of July to September include the quarterly Chapter AdCom Meeting at The University of Leeds on September 18th, which will be followed by a lecture by Professor David Rhodes. The following day, September 19, 1997, the "3rd High Frequency Post-Graduate Colloquium" will be held. This most successful event originated by the Chapter is growing in popularity each year. During September 30 - October 2, a Chapter Membership Stand is organized for the "Microwaves and RF Conference and Exhibition" at the Wembley Conference Centre London. Meetings during the last quarter of 1997 include:

- October: A lecture by Professor Rolf H. Jansen, from RWTH Aachen Technical University, at the University College Dublin, or Queens University, Belfast.
- November 24 - 25: The 5th IEEE International Workshop on "High Performance Devices for Microwave & Optoelectronic Applications" - EDMO '97, at Kings College, London. This event was extended from one to two days in 1996 to meet the growing interest.
- December 3: A lecture by Dr. Dave Palmer from the Philips Broadband Networks, on the topic of "MVDS" at Kings College, London. This will follow the year-end Chapter AdCom meeting.

In planning for 1998, it is anticipated that the program will be similar to the one in 1997. The program will include a "lecture series", "4th High Frequency Post-Graduate Colloquium", "Membership Booth at M+RF 98", "6th Workshop EDMO 98", and additionally will include the joint UK&RI, German and French sponsored "6th International Workshop on Terahertz Electronics".

For further information, please contact the Chapter Chair, Neil Williams, ERA Technology Limited, Cleeve Road, Leatherhead, Surrey KT22 7SA, UK.; TEL: +44 (0) 1372 367061; FAX: +44 (0) 1372 367099; E-MAIL: neil.williams@era.co.uk.

#### **ED/MTT Egypt Chapter**

— by Ibrahim Salem

Activities that were carried out by MTT/ED Egypt chapter included the following scientific lectures: "Active High Power RT Pulse Compression Using Optically Switched Resonant Delay Lines", by Dr. Samy Tantaawy, on March 24, 1997; "Millimeter Wave Power Combining", by Prof. Klaus Schuneman (presented by Prof. M. Mar-

zouk Ibrahim due to the illness of Prof. Schuneman) on March 25, 1997; and "Analysis and Design of Passive MMIC Packages Interconnects", by Dr. Hussein H. Mahmoud, on May 29, 1997.

The National Radio Science Committee held its 14th NRSC on March 23-25, 1997 at Cairo University. The conference included 13 papers on Fields and Waves Commission and 5 papers on Electron Devices Commission. The rest of the papers covered the other commissions of the URSI commissions.

Our chapter borrowed three IEDM videotapes from EDS and presented them to the members and the staff of the Ein-Shams-Faculty of Engineering. We plan to borrow other videotape courses later, as we find them valuable.

For further information, contact the Chapter Chair, Professor Ibrahim A. Salem, 17 Elqouba Street/3, Roxy Heliopolis, Cairo - 11341, Egypt; TEL: 202-349-8214; FAX: 202-263-6802; E-MAIL: isalem@brainy1.ie-eg.com.

#### **ED/MTT Greece Chapter**

— by Nikolaos Uzunoglu

Activities of the ED/MTT Greece Chapter include(d):

1) The organization of the Advance Study Institute on "Computational Electromagnetics" - State of the Art and Future Developments. This activity was held in the island of Samos, with an international participation. Topics that were covered during July 26 to August 5, summer School included: "Numerical Techniques," "Method of Moments," "Finite Element," "Finite Difference - Time Domain Techniques," "Transmission Line Techniques," "Technology Application" as well as the use of alternative techniques such as Method of Auxiliary Sources and Wavelet Approaches.

2) Preparation of a Continuing Education Course on "MMIC Technology" to be implemented during 1997-1998.

For further information, please contact the Chapter Chair, Professor Nikolaos K. Uzunoglu, National University of Athens, Dept. of Electrical & Computer Eng., Division of Electrosience, Heron Polytechniou 9 Street, Zografou 15773, Athens, Greece; TEL: 30-1-77223556; FAX: 30-1-7723557; E-MAIL: nuzu@zeus.central.ntua.gr.

#### **ED Israel Chapter**

— by Gady Golan

The IEEE EDS and Israeli Vacuum Society (IVS) joint meeting took place on May 8th 1997 in the Center for Technological Edu-

cation in Holon. The subject of the meeting was "Trends in the SC industry" and the sub-title was "Trends in the Photo-Voltaic Industry". Prof. Nathan Croitoru opened the meeting with some blessing words and gave his vision on future developments in the microelectronics industry. Prof. David Cahen from Weizmann Inst. (Head of IVS) gave a lecture on "Polycrystalline Photo-Voltaic Cells". Dr. Yona Siderer from Tamam IAI (Israel Aircraft Industry) gave a talk on "Photo-Voltaic Systems for Domestic Applications". Dr. Igor Lapsker from the Center for Technological Education talked about "Failure Mechanisms in SC observed in Scanning Electron Microscope SEM". Mr. Alex Axelevitch from the Center for Technological Education, spoke about "Linear Model Application for the Design of Thin Films". Dr. Gady Golan from The Center for Technological Education closed the meeting with the main topic "Semiconductor Manufacturing and Trends". His lecture was accompanied by the IEDM videotapes. About 90 people attended the meeting, most of them students from Holon. The next meeting is planned for December 4, 1997 at Tel Aviv University. It will be the annual meeting of IVS joint with IEEE-EDS. The title of this meeting will be: "Topics in the Modern ULSI Technology."

For more information, contact: Chapter Chair, Professor Nathan Croitoru, Tel-Aviv University, Faculty of Engineering, Dept. of Physical Electronics, Tel-Aviv 69978, Israel; TEL: 972-3-640-8138; FAX: 972-3-642-3508; E-MAIL: croitoru@eng.tau.ac.il..

— Terry H. Oxley, Editor

#### **ED/MTT France Chapter**

— by Robert Adde

The Chapter had an invited conference on May 20, 1997 held in cooperation with the Institut d'Electronique, University of Paris-South, Orsay. The guest was Dr. John K. Lowell, from Applied Materials and the University of Texas, who is an AdCom member and an EDS Distinguished Lecturer. The 90 minute enlightening presentation was on "New Advances in Optical Characterization of Materials". Dr. Lowell emphasized on second-harmonic generation and high-injection surface photovoltage characterization applied to silicon technology.

Throughout 1997, the Chapter has been a technical sponsor of and strongly involved in the organization of the meeting, Electromagnetic Sensors and their Applications, which will be held in Toulouse on November 27, 1997. The one-day meeting will include 4 invited papers, communica-



tions and posters. The themes are sensors for materials, non-destructive testing, remote measurements, speed sensors, electromagnetic badges, microwave radiometers and non contact energy receivers.

For further information on the meeting, contact the meeting secretary: TEL: (33) 05-61588372; FAX: (33) 05-61588377, E-MAIL: picq@len7.enseiht.fr

For information on the chapter, contact the chairperson: Henri Baudrand, ENSEIHT, Toulouse, France; TEL: (33) 0561588246; FAX: (33) 0561588377; E-MAIL: baudranh@len7.enseiht.fr.

— Robert Adde, Editor

## Asia & Pacific (Region 10)

### ED/LEO Australia Chapter

— by Chennupati Jagadish

A chapter web page is currently under construction to advertise chapter activities. Details of the chapter web page and address will be provided in the next issue.

Professor Jerry Woodall of Purdue University, EDS Educational Activities Chair and Distinguished Lecturer, is planning to visit the Chapter. Actual dates of the visit are not yet finalized. Professor Joachim Wolter of Eindhoven University of Technology, LEOS Distinguished Lecturer, is planning to visit the Chapter in November, 1997. Professor Jim Coleman of the University of Illinois at Urbana-Champaign, LEOS Distinguished Lecturer, is planning to visit the chapter during 1997/98.

The Conference on Optoelectronic and Microelectronic Materials and Devices (COMMAD '98) will be held in December 1998 in Perth, Western Australia. Further information can be obtained from COMMAD '98 Chair; Prof. Laurie Faraone; TEL: (09) 380-3104; FAX: (09) 380-1065; E-MAIL: faraone@ee.uwa.edu.au.

For further chapter information, please contact: Dr. C. Jagadish; TEL: (06) 249-0363; FAX: (06) 249-0511; E-MAIL: c.jagadish@ieee.org.

### ED/MTT India Chapter

— by K.S. Chari

The Chapter activities covered the following aspects :

- Two IEEE Video lending library short courses on "Low Voltage and Low Power Devices" and "Semiconductor Manufacturing" were screened at CSE Dept., IIT, Delhi and Solid State Physics Laboratory, Delhi on April, 2 and 25, 1997, respectively. About 60 researchers and students have attended these screenings.

- A workshop entitled "SOI Technology and Devices" was conducted on May 21, 1997, at Delhi by Dr. Sorin Cristoloveanu, Director LPCS at ENSERG, France and the IEEE Distinguished Lecturer. Representatives from industry, research and academic groups participated and had a lively discussion on the application of SOI Technologies.
- The Chapter had one executive-committee meeting on May 20, 1997 in conjunction with the visit of EDS Distinguished Lecturer, Dr. Sorin. Members interacted with Dr. Sorin over dinner and exchanged views.
- A talk titled "IT in 2000 and Beyond: Microelectronics and Software as Drivers" was given on May 30, 1997 at IETE, Delhi by Mr. S Ramakrishnan, Sr. Director, Department of Electronics, Delhi under joint effort with IEEE Delhi Section and IETE Delhi. Dr. K.S. Chari, Chapter Chair, delivered two talks on "Properties of Thermal Oxides on Single Crystal Silicon and Poly-Silicon Substrates" and "Interfacial Properties of Ultra-thin Oxides on Silicon" at Toshiba CRL and Hitachi DDC, Tokyo on the 11th and 13th of June, 1997.
- The Chapter Chair attended the EDS Region 10 Chapters Meeting held at Kyoto on June 8, 1997 and presented many issues of concern to the Chapter as well as few suggestions. Dr. Chari stressed the need for increased EDS funding to existing chapters to enhance their activities rather than focusing on creating multiple chapters within the countries.
- The Chapter Chair utilized his presence in Tokyo to visit the University of Tokyo. Professor Y. Arakawa, Institute of Industrial Science, hosted the visit of Chapter Chair to the IIS and RCAST on June 9, 1997.

For further information, please contact: Dr. K. S. Chari, Dept. of Electronics, CGO Complex, New Delhi; TEL: (011) 436-1464; FAX: (011) 436-3082; E-MAIL: chari@xm.doe.ernet.in.

### MTT/AP/ED Thailand Chapter

— by Narong Yoothanom

As an IEEE Chapter Chair and the President of the Engineering Deans Council of Thailand as well as the Engineering Dean of Thailand, I had organized a General Annual Meeting of the council and the First National Conference on "Engineering Education in Thailand" for three days, May 16-18, 1997, in the Rayong province. The number of participants was 210, repre-

sented many engineering colleges and universities in Thailand. The meeting and conference were very successful.

On May 19, 1997, the chapter and the Department of Electrical Engineering jointly invited Professor Dr. Tadashi Takano from the University of Tokyo and Institute of Space and Astronautical Science, Japan, to give a lecture on "Research and Developments on Applied Electromagnetics at ISAS" at Chulalongkorn University. The lecture lasted two hours. About 40 people from inside and outside the university were in attendance.

From May 21 to May 23, 1997, the chapter joined the Institute of Electronics, Information and Communication Engineers (IEICE, Japan), Chulalongkorn University and King Mongkut Institute of Technology-Ladkrabang (KMUTL) to organize a three day Joint Symposium on Antennas and Propagation at the Faculty of Engineering, KMUTL, Bangkok. There were 27 papers presented in English both from Japan and Thailand. Several papers came from the joint research between Japanese and Thai researchers. We had about fifty participants with a beautiful and impressive closing ceremony and a good-bye dinner with some Thai dance performances.

The chapter is now campaigning for more members in the three areas. We have been approached by several sectors to expand our joint chapter to cover more fields. The matter is now under the consideration of the committee.

For further information, contact: Prof. Narong Yoothanom, Dean of Engineering, Chulalongkorn University, Bangkok; TEL: (011) 66-2-2186308-10; FAX (011) 66-2-2536161; E-MAIL: feeny@kankrow.eng.chula.ac.th.

— Chennupati Jagadish, Editor

### Report on the 1997 Symposium on 0.01 $\mu$ m Si LSI Technology

— by Hiroshi Iwai

The 1st Symposium on 0.01  $\mu$ m Si LSI Technology (co-sponsored by JEIDA and SIRIJ and in cooperation with IEEE ED Tokyo Chapter, IEICE, and JSAP) was held in Tokyo on May 23, 1997. There were 165 people in attendance from Japan, Taiwan, and Korea. After the opening speech by Dr. H. Watanabe of NEC, Dr. T. Ikoma of TI Japan gave a keynote speech on "The Evolution of Semiconductor Technologies and Industries." There were also 11 invited talks given under the same title of "Fundamental Limits and its Breakthrough Possibility" on various items like Transistors, Interconnects, Lithography, and Circuits by Professors M. Koyanagi, T. Sakurai, Y. Yasuda and H.



Dr. T. Ikoma of TI Japan gave the keynote speech.

Kinoshita, and Drs. T. Toriumi, A. Matsuzawa, M. Yamashina, T. Mogami, S. Okazaki, H. Yasuda, and H. Iwai. Finally, Drs. H. Ishikawa of Fujitsu and S. Asai of Hitachi concluded the Symposium with closing remarks. The details of the next Symposium have not yet been decided.

For more detail, contact Mr. H. Itoh, JEIDA; TEL: +81-3-3433-6861; FAX: +81-3-3433-2003; E-MAIL: itoh@jeida.or.jp.

#### **Report on the 1997 Silicon Nanoelectronics Workshop (SNW '97)**

— by Toshiro Hiramoto

The 1997 Silicon Nanoelectronics Workshop was held in Kyoto June 8 - 9, 1997, just prior to VLSI Technology Symposium as a satellite workshop of the 1997 VLSI Symposia. The workshop focused on silicon-related nanoelectronics to bridge a gap between the Si nano-technology and the real VLSI world. More than 110 participants attended, and 3 invited and 29 contributed papers were presented. The topics included Si hot electron devices, 30nm gate-length MOSFET, room temperature Si single electron transistors, and optical applications of Si nanostructures. The highlight of the workshop was the discussion session entitled "Are Single Electron Memories on the Roadmap of DRAM and FLASH?" The prospect and challenges of the future memory devices were discussed. The 1998 Silicon Nanoelectronics Workshop will be held in Hawaii in June, 1998.

For details, please contact : Dr. A. Seabaugh, General Chair; TEL: (214) 995-4334; FAX: (214) 995-2836; E-MAIL: seabaugh@resbld.csc.ti.com.

#### **Report on the 2nd International Workshop on Statistical Metrology (IWSM '97)**

— by Hiroo Masuda

IWSM '97 was held in Kyoto on June 8, 1997. More than one hundred participants attended the Workshop sponsored by the IEEE EDS, in cooperation with JSAP

and IECIE, Japan. This Workshop is a forum for discussion of issues in the generation and utilization of statistically significant measurements to characterize and validate VLSI process design, and equipment operation. This year, 16 papers were selected for oral presentation and 13 papers for poster presentation. In addition, an invited talk described a recent yield management system and methodology. The workshop covered a wide variety of topics on statistical ideas concerning VLSI Development and Production, such as Yield Ramping Methodology, Statistical Device Characterizations, Variation Statistics on Circuits, TCAD Calibration Strategy, Defect Inspection Statistics, Statistical Process Control (SPC) and Yield Modeling. IWSM '98 will be held in Hawaii on June 7, 1998. For details, please contact the Program Chair: Dr. P. K. Mozumder. TEL: (972) 995-7479, FAX: (972) 995-1724, E-MAIL: pkmz@spdc.ti.com.

#### **Report on the 1997 Symposium on VLSI Technology (VLSI Technology Symposium '97)**

— by Seiichiro Kawamura

The 1997 Symposium on VLSI Technology was held in Kyoto from June 9 to June 12, 1997. This year marked the Symposium's 17th anniversary, as it started in 1981. More than 700 participants attended from all over the world, which is a record for the Symposium. This year, over 190 high-quality papers were submitted from all parts of the world including Japan, US, Europe, Korea, Taiwan, etc., and 76 papers were presented at the Symposium including two invited talks on 300mm Wafer Technologies and on Manufacturing Equipments. Four Rump Sessions were also held as a means to facilitate informal technical discussions among the researchers. One of them was a joint session with the Symposium on VLSI Circuits which addressed "Merged Logic and DRAM". Three other technology-specific sessions covered leading-edge VLSI topics such as the Interconnect Crisis, Ferroelectric Memory, and Surface Control for Thin Gate Oxides. A one-day Short Course attracted many people and focused, for the first time, on CAD Technologies (TCAD). The 1998 Symposium on VLSI Technology will be held in Honolulu, Hawaii from June 8 to 11, 1998.

Prospective attendees can obtain further information by contacting Widerkehr and Associates; TEL: +1-301-527-0900; FAX: 301-527-0994; E-MAIL: vlsi@aol.com; or Business Center for Academic Societies Japan; TEL : +81-3-5814-

5800; FAX: +81-3-5814-5823; E-MAIL: vlsisym@bcasj.or.jp.

— Hiroshi Iwai, Editor

#### **ED Taipei Chapter**

#### **Report of the 1997 International Symposium on VLSI Technology, Systems, and Applications**

— by T.P. Ma

The 14th anniversary of the symposium was held from June 3-5, 1997 in Taipei, Taiwan. More than 700 participants attended the symposium. Out of 183 abstracts from 19 countries and regions around the world, 65 papers were selected. The paper acceptance rate was a record low of 36%. The contributed papers constituted 10 technical sessions, which coincided with the number of invited papers given by leading experts in their fields. To celebrate the 50th anniversary of the invention of the transistor, Dr. Ian M. Ross, President Emeritus of AT&T Bell Laboratories gave the opening keynote speech entitled "The Transistor Anniversary". The Symposium had the pleasure of two other distinguished plenary speakers, Dr. Hiroyoshi Komiya, COO of SELETE, Japan, who talked about "Challenges to the 300mm Technology" and Mr. Peter Baltus of the Philips Research Laboratories, The Netherlands, whose topic was "Design Issues for Low Power Mobil Transceiver Front Ends".

Next VLS-TSA will be held in Taipei, Taiwan in 1999. For further information, please contact Rachel Huang, TEL: 886-35-917232; FAX: 886-35-820056; E-MAIL: rachel@erso.itri.org.tw.

#### **Report of the Symposium on ULSI Technology & Systems**

— by Hiroshi Iwai

The first Symposium on ULSI Technology & Systems, sponsored by Microelectronics and Information Center of National Chiao Tung University, National Nano Device Laboratory, and IEEE Taipei Section was held at National Chiao Tung University, Hsinchu, Taiwan on May 15, 1997. This symposium was organized by Professors C.Y. Chang and T.Y. Huang and was jointly held by the IEEE ED Taipei Chapter as an EDS Distinguished Lecturer Program organized by Professor S.C. Sun. More than 150 people attended from Taiwan and Japan. A total of 6 invited papers were presented. They were: "Challenge to Giga Hz/bit Chips" by M. Fukuma of NEC; "Device Techniques for Sub-0.1um CMOS" by T. Mogami of NEC; "Sub-0.18 um System USLI Techniques" by M. Yamashina of NEC; "RF CMOS Technolo-



Photo (from left): T. Y. Huang, M. Fukuma, H. Iwai, C.Y. Chang, T. Magami, T. C. Chang, C. H. Chien.

gy" by H. Iwai of Toshiba; "Plasma Charging Damage in Thin Gate Oxide" by H.C. Lin of NDL; and "Metal CVD & Low k Material" by T.C. Chang of NDL.

The second symposium is under plan-

ning. For details, please contact Prof. T.Y. Huang, TEL: 886-35-726100 ext.7771; FAX: 886-35-713403; E-MAIL: tyhuang@ndl.nctu.edu.tw.

— by S.C. Sun, Editor

## AdCom (continued from page 11)

Concerning the journals, it was proposed to keep the 1998 *Electron Device Letters* and *Transactions on Electron Devices* page counts at 700 and 2,400, respectively. It was also recommended that the member prices for EDL and T-ED stay the same for 1998 at \$12 and \$18, respectively. On the other hand, it was suggested to raise the non-member prices for EDL and T-ED as per the recommendation of IEEE Marketing. Finally, it was proposed that the member rate for the *Journal of Electronic Materials* (JEM) stay the same (\$32). The page counts and publication rates for 1998 were passed unanimously.

### Executive Director's Report

Bill Van Der Vort reported on the progress made on a number of important EDS projects:

- The new EDS Membership Directory has been completed and mailed to all EDS members.
- The arrangements for the 2nd biennial Region 10 Chapters Meeting are completed.
- Work has proceeded with IEEE sections and chapters for Regions 8 and 10 to expand current chapters and establish new ones.
- Work has proceeded on the CD ROM project, which was approved earlier in this meeting.
- The EDS Membership Directory will be

expanded to be used in lieu of creating a separate Chapters Manual.

- Plans are underway for the 2nd Annual Regions 1 - 6, 7 & 9 Chapters Meeting at the IEDM.
- The 1998 membership renewals are being coordinated for about 150 members from 11 Eastern Europe chapters subsidized by MTTS, APS, and EDS.
- Consideration is being given to the possibility of a member survey.
- Work is underway on the next "Meetings Best Practices Workshop" to be held at the IEDM.

### Request For International Interconnect Technology Conference (IITC)

Bob Havemann requested EDS to provide 100% financial support for a new Interconnect Technology Conference to be held in San Francisco, June 1 - 3, 1998. The forecast is for an attendance of 500-700 people, growing to 1,000 in two years.

There are many conferences that have an interconnect component, but only three are fully directed at interconnects. These are DUMIC, VMIC, and Advanced Metalization; each has a unique focus. The conference proposed here would be supported by professional societies and by industry.

IITC would have exhibits, and an expanded scope of presentations. The proposed Organizing Committee would consist of Bob Havemann (TI), Rich Liu (Lucent),

and representatives from AMD, Intel, IBM, HP, Stanford, NSC, and Motorola, in addition to many member companies from Japan, Korea, and Europe. The conference would have approximately an equal amount of live and poster presentations, and would have an industry exhibit. The motion passed unanimously.

### In Progress Status of the 1997 Custom Integrated Circuits Conference (CICC)

Lauren Christopher advised that there are 23 sessions planned, with a keynote talk by Henry Samueli on Broad-band Communications ICs. The original estimate was for 700 attendees, but now there is a good likelihood that it might rise to 750. The trend shows that the number of exhibitors will be lower. The educational session may have as many as 450 in attendance. The CICC conference management has decided to continue to hold future occurrences of the meeting in Santa Clara.

### Membership Chair's Report

Paul Chow reported that EDS membership totalled 9,900 in 1985, and is projected to be over 11,000 in 1997. The recent trend seems to be membership stagnation, despite global growth in electronic device engineering. Contrary to this, EDS membership increased in both 1995 and 1996 on an average of about 3% per year, and is one of the only societies of the IEEE that is growing. However, historically, there is a need to replenish approximately 2,000 members each year to maintain status quo. We recruited 148 new members at the 1996 IEDM, 147 members at the 1996 ISSCC. We need to increase our presence at more conferences, such as the CICC, the Photovoltaic Specialists Conference, and others.

Paul presented a proposal to have EDS participate in the IEEE Marketing Direct Mail Membership Campaign. The IEEE Marketing Department will coordinate a mailing in November to 25,000 non-members of EDS. The estimated cost to EDS is \$7K. The campaign is expected to result in the recruitment of approximately 250 new EDS members (i.e., 1%). It was suggested that mailing lists of conferences sponsored by EDS be used, as well as the lists suggested by IEEE Marketing. This motion was approved unanimously.

### Regions/Chapters Report

Cary Yang reported that the Region 10 Chapters Meeting will be held in Kyoto,

(continued on page 19)

# EDS Meetings Calendar

(As of September 3, 1997)

## U.S., Canada & Latin America (Regions 1-6, 7 & 9)

Oct. 6 - 8, 1997, @ **IEEE INTERNATIONAL SYMPOSIUM ON SEMICONDUCTOR MANUFACTURING**, Location: Westin St. Francis Hotel, San Francisco, CA, Contact: Court Skinner, Tel: (408) 721-7420, Fax: (408) 721-6454, E-Mail: l.skinner@ieee.org, Deadline: Past Due

Oct. 6 - 9, 1997, \* **IEEE INTERNATIONAL SOI CONFERENCE**, Location: Tenaya Lodge at Yosemite, Fish Camp, CA, Contact: Sandra Grawet, Tel: (310) 316-5153, Fax: (310) 316-0713, E-Mail: 70541.1225@compuserve.com, Deadline: Past Due

Oct. 12, 1997, ✓ **GALLIUM ARSENIDE RELIABILITY WORKSHOP**, Location: Anaheim Marriott Hotel, Anaheim, CA, Contact: Anthony Immorlica, Tel: (603) 885-1100, Fax: (603) 885-1074, E-Mail: anthony.a.immorlica@lcmo.com, Deadline: Past Due

Oct. 12 - 15, 1997, \* **IEEE GALLIUM ARSENIDE INTEGRATED CIRCUITS SYMPOSIUM**, Location: Anaheim Marriott Hotel, Anaheim, CA, Contact: Richard B. Brown, Tel: (313) 763-4207, Fax: (313) 763-9324, E-Mail: brown@engin.umich.edu, Deadline: Past Due

Oct. 12 - 15, 1997, # **IEEE INTERNATIONAL CONFERENCE ON COMPUTER DESIGN: VLSI IN COMPUTERS AND PROCESSORS**, Location: Hyatt Regency Hotel, Austin, TX, Contact: IEEE Computer Society, Tel: (202) 371-1013, Fax: (202) 728-0884, E-Mail: swagner@computer.org, Deadline: Past Due

Oct. 13 - 16, 1997, \* **IEEE INTERNATIONAL INTEGRATED RELIABILITY WORKSHOP**, Location: Stanford Sierra Camp, Lake Tahoe, CA, Contact: Ehren Achee, Tel: (512) 869-1935, Fax: (512) 869-0992, E-Mail: jsreedholm@aol.com, Deadline: Past Due

Oct. 20 - 24, 1997, ✓ **MANUFACTURING SCIENCE AND TECHNOLOGY GROUP PROGRAM**, Location: San Jose Convention Center, San Jose, CA, Contact: Frederick H. Dill, Tel: (914) 945-3332, Fax: (914) 945-4520, E-Mail: f.dill@ieee.org, Deadline: Past Due

Nov. 5, 1997, ✓ **IEEE ELECTRON DEVICES ACTIVITIES IN WESTERN NEW YORK CONFERENCE**, Location: Chester F. Carlson Auditori-

um, Rochester Institute of Technology, Rochester, NY, Contact: Karl Hirschman, Tel: (716) 475-5130, Fax: (716) 475-5041, E-Mail: kdhemc@rit.edu, Deadline: 10/1/97

Nov. 9 - 12, 1997, \* **IEEE INTELLIGENT TRANSPORTATION SYSTEMS CONFERENCE**, Location: Boston Park Plaza Hotel, Boston, MA, Contact: IEEE Boston Section, Tel: (617) 890-5290, Fax: (617) 890-5294, E-Mail: sec.boston@ieee.org, Deadline: Past Due

Nov. 9 - 13, 1997, # **IEEE INTERNATIONAL CONFERENCE ON COMPUTER-AIDED DESIGN**, Location: Red Lion Hotel, San Jose, CA, Contact: Darrin Judkins, Tel: (303) 530-4562, Fax: (303) 530-4334, E-Mail: darrin@dac.com, Deadline: Past Due

Dec. 4 - 6, 1997, \* **IEEE SEMICONDUCTOR INTERFACE SPECIALISTS CONFERENCE**, Location: Mills House Hotel, Charleston, SC, Contact: Dan Fleetwood, Tel: (505) 844-1825, Fax: (505) 844-2991, E-Mail: dmfleet@sandia.gov, Deadline: Past Due

Dec. 7 - 10, 1997, \* **IEEE INTERNATIONAL ELECTRON DEVICES MEETING**, Location: Washington Hilton & Towers Hotel, Washington, DC, Contact: Phyllis Mahoney, Tel: (301) 527-0900, Fax: (301) 527-0994, E-Mail: pwmahoney@his.com, Deadline: Past Due

Feb. 22 - 27, 1998, ✓ **CONFERENCE ON HIGH TEMPERATURE ELECTRONIC MATERIALS, DEVICES & SENSORS**, Location: Bahia Hotel, San Diego, CA, Contact: Engineering Foundation, Tel: (212) 705-7837, Fax: (212) 705-7441, E-Mail: engfnd@aol.com, Deadline: Past Due

March 2 - 4, 1998, ✓ **INTERNATIONAL CARACAS CONFERENCE ON DEVICES, CIRCUITS AND SYSTEMS**, Location: Margarita Hilton Hotel, Margarita Island, Venezuela, Contact: Francisco J. Garcia-Sanchez, Tel: 58-2-9064010, Fax: 58-2-9064010, E-Mail: iccdcs@usb.ve, Deadline: Past Due

March 30 - Apr. 2, 1998, \* **IEEE INTERNATIONAL RELIABILITY PHYSICS SYMPOSIUM**, Location: Reno Hilton Hotel, Reno, NV, Contact: Ann N. Campbell, Tel: (505) 844-7452, Fax: (505) 844-2991, E-Mail: ancampbe@sandia.gov, Deadline: Past Due

April 6 - 8, 1998, ✓ **INTERNATIONAL CONFERENCE ON MODELING AND SIMULATION**

**OF MICROSYSTEMS, SEMICONDUCTORS, SENSORS AND ACTUATORS**, Location: Santa Clara Marriott, Santa Clara, CA, Contact: Andreas Wild, Tel: (602) 952-3108, Fax: (602) 952-3786, E-Mail: tdoc03@email.sps.mot.com, Deadline: 11/1/97

May 11 - 14, 1998, \* **IEEE CUSTOM INTEGRATED CIRCUITS CONFERENCE**, Location: Westin Hotel/Santa Clara Convention Center, Santa Clara, CA, Contact: Melissa Widerkehr, Tel: (301) 527-0902, Fax: (301) 527-0994, E-Mail: cicc@his.com, Deadline: 12/3/97

May 26 - 29, 1998, # **INTERNATIONAL CONFERENCE ON ELECTRON, ION AND PHOTON BEAMS**, Location: Westin Hotel, Chicago, IL, Contact: Al Wagner, Tel: (914) 945-1962, Fax: (914) 945-4015, E-Mail: awagner@watson.ibm.com, Deadline: 1/12/98

June 1 - 3, 1998, \* **IEEE INTERNATIONAL INTERCONNECT TECHNOLOGY CONFERENCE**, Location: Hyatt Regency Hotel, San Francisco Airport, San Francisco, CA, Contact: Wendy Walker, Tel: (301) 527-0900, Fax: (301) 527-0994, E-Mail: iitc@his.com, Deadline: 1/23/98

June 1 - 5, 1998, @ **IEEE SEMICONDUCTING AND INSULATING MATERIALS CONFERENCE**, Location: Berkeley Marina Marriott Hotel, Berkeley, CA, Contact: Zuzanna Liliental-Weber, Tel: (510) 486-6276, Fax: (510) 486-4995, E-Mail: zlw@ux5.lbl.gov, Deadline: 12/15/97

June 3 - 5, 1998, ✓ **INTERNATIONAL SYMPOSIUM ON PLASMA PROCESS-INDUCED DAMAGE**, Location: Hilton Hawaiian Village Hotel, Honolulu, HI, Contact: Della Miller, Tel: (408) 737-0767, Fax: (408) 737-2403, E-Mail: della@technicalmarketing.com, Deadline: 1/30/98

June 7, 1998, @ **IEEE INTERNATIONAL WORKSHOP ON STATISTICAL METROLOGY**, Location: Hilton Hawaiian Village Hotel, Honolulu, HI, Contact: Harold Hosack, Tel: (972) 995-4942, Fax: (972) 995-1724, E-Mail: hosack@spdc.ti.com, Deadline: 2/16/98

June 7 - 8, 1998, @ **IEEE SILICON NANOELECTRONICS WORKSHOP**, Location: Hilton Hawaiian Village Hotel, Honolulu, HI, Contact: Gary Bernstein, Tel: (219) 631-6269, Fax: (219) 631-

\* = Sponsorship or Co-Sponsorship Support  
✓ = Technical Co-Sponsorship Support

@ = Alternates support between 'Sponsorship/Co-Sponsorship' and 'Technical Co-Sponsorship'  
# = Cooperation Support

7983, E-Mail: berstein1@nd.edu, Deadline: 2/2/98

June 7 - 9, 1998, \* **RADIO FREQUENCY INTEGRATED CIRCUITS SYMPOSIUM**, Location: Baltimore Convention Center, Baltimore, MD, Contact: Jim Miniz, Tel: (914) 892-8905, Fax: (914) 892-6300, E-Mail: j.moniz@vnet.ibm.com, Deadline: 12/1/97

June 9 - 11, 1998, @ **IEEE SYMPOSIUM ON VLSI TECHNOLOGY**, Location: Hilton Hawaiian Village Hotel, Honolulu, HI, Contact: Melissa Widerkehr, Tel: (301) 527-0902, Fax: (301) 527-0994, E-Mail: vlsi@aol.com, Deadline: 1/7/98

June 11 - 13, 1998 # **IEEE SYMPOSIUM ON VLSI CIRCUITS**, Location: Hilton Hawaiian Village Hotel, Honolulu, HI, Contact: Melissa Widerkehr, Tel: (301) 527-0902, Fax: (301) 527-0994, E-Mail: vlsi@aol.com, Deadline: 1/7/98

June 14 - 19, 1998, ✓ **INTERNATIONAL HIGH TEMPERATURE ELECTRONICS CONFERENCE**, Location: Albuquerque Marriott Hotel, Albuquerque, NM, Contact: Richard R. Grzybowski, Tel: (860) 610-7399, Fax: (860) 610-7852, E-Mail: grzyborr@utrc.utrc.com, Deadline: Past Due

June 22 - 24, 1998, \* **IEEE DEVICE RESEARCH CONFERENCE**, Location: University of Virginia, Charlottesville, VA, Contact: Emmanuel Crabbe, Tel: (914) 892-2056, Fax: (914) 892-2568, E-Mail: crabbe@watson.ibm.com, Deadline: 3/2/98

June 22 - 25, 1998, ✓ **INTERNATIONAL POWER MODULATOR SYMPOSIUM**, Location: Westin Mission Hills Resort, Rancho Mirage, CA, Contact: Janice Brooks, Tel: (703) 413-3882, Fax: (703) 413-1315, E-Mail: j.brooks@washington.polisades.org, Deadline: 2/16/98

July 19 - 24, 1998, @ **IEEE INTERNATIONAL VACUUM MICROELECTRONICS CONFERENCE**, Location: The Grove Park Inn Resort, Asheville, NC, Contact: Rene Gielen, Tel: (919) 515-2378, Fax: (919) 515-7724, E-Mail: rene\_gielen@ncsu.edu, Deadline: 5/98

Aug. 2 - 6, 1998, @ **INTERSOCIETY ENERGY CONVERSION ENGINEERING CONFERENCE**, Location: Sheraton Colorado Springs Hotel, Colorado Springs, CO, Contact: David L. Black, Tel: (202) 547-6854, Fax: (202) 547-6854, E-Mail: dlblackone@aol.com, Deadline: 12/15/97

Aug. 2 - 6, 1998, \* **IEEE NON-VOLATILE SEMICONDUCTOR MEMORY WORKSHOP**, Location: Hyatt Regency Hotel, Monterey, CA, Contact: Al Fazio, Tel: (408) 765-9610, Fax: (408) 765-9206, E-Mail: fazio@rd2cad.intel.com, Deadline: 4/3/98

## Europe, Middle East & Africa (Region 8)

Oct. 7 - 10, 1997, ✓ **EUROPEAN SYMPOSIUM ON RELIABILITY OF ELECTRON DEVICES, FAILURE PHYSICS AND ANALYSIS**, Location: Palatium of Arcachon, Arcachon, France, Contact: Nathalie Labat, Tel: 33-05-56-84-65-51, Fax: 33-05-56-37-15-45, E-Mail: labat@ixl.u-bordeaux.fr, Deadline: Past Due

Oct. 8 - 11, 1997, \* **INTERNATIONAL SEMICONDUCTOR CONFERENCE**, Location: Sinaia Hotel, Sinaia, Romania, Contact: Doina Vancu, Tel: 40-1-2301448, Fax: 40-1-2307519, E-Mail: cas@imt.ro, Deadline: Past Due

Nov. 24 - 25, 1997, ✓ **WORKSHOP ON HIGH PERFORMANCE ELECTRON DEVICES FOR MICROWAVE AND OPTOELECTRONIC APPLICATIONS**, Location: King's College London, The Strand, London, UK, Contact: Ali A. Rezazadeh, Tel: 44-171-873-2879, Fax: 44-171-873-2879, E-Mail: a.rezazadeh@kcl.ac.uk, Deadline: Past Due

Feb. 24 - 26, 1998, ✓ **NATIONAL RADIO SCIENCE CONFERENCE**, Location: Helwan University, Helwan, Cairo, Egypt, Contact: Ibrahim A. Salem, Tel: (202) 594-1306, Fax: (202) 594-1270, E-Mail: isalem@brainy1.ie-eg.com, Deadline: 10/11/97

June 2 - 5, 1998, ✓ **INTERNATIONAL CONFERENCE ON MATHEMATICAL METHODS IN ELECTROMAGNETIC THEORY**, Location: Kharkov State University, Kharkov, Ukraine, Contact: Zinovy Nazarchuk, Tel: 380-0322-63-70-38, Fax: 380-0322-64-94-27, E-Mail: nazarchu@vision.ipm.lviv.ua, Deadline: Not Available

June 7 - 12, 1998, ✓ **INTERNATIONAL CONFERENCE ON HIGH-POWER PARTICLE BEAMS**, Location: International Conference Center, Haifa, Israel, Contact: Joseph Shiloh, Tel: 972-4-8795016, Fax: 972-4-8795315, E-Mail: jshiloh@rafael.co.il, Deadline: 12/15/97

June 14 - 19, 1998, ✓ **INTERNATIONAL CONFERENCE ON HIGH-POWER ELECTROMAGNETICS**, Location: Dan Panorama Hotel, Tel-Aviv, Israel, Contact: Joseph Shiloh, Tel: 972-4-8795016, Fax: 972-4-8795315, E-Mail: jshiloh@rafael.co.il, Deadline: 12/15/97

June 24 - 26, 1998, ✓ **EUROPEAN WORKSHOP ON LOW TEMPERATURE ELECTRONICS**, Location: Study Center "I Cappuccini" of the Miniato Savings Bank Ltd., San Miniato, Tuscany, Italy, Contact: Daniel V. Camin, Tel: 39-2-2392-303, Fax: 39-2-2392-624, E-Mail: wolte@mi.infn.it, Deadline: 12/15/97

July 6 - 10, 1998, @ **IEEE WORLD CONFERENCE ON PHOTOVOLTAIC ENERGY CON-**

**VERSION**, Location: Hofburg Kongresszentrum, Vienna, Austria, Contact: Sheila G. Bailey, Tel: (216) 433-2228, Fax: (216) 433-6106, E-Mail: sheila.bailey@lerc.nasa.gov, Deadline: 12/1/97

## Asia & Pacific (Region 10)

Oct. 8 - 10, 1997, ✓ **INTERNATIONAL CONFERENCE ON MICROELECTRONICS**, Location: Trade Mark Building, Jakarta, Indonesia, Contact: Onno W. Purbo, Tel: 62-22-2506280, Fax: 62-22-2508763, E-Mail: onno@kalpataru.netura.net.id, Deadline: Past Due

Oct. 13 - 15, 1997, ✓ **INTERNATIONAL CONFERENCE ON VLSI AND CAD**, Location: Seoul TEMF Hotel, Seoul, Korea, Contact: Sung Tae Ahn, Tel: 82-2-780-6001, Fax: 82-2-760-6060, E-Mail: intercom@soback.kornet.nm.kr, Deadline: Past Due

Oct. 27 - 31, 1997, ✓ **INTERNATIONAL CONFERENCE ON NITRIDE SEMICONDUCTORS**, Location: Tokushima Prefectural Hall, Aiba, Tokushima, Japan, Contact: Sadafumi Yoshida, Tel: 81-248-54-2222, Fax: 81-298-58-5434, E-Mail: syoshida@etl.go.jp, Deadline: Past Due

Jan. 14 - 17, 1998, ✓ **INTERNATIONAL CONFERENCE ON COMPUTERS AND DEVICES FOR COMMUNICATION**, Location: Science City, E-M Bye Pass, Calcutta, India, Contact: P.K. Basu, Tel: 91-33-350-9413, Fax: 91-33-351-5828, E-Mail: codec@cucc.ernet.in, Deadline: Past Due

March 23 - 26, 1998, \* **IEEE INTERNATIONAL CONFERENCE ON MICROELECTRONIC TEST STRUCTURES**, Location: Kanazawa Citymonde Hotel, Kanazawa, Japan, Contact: Masakazu Shimaya, Tel: 81-462-40-2628, Fax: 81-462-40-4219, E-Mail: None, Deadline: Past Due

May 11 - 15, 1998, @ **IEEE INTERNATIONAL CONFERENCE ON INDIUM PHOSPHIDE AND RELATED MATERIALS**, Location: University of Tsukuba, University Hall, Tsukuba, Japan, Contact: Melissa Estrin, Tel: (732) 562-3896, Fax: (732) 562-8434, E-Mail: m.estrin@ieee.org, Deadline: 11/25/97

June 3 - 6, 1998, @ **IEEE INTERNATIONAL SYMPOSIUM ON POWER SEMICONDUCTOR DEVICES & INTEGRATED CIRCUITS**, Location: Rihga Royal Hotel, Kyoto, Japan, Contact: Yoshitaka Sugawara, Tel: 81-6-494-9736, Fax: 81-6-494-9728, E-Mail: None, Deadline: 10/15/97

July 13 - 16, 1998, ✓ **INTERNATIONAL MICROPROCESS AND NANOTECHNOLOGY CONFERENCE**, Location: Hotel Hyundai, Kyoungju, Korea, Contact: Hiroaki Masuko, Tel: 03-5814-5800, Fax: 03-5814-5823, E-Mail: hmasuko@bcasj.or.jp, Deadline: 3/15/98



## AdCom (continued from page 16)

Japan on June 8, 1997 in conjunction with the VLSI Symposia. The Region 8 Chapters Meeting will be in Stuttgart, Germany on September 21, 1997 at the European Solid-State Device Research Conference. During the ensuing discussion, it was noted that Region 9 (Latin America) has the highest potential for membership growth, thus, current development efforts should continue in this area.

### "Partners" Program Organized

A motion was made to establish an EDS Chapter Partners Program as presented by Cary Yang and based on the LEOS Chapter Angel program. The EDS program had been approved conceptually at the last meeting. It would work in the following way. Each elected AdCom member would be required to become a partner to 2 or 3 chapters. Ex-Officio members are encouraged to do likewise. The Regions/Chapters Chair, in conjunction with the Executive Office, will draw up a list of assignments. Everyone should pick at least one chapter from Region 8.

The proposed responsibilities of a chapter Partner will be as follows: establish a continuing dialogue (via e-mail and/or telephone) with the chapter chair and other members; attend or arrange for lecturer/AdCom member to attend at least one chapter meeting per year to give a technical talk and/or presentation concerning IEEE and EDS; whenever possible, meet with chapter chairs/officers at a chapters meeting scheduled in conjunction with one of EDS' conferences; provide annual reports to the EDS Regions/Chapters committee. The Partners will try to combine visits to chapters with their travel. If necessary, some travel support will be provided by AdCom. It was noted that this program might help the STAR Program.

### News From The Far East

Jim Clemens and Kunio Tada described recent activities in Region 10:

- The EDS membership brochure is now available in Mandarin, thanks to the work of James Kuo. A Japanese version of the EDS brochure was developed by Jim Clemens and Kunio Tada and was made available soon after the AdCom meeting.
- The "sister-society" agreement with the EDS Japanese "equivalent," the Electronics Society (ES) of the Institute of Electronics, Information and Communication Engineers (IEICE), was signed in December, 1996, and was put into practice on June 1, 1997. Also, an agreement with the Japanese Society

for Applied Physics (JSAP) is in its third year of activity.

### "Educational Activities" Continue To Prosper

This report was given by April Brown, in the absence of Jerry Woodall. The number of distinguished lectures continues to grow. There were 34 lectures held in 1995 and 41 in 1996. Another 23 lectures are already scheduled for 1997.

There was also discussion about the video tapes that EDS supplies to chapters. Most of the requests come from abroad, but the quality of these tapes is sometimes low. There was considerable discussion about this problem, and how to improve the situation.

### Other Meeting Highlights

- Publications — Steve Hillenius reported that the 1996 Paul Rappaport Award went to Chris Diorio, Paul Hasler, Bradley A. Minch and Carver A. Mead for their paper published in the November 1996 issue of *Transactions on Electron Devices*, entitled "A Single-Transistor Silicon Synapse".
- EDS Awards — Tak Ning reported that nominations for 1998 IEEE Field Awards will be due very soon, so it is not too early to think of candidates for 1999.
- IEEE Fellow Evaluations — Dexter Johnston compared the situation for 1997 relative to 1996. In '96, there were 37 nominations, from which 12 were elected (33%). This year, there were 55 nominations making the competition intense.
- EDS Nominations for Officers and AdCom members — Dexter Johnston stressed that we were fast approaching another election, and that NOMINATIONS ARE NEEDED!
- Membership Directory — This was a big project for the past year, and Dexter Johnston gave an update on the design and production of the first EDS Membership Directory. He said that it would be mailed out by May 15th. [Note to the reader: If you are a member of the EDS, and have paid your dues, you have probably already received your directory, since I received mine in early June. My compliments to the EDS Executive Office staff, and the officers who worked on it, as they did a marvelous job!]
- Publications — Journal of Electronic Materials (JEM): April Brown reported that JEM published 1,842 pages in 1996. There were special issues on Ion Beam and Laser Processing, III-V

Nitrides and SiC, InP and Related Materials, and Contacts.

— Journal of Lightwave Technology (JLT): This journal is sponsored by EDS, five other societies of the IEEE, and the Optical Society of America. Dexter Johnston reported that it will go on-line for IEEE member subscribers. Two new representatives from EDS are needed for JLT as soon as possible. The emphasis of JLT is on fiber-optic systems, semiconductor lasers, LiNbO<sub>3</sub>, etc. The turn-around time has been reduced from 15 months to 8 months by using Piscataway editorial support. It is hoped to shave off yet another month.

### • Review of Meetings

— International Electron Devices Meeting (IEDM): Steve Hillenius reported that the attendance at the 1996 IEDM was 2,246, which was an all time high. The Home Page was used effectively for prospective attendees to view accepted abstracts. The luncheon talk by Gordon Moore resulted in record attendance, and the short course attendance exceeded expectations by nearly 200 people. The CD ROM of extended abstracts was very well received. For 1997, there will be features on gigascale CMOS and trends in RF devices for wireless. The luncheon will feature the 50th anniversary of the transistor.

— International Reliability Physics Symposium (IRPS): Ajit Goel reported that the "Hot Topics" in this year's meeting included dielectrics, hot carriers, processing, and devices. Attendance was slightly below expectation. About 35% of the submissions were selected. The equipment demonstration was very popular. The machines were operable and attendees brought samples to run, so that experiments were in progress even during the meeting! "First" for the conference included on-line registration (about 10% of the registrants utilized this) and 100% digital electronic presentations, eliminating all slides.

— Semiconducting and Insulating Materials Conference (SIMC, formerly called the Semi-insulating III-V Conference): Zuzanna Liliental-Weber reported that this conference was held in Toulouse, France, in April of 1996. "Hot Topics" included Si III-V material, including low temperature growth; II-VI compounds and nitrides, SiGe and SiC, defects, characterization. There were approximately 100 attendees.

James L. Merz  
University of Notre Dame  
Notre Dame, IN



## NEWSLETTER EDITORIAL STAFF

### EDITOR-IN-CHIEF

Krishna Shenai  
EECS Department (M/C 154), 1135 SEO  
The Univ. of Illinois at Chicago  
851 South Morgan Street  
Chicago, IL 60607-7053

Tel: (312) 996-2633  
Fax: (312) 996-0763  
E-Mail: k.shenai@ieee.org



### EDITORS

#### **REGIONS 1-6, 7 & 9**

##### **Eastern and Northeastern USA**

###### **(Regions 1 & 2)**

M. Ayman Shibib  
Lucent Technologies Inc.  
Bell Laboratories  
2525 N. 12th Street  
P.O. Box 13396  
Reading, PA 19612  
Tel: (610) 939-6576  
Fax: (610) 939-6795  
E-Mail: a.shibib@ieee.org

##### **Southeastern and Southwestern USA & Latin America (Regions 3, 5 & 9)**

Elias D. Towle  
Thornton Hall E214  
University of Virginia  
Charlottesville, VA 22903-2442  
Tel: (804) 924-6078  
Fax: (804) 924-8818  
E-Mail: e.towle@ieee.org

##### **Central USA & Canada (Regions 4 & 7)**

Savvas G. Chamberlain  
Electrical & Comp. Eng. Dept.  
University of Waterloo  
Waterloo, Ontario  
N2L 3G1, Canada  
Tel: (519) 888-4598  
Fax: (519) 746-6321  
E-Mail: sg.chamberlain@ieee.org

##### **Western USA (Region 6)**

Paul K.L. Yu  
Univ. of California at San Diego  
Dept. of Elec. and Computer Engrg.  
Eng. Bldg. Unit 1, Room 3604  
La Jolla, CA 92093-0407  
Tel: (619) 534-6180  
Fax: (619) 534-0556  
E-Mail: p.yu@ieee.org

#### **REGION 8**

##### **Eastern Europe & The Former Soviet Union**

Adrian Veron  
Baneasa S.A.  
Erou Iancu Nicolae 32  
Bucharest 72996 Romania  
Tel: 401-633-4050, Ext. 203  
Fax: 401-633-4225  
E-Mail: a.veron@ieee.org

##### **Scandinavia & Central Europe**

Mikael L. Ostling  
Department of Electronics, FTE  
P.O. Box Electrum 229  
Royal Institute of Technology  
S-164 40 Kista  
Sweden  
Tel: 46-8-7521402  
Fax: 46-8-752 7782  
E-Mail: m.ostling@ieee.org

##### **UK, Middle East & Africa**

Terry H. Oxley  
Tremont  
Back Lane Halam Newark  
Notts NG22 8AG  
England  
Tel: 44-1636-815510  
Fax: 44-1636-815865  
E-Mail: t.oxley@ieee.org

##### **Western Europe**

Robert G. Adde  
Institut d'Electronique Fondamentale  
URA22 CNRS, Bat 220  
Universite Paris-Sud  
91405, Orsay  
France  
Tel: 33-1-69-15-40-54  
Fax: 33-1-60-15-40-90  
E-Mail: r.adde@ieee.org

#### **REGION 10**

##### **Australia, New Zealand & South Asia**

Chennupati Jagadish  
Dept. of Electronic Materials Engrg.  
Research School of Phys. Sciences & Engrg.  
Australian National University  
Canberra, ACT 0200  
Australia  
Tel: 61-2-6249-0363  
Fax: 61-2-6249-0511  
E-Mail: c.jagadish@ieee.org

##### **Northeast Asia**

Hiroshi Iwai  
Microelectronics Engineering Lab  
Toshiba Corporation  
1, Komukai-Toshiba-cho, Saiwai-Ku  
Kawasaki, 210, Japan  
Tel: 81-44-549-2335  
Fax: 81-44-549-2291  
E-Mail: h.iwai@ieee.org

##### **East Asia**

S.C. Sun  
Taiwan Semiconductor Manufacturing  
Company Ltd.  
No. 9, Creation Rd. I  
Science-Based Industrial Park  
Hsinchu, Taiwan, R.O.C.  
Tel: 886-35-781688 ext. 4700  
Fax: 886-35-773671  
E-Mail: s.sun@ieee.org

**Effective 1, June 1997, the area  
code of the telephone number  
for the EDS Executive Office was  
changed to 732.**