



IEEE ELECTRON DEVICES SOCIETY Newsletter

APRIL 2006 Vol. 13, No. 2 ISSN:1074 1879

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2006 IEEE Symposium on VLSI Technology



Hilton Hawaiian Village, Honolulu, Hawaii

The 26th Annual IEEE Symposium on VLSI Technology will be held June 13-15, 2006, at the Hilton Hawaiian Village in Honolulu, Hawaii. The VLSI Technology Symposium is jointly sponsored by the IEEE Electron Devices Society (EDS) and the Japan Society of Applied Physics (JSAP).

The VLSI Symposium is well recognized as one of the premiere conferences on semiconductor technology, and research results presented at the conference represent a broad spectrum of VLSI technology topics, including:

- New concepts and breakthroughs in VLSI devices and processes.
- New functional devices including quantum effect devices with possible VLSI implementation.
- Materials innovation for MOSFET and interconnect in VLSI.
- Advanced lithography and fine patterning technologies for high density VLSI.
- Process/Device modeling of VLSI devices.
- Packaging and reliability of VLSI devices.

(continued on page 8)



Your Comments Solicited

Your comments are most welcome. Please write directly to the Editor-in-Chief of the Newsletter at nstojadinovic@elfak.ni.ac.yu

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EDS AdCom Elected Members-at-Large

Elected for a three-year term (maximum two terms) with 'full' voting privileges

<u>2006</u>	<u>Term</u>	<u>2007</u>	<u>Term</u>	<u>2008</u>	<u>Term</u>
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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. The e-mail addresses of these individuals are listed on this 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 (ISSN 1074 1879) is published quarterly by the Electron Devices Society of the Institute of Electrical and Electronics Engineers, Inc. Headquarters: 3 Park Avenue, 17th Floor, New York, NY 10016-5997. Printed in the U.S.A. One dollar (\$1.00) per member per year is included in the Society fee for each member of the Electron Devices Society. Periodicals postage paid at New York, NY and at additional mailing offices. **Postmaster:** Send address changes to IEEE Electron Devices Society Newsletter, IEEE, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.

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Outgoing Message from the 2004-5 EDS President



Hiroshi Iwai

I would like to take the opportunity in completing my term as President of the Electron Devices Society (EDS), to express my sincere appreciation to the members of EDS, the EDS Administrative Committee (AdCom)/ Executive Committee (ExCom), and the EDS Executive Office, who have all worked hard together and supported me to reform our Society, which is now facing a big change in the value of the membership. In the past, the IEEE EDS journal subscriptions and IEEE EDS conference proceedings were the main reason for individuals to become IEEE and EDS members. Now, regardless if they are members or non-members, the employees and students of big companies and universities who purchase the subscriptions and conference proceedings from the IEEE, can access the journals instantaneously and free of charge through the web. Thus, the motivation to join the IEEE EDS is gone for the majority of the members. Now, what is the value of EDS for members, as well as non-members around the world? EDS is a global society which organizes many top level international conferences (such as the International Electron Devices Meeting - IEDM) and journals (such as *Electron Device Letters* - EDL and *Transactions on Electron Devices* - T-ED) for the companies and universities to publish their technical accomplishments. In other words, electron devices engineers and their affiliated organizations can make their achievement recognized world-wide, with its quality guaranteed by the IEEE EDS. Also, they can obtain the newest technical information by attending these conferences and subscribing to the journals. Thus, EDS is a community consisting of the above people and it is desirable that the

people, who enjoy the benefits of the EDS, support it by joining the Society. In the meantime, EDS has to establish a mechanism to make the Society attractive enough to encourage them to join. This has been the consensus of the EDS as confirmed by ExCom and AdCom for the past two years during my term as President. Thus, we have been working to initiate a number of new activities/programs to make EDS attractive, to approve them at the AdCom, and to execute them.

Direct motivation for the conference attendees to join the IEEE EDS is to change the conference registration fee differential between members and non-members to be larger than the cost of the membership fees of the IEEE plus EDS. We have been negotiating with the EDS sponsored conferences concerning the registration fee differential between members and non-members and we have received agreement from some of the conferences, such as the IEDM. We have already started to send a solicitation letter to the first author of the papers accepted to the EDS sponsored conferences and journals to join the IEEE EDS, if they are not already a member. It is a controversial topic now, but we might have to think about charging a moderate page fee for journal paper publication to non-members in the future, as done by some other journals. As I wrote in past issues of the EDS Newsletter, we issued a DVD archive (EDS Archival Collection), which includes all the issues of T-ED, EDL, and the Technical Digests of the IEDM from their beginning. The collection is only offered to EDS members and at a very low price of \$30 USD (\$9.95 USD for students). This is a great privilege and benefit for EDS members. Furthermore, we are in the process of planning a way to preserve the archives of the proceedings of as many conferences for which EDS is sponsoring, co-sponsoring and technically co-sponsoring. Almost all of the proceedings since 1988 of EDS sponsored, co-sponsored and techni-

cally co-sponsored conferences, are preserved on the IEEE Xplore system. However, there are only a few conferences with information on Xplore dated prior to 1988. Different from the journals, most of the archived conference proceedings are not preserved in libraries and eventually will disappear in the years ahead. It is our duty to make a plan and execute it, as soon as possible, before they disappear. New ideas and findings have been published either at conferences or in the letters type publications, and then some of them are later published as larger size articles in transactions and journals. Thus, preserving the conference archive is a very important initiative. Regarding journal papers, the number of full paper versions of the conference-published papers in T-ED is decreasing significantly, although some of them are published in non-IEEE journals. We are working with the IEDM to have at least 25 best papers of the IEDM published per year, in T-ED as invited papers. We will work with other conferences to recommend good papers to be published in T-ED.

EDS is a society that covers all the technical field of electron devices. We are working with EDS conferences, through EDS technical committees, to watch newly emerging fields and to include the fields into our Society by providing special sessions at conferences, creating topical workshops, or inviting specialists to the conferences. Not only the emerging fields, but also developing the existing field is important. Displays, sensors and semiconductor manufacturing, for examples are the fields in which EDS conference activity is not so strong, and we need to enhance it. EDS has only a small portion of the electron devices manufacturing engineers or industrial people as its members. In order to attract industrial people, we are working with conferences such as the IEDM to provide industrial exhibitions at the conferences.

Besides conferences and journals, chapters are another fundamentally important unit of EDS activities. Communication with local members can be done through the chapters. Activities of the EDS Regions/Chapters, Education, and Membership committees can also be implemented through the chapters. Besides the benefit to the members to attend top level lectures, having Distinguished Lecturers (DL) is one of the most important opportunities for EDS to communicate to its members. We increased the number of the Distinguished Lecturers (DL) from 99 to 139, and lectures from 122 to 142, over the past two years. Also, we organized 12 mini-colloquia of DLs throughout the world over the past two years. We will continue the effort to further increase the number of DLs. Asia (including China and India) and Latin America are the largest growth areas for the electron devices and engineers in the near future. However, there are so many big cities or areas where chapters do not exist. EDS has sent delegations to

meet the local people to solicit to form chapters in many areas of the world. As a result, the number of chapters has increased from 109 to 120 in the past 2 years, and the formation of many new chapters is now in progress. However, it is still insufficient to cover the areas, and this effort will be strongly continued in future years. For most of the underdeveloped countries, the IEEE membership fee of about \$120 USD is extremely expensive for the local people, although the EDS membership fee is only \$11 USD. Thus, EDS promotes the Membership Fee Subsidy Program which allows 12 members in a chapter to be subsidized each year. We approve the subsidy for founding members of the new chapter, so that a sufficient number (12) of the founding members can be easily obtained. Also, we encourage non-members to obtain EDS affiliate memberships, as the IEEE affiliation fee is about half the price of the regular membership fee.

In order to promote educational activity, we will increase student relat-

ed awards and create a new EDS Education Award. EDS started the practice of issuing certificates of appreciation each year to the people who contributed to the EDS, in addition to those EDS AdCom members who step down each year from their positions.

These are the EDS initiatives for which I have been working with the members and the EDS Executive Office as the President for the past two years. Our philosophy is to provide as much service as we can to promote the ED activities. These initiatives will be continued by the new President, Ilesanmi Adesida; but it is you, members of the EDS, who can improve the EDS for yourself. We are looking forward to your participation and feedback of our initiatives. Thank you again for your great support for the past two years.

*Hiroshi Iwai
2004 – 2005 EDS President
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Upcoming Technical Meetings

2006 IEEE International Interconnect Technology Conference (IITC)

The ninth annual IEEE IITC (International Interconnect Technology Conference), the premier conference dedicated to advanced interconnect technology, will be held June 5-7,



San Francisco Airport Hyatt Regency Hotel

2006, at the San Francisco Airport Hyatt Regency Hotel, conveniently located 20 minutes from Silicon Valley and downtown San Francisco. The conference will be preceded by a Short Course on leading-edge interconnect technology on Sunday, June 4th.

The IITC is the world's leading forum for professionals in semiconductor processing, academia and equipment development, to gather, present, discuss and debate exciting new science and technology, through oral presentations, poster displays, exhibit booths and supplier seminars.

The IITC was established with the support of the IEEE Electron Devices Society to address interconnect issues from both fundamental materials viewpoints as well as system-level per-

spectives. Ever-increasing demands for greater circuit density and performance present enormous connectivity challenges, and have focused attention on the design, cost, performance and reliability demands on interconnects. New materials, architectures, communication mechanisms and process technologies are needed, and new approaches are emerging in this rapidly evolving area to meet these challenges. The IITC facilitates progress on critical issues and technologies for the fabrication of advanced interconnects in monolithic ICs, multi-chip modules (MCMs) and state-of-the-art packages.

Short Course

This conference provides several venues for learning and professional

interaction. The popular Short Course once again will address advanced interconnect process, design and reliability issues. Participation is strongly encouraged by those wishing to benefit from a combination of tutorials on interconnect fundamentals, briefings on the latest interconnect technology advances, and direct interaction with experts actively at work in the field.

Supplier Exhibits/Seminars

Without doubt, the cost and performance of ULSI circuits strongly depend on the capability and productivity of interconnect materials and processing equipment. In recognition of this critical role, supplier exhibits and seminars are included as an integral part of the IITC technical program and will be held on the first and second days of the conference. These exhibits and seminars offer additional learning and networking opportunities, and provide alternative forums to address specific technological challenges.

Presentations

Oral presentations and poster papers offered during the conference span a broad range of interconnect technology topics, including:

1. Silicides/Salicides: Characterization, new materials and processes, electrical performance and process integration issues for metal silicides/salicides.
2. Dielectrics: Dielectric materials (low k, high k, ARCs, etc.) and deposition processes (vapor deposition, CVD, spin-on, etc.) for

interconnect applications

3. CMP/Planarization: Dielectric/Metal CMP processes, equipment and metrology issues, and Alternate planarization techniques.
4. Metallization: Metal deposition processes/equipment (PVD, CVD, ALD, electroplating) and materials characterization, with particular emphasis on advanced aluminum and copper metallization.
5. Process Integration: Multilevel interconnect processes, clustered processes, novel interconnect structures, contact/via integration, metal barrier and materials interface issues, etc.
6. Process Control/Modeling: CMP, metal/dielectric deposition and etching processes, PVD, CVD, electroplating, etc.
7. Reliability: Metal electromigration and stress voiding, dielectric integrity and mechanical stability, thermal effects, passivation issues, interconnect reliability prediction/modeling.
8. Interconnect Systems: Interconnect performance modeling and high frequency characterization, interconnect system integration and advanced packaging concepts (flip-chip, chip-on-chip, MCM, etc.), novel architectures.
9. System-on-a-Chip: Interconnect, design and processing of SOC, embedded memory processing, materials and integration, RF and high frequency passive components, noise and cross-talk issues
10. Dry Processing: Dry etching of vias, trenches and damascene

structures, dry etching of metal, dry cleaning processes, plasma induced damage, etc.

11. Alternative Interconnects: Advanced interconnect concepts, optical and RF interconnect, superconductors, nanotechnology-based interconnect, etc.

Given the rapid acceleration of integrated circuit technology, the last topic provides an important forum for discussion of the interconnect crisis and potential paradigm shifts to novel interconnect schemes.

Professionals involved in interconnect-related activities are strongly encouraged to participate in this exciting conference. Detailed information can be obtained from the IITC website: <http://www.ieee.org/conference/iitc>. For additional information or inquiries regarding supplier exhibits and seminars, please contact Wendy Walker, IITC Administrator at +1 301-527-0900 Ext. 104, Fax: +1 301-527-0994, or email: iitc@his.com.

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2006 IEEE/SEMI Advanced Semiconductor Manufacturing Conference (ASMC)

“Advancing the Excellence of Semiconductor Manufacturing”

ASMC 2006 continues a long tradition of unveiling breakthroughs in semiconductor manufacturing—from fab productivity and profitability to advanced process controls and device yield.

With more than 90 peer-reviewed technical papers, expert keynotes

and a relevant panel discussion, ASMC attracts engineers and managers from fabs around the world who want to advance their semiconductor manufacturing knowledge with real solutions...direct from the fab. The IEEE/SEMI Advanced Semiconductor Manufacturing Conference (ASMC) is an international conference sponsored by the IEEE

Electron Devices Society (EDS), the IEEE Components, Packaging, and Manufacturing Technology Society (CPMT), and SEMI.

The conference, which alternates between the U.S. and Europe to better serve the interests of its international audience, returns to Boston, May 22–24, 2006, at the Sheraton Boston Hotel.

Peer-reviewed papers from nineteen nations and more than 49 companies and institutions have been selected for presentation in 14 sessions. This year's event covers these topics of interest to semiconductor manufacturing engineers and managers:

- advanced metrology
- advanced processes and materials
- APC
- cleaning and surface preparation
- cost reduction
- defect inspection
- equipment reliability/productivity
- factory automation/dynamics
- defect inspection
- equipment reliability/productivity
- human resource development
- lithography
- yield enhancement/modeling
- yield productivity.

The conference will recognize a "best paper award," sponsored by Toppan Photomasks, and a "best student paper award," sponsored by ISMI.

ASMC 2006 also features a distinguished line-up of keynote speakers to begin each day of the conference. On Monday, May 22, Deb Newberry, author and professor, will present Nanotechnology: *What is it and How Does it Apply to*

Me? Monday closes with the popular ASMC poster reception, sponsored by KLA-Tencor. This session encourages interaction between poster authors and conference attendees.

On Tuesday, May 23, Dr. Chenming Hu, TSMC Distinguished Chair and Professor of Electrical Engineering & Computer Sciences, University of California, Berkeley, will discuss CMOS issues. Tuesday ends with a thought-provoking panel discussion, moderated by Tom Cheney, editor of MICRO Magazine, and featuring a distinguished panel of industry leaders who will share their views on globalization, growth, productivity and profitability. The topic is *Maintaining the Productivity Curve: Is a Bigger Wafer Needed?*

The third keynote, Dr. Venu Menon, Vice President and CMOS1 Manager Silicon Technology Development, Texas Instruments, Inc., will discuss *Challenges and Opportunities for Volume Manufacturing at 65nm and Beyond*.

Back by popular demand are the luncheon round tables. Subject-matter experts will lead round table discussions on ASMC topics. These present excellent opportunities to meet others in your interest area or

to learn more about new technical subjects.

As an added bonus, this year's ASMC includes a two-hour update on the International Technology Roadmap on Semiconductors (ITRS). Industry experts will provide an overview of various ITRS topics including factory automation, front-end processes, lithography and yield enhancement. Presentations will be followed by a panel discussion with Q&A.

Who should attend ASMC 2006? Semiconductor professionals involved in production control, process control, process transfer, yield and cycle time improvement, cost reduction, preventive maintenance, line supervision, facilities fab operation, quality, training and education.

ASMC 2006 will take place at the Sheraton Hotel, situated in the charming and historic Back Bay section of Boston. The hotel is ideally located for business in one of America's most historic and dynamic cities. Four miles from Boston's Logan Airport, the Sheraton Hotel is close to the Financial District, Downtown Crossing, the scenic Charles River, many of Boston's favorite shops, restaurants, and museums, and a short walk to the Prudential Center and famous Newbury Street.

A block of sleeping rooms has been reserved for conference participants at the Sheraton Hotel. To make a reservation, contact the Sheraton Hotel by May 1st at +1 617-236-2000 or toll-free +1 800-325-3535. To register online and for directions, visit www.semi.org/asmc and click on the hotel information. Mention "ASMC" or "SEMI" to obtain the special group rate.

For schedule information and to register on-line, visit <http://www.semi.org/asmc> or contact Ms. Margaret Kindling, SEMI Washington, D.C., (mkindling@semi.org).

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Greater Boston Convention & Visitors Bureau

2006 University/Government/Industry Microelectronics Symposium (UGIM)

The 16th Biennial University/Government/Industry Microelectronics Symposium (UGIM'06) will be held in San Jose, California, June 25-28, 2006, on the campus of San Jose State University (SJSU). For the past 30 years this symposium has had the unique mission to bring together micro/nanofabrication researchers and educators from these three sectors, not only to present new technical results, but also the programs, collaborations, and laboratories that make them possible. Representatives of university micro/nanofabrication laboratories traditionally attend UGIM to exchange information. Government agencies such as NSF, Sematech, SRC, DARPA, AFRL and ONR regularly participate with updates on funding opportunities. Industry partnerships with universities (often with government support) that open up new opportunities for both education and research are frequently presented here. The Electron Devices Society of the IEEE is a technical co-sponsor of the UGIM symposia.

This year's host for the Symposium is the College of Engineering of San Jose State University. The College has been listed among U.S. News & World Report's top undergraduate engineering programs in the U.S.A., since hosting the ASEE Frontiers in Education conference in the 1980's. The following quotes from two Silicon Valley leaders describe San Jose State's role as a provider of engineering talent to Silicon Valley.

"San Jose State's College of Engineering and Silicon Valley grew up together...the College helped Industry with job-ready graduates whose hands-on skills made Silicon Valley the high technology leader." David Packard, Hewlett Packard

"San Jose State's Engineering College has had a very positive influence on the development of Silicon Valley. Graduates of this Professional School have contributed to the development of Intel since Intel's beginning in 1968." Robert Noyce, Intel



San Jose College of Engineering

The UGIM'06 technical session will begin on Monday, June 26th at 8:30 AM in the auditorium of SJSU's College of Engineering and end at noon on Wednesday, June 28th. This year's Symposium will have two laboratory open houses. The first will be on Sunday afternoon June 25 at 2:00 PM at the Stanford Nanofabrication Facility (SNF) (<http://snf.stanford.edu/>). The Second will be held on Monday evening at 5:00 PM at San Jose State University's Microelectronics Processing Engineering Laboratory (MPEL). The open houses will consist of an informal discussion session for managers and researchers from various microelectronics laboratory facilities followed by tours of SNF's and SJSU's facilities. The discussion will focus on issues such as funding, equipment acquisition, maintenance, staff, operational expenses, processing issues, industry interaction, collaborations with other universities, intellectual property and compatibility problems.

Papers will cover the following technical areas:

- New initiatives in university microelectronics programs, courses, laboratories, technology transfer, industry interaction
- Government-University microelectronics research programs
- Microelectronic research projects in the areas of materials, simulation, design, processes, testing, and reliability
- Process equipment development, manufacturing, statistical process control and design of experiments

- MEMS programs, courses, applications, processing, interactions, and research electronic packaging technologies, processes and materials
- Standard silicon and compound semiconductors
- Bioengineering and Biotechnology
- Nanotechnology and nanofabrication
- Metrology and sensors
- University microelectronics research facilities

Two distinguished speakers will give invited talks at the conference:

- Meyya Meyyappan (Director, Center for Nanotechnology, NASA Ames Research Center)
- Yoshio Nishi (Director, Stanford Nanofabrication Facility)

The city of San Jose is located in Silicon Valley and is the home to many microelectronics companies such as Intel, AMD, Applied Material, Novellus, Lam Research, National Semiconductor, Linear Technology, Cadence Design Systems, Synopsys, Mentor Graphics, Nvidia, Cisco, Atmel, Altera, and Cypress Semiconductor. Located in Northern California, San Jose is the largest city in the San Francisco Bay Area, third largest city in California, and the 10th largest city in the United States. San Jose is within one hour driving distance of downtown San Francisco and Santa Cruz beaches and several hours driving distance to Napa Valley and Yosemite National Park. It has one theme park, and one water park.

For more information on the Symposium, please visit the symposium website at <http://www.engr.sjsu.edu/ugim06>, or contact David Parent, One Washington Square Hall, EE Department, SJSU, San Jose, CA, 95192-0084 (E-mail: dparent@email.sjsu.edu).

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2006 IEEE Symposium on VLSI Technology

(continued from page 1)

- Theories and fundamentals related to the above devices.
- New concepts and technologies for VLSI manufacturing.

In addition to the innovative technical work presented at the conference, a one-day short course on "Process Technologies for Continuous Scaling" will be offered on the day preceding the conference, Monday June 12th. This short course offers an excellent opportunity for attendees to learn about the latest advances in semiconductor device and process technologies from a series of tutorials presented by industry experts.

Also preceding the conference is a satellite workshop on Silicon Nanoelectronics, which will be held at the Hilton Hawaiian Village on June 11-12. This workshop is sponsored by the Electron Devices Society and covers all aspects of silicon-based nanoelectronics. For further information visit the website <http://nano.nd.edu/si-nano>.

One of the unique strengths of the VLSI Technology Symposium is its association with the Symposium on VLSI Circuits, which is held each year at the same location during the same week. The 2006 Symposium on VLSI Circuits will also be held at the Hilton Hawaiian Village on June 15-17, with a circuits-related short course offered on June 14. In addition, a joint "Rump Session" on a topic of interest to both technologists and circuit designers will be held on the evening of Wednesday, June 14. This joint session will complement two additional rump sessions held the same evening on key issues of interest to the VLSI technical community.

Among other unique features that differentiate the Symposium on VLSI Technology are its spirit of international collaboration and emphasis on creating an informal atmosphere where new ideas and technology directions can be debated and discussed. The location of the VLSI Symposium typically alternates between the United States and Japan, giving it a true international setting. More than 800 participants from around the world attended the 2005 Technology Symposium in scenic Kyoto, Japan.

The 2006 venue in Honolulu, Hawaii also offers many scenic and cultural attractions. Travel to the other surrounding Hawaiian islands, each of which offers a unique setting and flavor, is also relatively easy. A luau banquet hosted by the Symposium on Tuesday night offers attendees an opportunity to further experience Polynesian food and culture. The Hilton Hawaiian Village hotel, located on world-famous Waikiki Beach, is a world-class facility that offers a wide range of recreational opportunities. The Hotel is easily accessible by taxi from nearby Honolulu International Airport.

For further information, please visit our conference web site at <http://www.vlssymposium.org>, or contact the following conference secretariats:

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We cordially invite you to attend the 2006 Symposium on VLSI Technology to learn about recent state-of-the-art advancements in semiconductor technology and take advantage of the many opportunities for technical and cultural interactions offered by the Symposium.

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Society News

December 2005 AdCom Meeting Summary



John K. Lowell

The 2005 Annual meeting of the IEEE Electron Devices Society was called to order by President, Hiroshi Iwai, on Sunday, 4 December, at the Washington, D.C. Hilton pre-

ceding the IEDM Conference.

Executive Reports

Given *Debt of Gratitude* certificates were elected members of AdCom, Cor Claeys, James Dayton, Masao Fukuma, Mikael Ostling, Kwyyro Lee, David Pulfrey, Ken Galloway (Meetings V-P), Steve Hillenius (Fellows Chair), Lucian Kasprzak (Device Reliability Physics TC Chair), and James Kuo (Membership V-P) who are leaving in 2005. Also receiving EDS Certificates were Hisayo Momose (EDS *Newsletter* Editor-NE Asia), Doug Verret (*T-ED* Editor-in-Chief), Yuan Taur (*EDL* Editor-in-Chief), Gady Golan (EDS *Newsletter* Editor-Middle East/Africa), Adelmo Ortiz-Conde (EDS *Newsletter* Editor-Latin America), and Werner Weber (adding ESSDERC proceedings on Xplore). Awarded *Years of Service* certificates from the EDS Executive Office were Laura Riello, Marlene James, Jo Ann Marsh, Mariola Piatkiewicz and William Van Der Vort.

Hiroshi's address focused on the results of the 2005 IEEE TAB meetings. Approved by TAB were the IEEE Computer Aided Design Council, and the Systems Council. He discussed the modified assignments of societies and councils to Divisions to equalize the size of each. For example, in Division I, CPMTS & LEOS have been reassigned and the Division now includes EDS, CASS, SSCS, ECAD Council and the Nanotechnology Council. Hiroshi reviewed the proposed TAB restructuring plans, and a new requirement for conferences to submit budgets to IEEE 9 months in advance with a rec-

ommended minimum surplus of 20%. Moving to EDS, he shared his view on progress EDS has made in the last two years regarding service to members, membership, and global promotion of EDS activities. While significant advancement has been made in these areas, at issue is the value of EDS membership since many of the original reasons, which centered on publications, have changed. Over the next couple years, EDS must adapt new initiatives to address membership issues, preservation of archive for the proceedings of EDS sponsored, co-sponsored, technical co-sponsored conferences/workshops, involvement from industry, improve publication quality, and continue promotion worldwide.

Treasurer, Juin Liou, reports that EDS finances have done well in 2005 but have not prospered as well as in the past due to lower conference income. He projected a \$234K net surplus for the year with a forecast \$136K net in 2006. [Note: all financial information within this report is in US\$.] Reserves rose to \$4,103K. Increased operating expenses, and losses from publications, T-DMR, and C&D Magazine also took a toll on the final net. Membership fees will stay fixed thru 2007, but EDL and T-ED costs will be raised by \$2. In 2007, the page count for EDL will increase while that for T-ED remains fixed.

V-P Reports

On the membership side, EDS had

11,219 members in 2005 holding fairly steady from 11,494 in 2004. Of these, 6,705 are regular members, 3,700 are permanent members, 785 are students, and 29 remain affiliate members. The demographics are given below.

John Lowell, reporting for Membership V-P, James Kuo, exemplified that the committee continues its promotions through credit voucher programs at IEDM, membership distributions at EDS conferences, promotion through the Distinguished Lecturer Program, using chapter subsidies to pay for memberships and subscriptions, and reinstated both TIP mailings, and the Senior Member Program. For 2006, AdCom approved the following changes in the Membership Fee Subsidy Program (MFSP): (1) EDS will now accept IEEE/EDS renewals, (2) each member/student can only be covered under this program once, and (3) four of the 12 members/students each year must be new IEEE/EDS members/students.

Regions/Chapters V-P, Cor Claeys, listed five new EDS chapters formed this year: AP/ED/MTT Malaysia, C/COM/ED Universidad Cristobal Colon Student Branch, ED Xian, ED Universidad del Sol Student Branch, and ED Bahia. This brings the current number of worldwide chapters to 120. Nineteen other chapters are in the discussion stage for 2006. Cor announced that ED/SSC Bangalore is EDS' "Chapter-of-the-Year" in 2005. He also discussed a new appointment

IEEE Region	Count	% of Total
1-6 (United States)	6,354	56.7
7 (Canada)	193	1.7
8 (Europe, Middle East, & Africa)	1,986	17.7
9 (Latin America)	161	1.4
10 (Asia Pacific)	2,525	22.5
Total	11,219	100

EDS Membership Demographics for 2005 (statistics as of 10/31/05)



Presiding over the 2005 EDS Administrative Committee (AdCom) Meeting in Washington, D.C., are (left to right), William Van Der Vort, EDS Executive Director, Ilesanmi Adesida, EDS President-Elect and Hiroshi Iwai, EDS President.

policy and other guidelines to revive the Chapters Partners program. Paul Yu, Education V-P, gave statistics on the Distinguished Lecturer (DL) program. Both the number of lecturers (139) and the number of lectures given (142) have escalated from their 2004 levels. As stated above, activity with the EDS Videotape Lending Library continues to decline. Plans are underway to convert them to DVD, or donate them to universities as the program is phased out. The EDS Graduate Student Fellowship Program had another successful year. This year's winners were Sun-Jung Kim (Natl. University, Singapore), Tony Aik Sing Low (Natl. University, Singapore), Elena Smotrova (Natl. Academy of Sciences, Ukraine), and Christopher Morris (Univ. of Washington). Funding and recognition for the DL program was also outlined. In conclusion, Paul outlined a new EduCom GSF Award aimed at students who are starting graduate work at the Masters level. The plan is to recognize worthy students at the onset of graduate study, complimenting the original GSF which targets established doctoral students. Students would apply in their senior year of undergraduate work to compete for one of five awards at \$2K each. Funding for the award received AdCom approval.

Renuka Jindal, Publications V-P, reported that paper circulation for *EDL & T-ED* fell below 5,000 for the first time in twenty years. While this is not alarming, as web-based circulation has expanded, it is viewed in parallel with the declining EDS membership base. Discussion continues on the definition of "nanotechnology" within EDS publications. According to Renuka, if a paper refers to a "device" be it, elec-

tronic, photonic, or organic, then it falls within the realm of EDS interests. In addition, the confidentiality of paper reviews has been an issue this year. In some instances, reviewer comments have been used for situations not related to author feedback. While specifics are confidential, Renuka assured that any use of this material outside of the review process is assumed to be inappropriate. On the financial side, the state of *C&D Magazine* remains an issue. In the 2006 budget, three societies are due to be charged \$40K, and in 2007, both LEOS and CASS will be withdrawing sponsorship; and as a result EDS is projected to put in \$65K by itself. The fact that Division I has changed, and is no longer represented by the societies under which the original magazine was formed is another factor. Renuka has been working behind the scenes to come up with a financial model that would allow the magazine to continue. Suggested formats are (1) an all-electronic journal similar to *Transactions on Device and Materials Reliability (T-DMR)* or (2) a Common Design Service model (where all issues will look the same). A decision is due in early 2006 as to whether EDS will continue its sponsorship for 2007. Another publication with financial problems is T-DMR. For its first four years of publication, T-DMR lost \$257K, with EDS covering 50% of the loss. The journal is expected to experience a surplus of about \$44K in 2005. In 2006, this is significantly reduced, as the publication will receive less revenue than expected from the All Society Periodicals Packages (ASPP), due to the recent changes to the distribution algorithm. The Advisory Board is seriously considering

unbundling the journal in 2007 which will allow them to operate at a break-even level. Renuka reminded everyone that the EDS Archival Collection DVD is only available to EDS members, as a means to increase the value of EDS membership. In addition, there are plans for a pilot project to convert the IEDM short course videotapes to DVD to be sold on a member-preferential basis. A long-term plan to possibly archive the proceedings from twelve fully supported conferences (other than IEDM), and thirty-five technically supported conferences is also being discussed. The Publications Committee has been charged with deciding which of these meetings is interested, and appropriate. This year's Paul Rappaport and the George E. Smith awards winners (see the October EDS *Newsletter* for details) were given, and the reviewer luncheon was also discussed. Renuka unveiled a new pilot project tentatively called "Ask EDS". The impetus for this effort came from the frequent questions from EDS members addressed to the *EDL & T-ED* editors. Through the new program, a talent pool of technical committee members, DLs, AdCom members, EDS members-at-large, and non-EDS experts would be called upon to answer inquiries on various topics. The replies are intended to be of a general nature with a liability disclaimer. Hiroshi approved \$5K to fund this project for one year.

Jon Candelaria, General Chair of the 2005 IEDM, expects 1,500 attendees and 450 at the Short Courses. The financials project an expected surplus of \$79K. Hot topics for the plenary and panel sessions are the impact future scaling of CMOS, display technology, and non-volatile memories. Meetings V-P, Ken Galloway got approval for all EDS repeat meetings in 2007, and gave statistics on those for 2005. This past year EDS supported 25 financially sponsored meetings, 79 that were technically co-sponsored, and none with cooperative support. Meeting closing continues to be problematic and cost EDS \$2.5K this year. Over the last five years, late closings fees of \$14.5K were charged to EDS. Continuing the topic of meetings, Technical Activities V-P, Mark Law has looked at meeting relevancy. The issue here is that many meetings deal with a

wide variety of topics making it difficult to assign them to a specific technical committee for guidance. Moreover, many meetings are "regional", addressing themselves to attendees from a defined locale, and cover a broad range and not just one specific technical area, falling outside the EDS meeting mainstream. Interest in an "umbrella" meeting, wherein several small meetings could meet simultaneously sharing the cost, has been minimal. Mark will try to get a larger meeting to cooperate.

Chair Reports

Award's V-P, Al Mac Rae, presented his list of EDS members recognized with major national, IEEE, and EDS awards in 2005. Summarized as follows:

With the Fellows report, Chairman, Steve Hillenius, stated that from the 56 nominations EDS received, 11 EDS members were promoted to Fellow grade. There were also another 12 EDS members elected Fellow who were reviewed by other societies. EDL EIC Yuan Taur, reports that EDL published 269 papers this year, an increase of 8% over 2004. He is planning to add a new Associate Editor for molecular electronics. Division I Director, Lew Terman, presented on the state of the Division. Highlights of his report focused on the key IEEE issues of membership, finances, and the TAB reorganization. Current IEEE membership is flat and trends show a decrease of 2% yearly in the U.S., and a 5% increase elsewhere. At this rate, in fourteen years the ratio of U.S. to non-U.S. membership will be 50-50. Society membership is also declining at a 5% per year rate. IEEE reserves now stand at \$140M. The TAB restructuring is driven by several issues one involving the financial situation of the IEEE Computer Society. In addition, TAB has become too big and unwieldy. The Board of Directors plans to reduce the infrastructure charges allotted to each society. They are also looking to add member benefits by adding special search engines to Xplore.

Technical Committee (TC)

& General Business Reports

Philip Wong's Nanotechnology TC

Award	Recipient/Affiliation
IEEE Medal of Honor	James Meindl (Georgia Tech)
IEEE Frederick Phillips Award	Louis Parrillo (Parrillo Consulting)
IEEE Jun-ichi Nishizawa Medal	Mitsumasa Koyanagi (Tohoku Univ.), Kiyoo Itoh (Hitachi) and Hideo Sunami (Hiroshima Univ.)
IEEE Andrew S. Grove Award	Chang-Gyu Hwang (Samsung)
IEEE Daniel Noble Award	Carlos A. Paz de Araujo (Univ. Colorado)
IEEE Cleo Brunetti Award	Susumu Namba (Nagasaki Inst. of Applied Science)
EDS J.J. Ebers	Bijan Divari (IBM)
EDS Distinguished Service Award	Cary Yang (Santa Clara University)

EDS Recipients of National, IEEE, and EDS Awards for 2005

has been busy with editor recommendations for *EDL*, *Transactions on Nanotechnology (T-Nano)* & *T-ED*. Optoelectronics TC Chair, Leda Lunardi reported on several tasks such as identifying special issue topics and reviewing requests for sponsored meetings. Their list of hot topics for 2006 includes photonic circuits, silicon optoelectronics, free-space laser communications, and multimode fiber links. She also reviewed a proposed change in the agreement with OSA on the *Journal of Lightwave Technology (JLT)*. The new agreement gives all contributing societies an equal share of the costs and the surplus instead of being OSA dominant. The new agreement received AdCom approval. Enrico Sangiorgi, leader of the Technology Computer Aided Design (TCAD) TC, discussed the preparation of a special, *T-ED* issue. In other reports, Paul Yu reviewed the status of EDS participation in the IEEE Expert Now (formerly XELL) short course program. The thrust is to offer 1-hour online learning modules available 24x7 offering the latest information on emerging technology reported at IEEE conference tutorials. Lu Kasprzak outlined the proposed financial changes for *T-DMR*. Since the formula for distributing ASPP funds has changed, the publication needs additional revenue in 2007. It is seriously considering to unbundle itself, meaning in 2007, it will no longer be free. Subscriptions for soft copy, hard copy, CD and combinations will be sold, and members

of sponsoring societies will be billed for soft copy. Lu projects that 10% of the 13,000 combined memberships of EDS and the Reliability Society would subscribe, giving them revenue of \$25K. AdCom approved the new financial structure. Pricing trade-offs with the co-sponsoring Reliability Society will be discussed in 2006.

Publication Reports

Reporting on *T-ED*, Editor-in-Chief, Doug Verret, showed that the page count for 2005 increased significantly due to the publication of two special issues. Speaking for *T-DMR*, the EIC, Tony Oates, stated that the publication has been holding a steady page count of about 730 pages for the last two years. He is hoping for an increase in the near future. Its 2004 downloads on Xplore have grown to the 70th percentile. *Transactions on Semiconductor Manufacturing (T-SM)*, according to Editor Duane Boning, is publishing around 640 pages each year, and will move to IEEE Manuscript Central in 2006. It has just finished its five-year IEEE Periodical Review.

Newly Elected EDS Offices

For 2006, your elected EDS officers are President, Ilesanmi Adesida, President-Elect, Cor Claeys, Treasurer Juin Liou, and Secretary, John Lowell. Re-elected to a second AdCom term were Francisco Garcia Sanchez (Universidad Simon Bolivar, Caracas, Venezuela) and Juin Liou (Univ. of Central Florida). New-

Motion	Action
Approval of Minutes from Spring AdCom 2005	Passed
Approval of Ex-Officio Appointments for 2006	Passed
Approval of Publications Page Count & Member Fees for 2007	Passed
Approval of Changes in Membership Fee Subsidy Program	Passed
Approval of Meetings List for 2007	Passed
Approval of new <i>JLT</i> Funding Agreement	Passed
Approval of Changes to <i>T-DMR</i> Fee Structure	Passed
Pledged \$10K to Fund Masters-Level Grad Student Fellowship	Passed
Approval of EDS Education Award	Passed

Summary of EDS AdCom Actions – December 2005

ly elected AdCom members include Jamal Deen (McMaster University, Ontario, Canada), James B. Kuo (National Taiwan University, Taipei), Giorgio Baccarani (University of Bologna, Italy), Huiling Shang (IBM), Jacobus W. Swart (State University of Campinas, Brazil), and Sunit Tyagi (Intel).

The next meeting of EDS AdCom will be on Sunday, June 4, 2006, in Naples, Italy.

John K. Lowell
EDS Secretary
Lowell Consulting
Dallas, TX, USA

MESSAGE FROM THE EDS NEWSLETTER EDITOR-IN-CHIEF



Ninoslav D.
Stojadinovic

I am writing this message after a lapse of almost a year. It is sometimes astonishing to see how quickly the year has gone by. As professionals, all of us are very busy in our work. I hope that

this issue comes at a very prosperous time in your career.

I would like to take this opportunity to thank three outgoing Regional Editors for outstanding service to the Newsletter and Electron Devices community. They are Gady Golan (Region 8 - UK, Middle East & Africa), Adelmo Ortiz-Conde (Region 9 - Latin America) and Hisayo Sasaki Momose (Region 10 - Northeast Asia). Their outstanding voluntary contributions for the past six years, as regional newsletter editors, are exemplary to the rest of us. Replacing them on the Newsletter Editorial Staff are Zhirun Hu, Jacobus W. Swart and Kazuo Tsutsui, respectively, whose biographies follow. It is my pleasure to welcome them as new editors for the *EDS Newsletter*.



Zhirun Hu received his B. Eng in telecommunication engineering from Nanjing University of Posts and Telecommunications, Nanjing, China, in 1982, Master in Business Administration, and Ph.D. in electrical and electronic engineering from the Queen's University of Belfast, United Kingdom, in 1988 and 1991, respectively.

In 1991, he joined the Department of Electrical and Electronic Engineering, University College of Swansea, as a senior research assistant in computational semiconductor device simulation. In 1994, he rejoined the Department of Electrical and Electronic Engineering, the Queen's University of Belfast, as a research fellow in silicon MMIC design, realization and characterization. In 1996, he joined GEC Marconi, as a microwave technologist working on microwave/millimetre-wave device and circuit design and characterisation. He was a lecturer with the Department of Electronic Engineering, King's College London from 1998 to 2003. He joined the Department of Electrical and Electronic Engineering, the University of Manchester, England, in January 2004.

His main research interests are in high frequency device and circuit modelling, optimization, design, realization and characterisation. He has published 45 referred journal and conference papers

His most important IEEE activities include: (1) People to People Ambassador Programs Electron Devices Delegation to China led by Professor Cary Y. Yang in 2001, and (2) IEEE UK & RI GOLD committee member.



Jacobus W. Swart received the B. Engineer and Dr. Engineer Degrees in 1975 and 1981 respectively, from the Polytechnic School, University of São Paulo, Brazil. Following, he worked at: K. U. Leuven, Belgium, 1982-83; CTI, Campinas, 1984; LSI-University of São Paulo, 1985-88; RTI, USA, 1991, and The School of Electrical and Computer Engineering, State University of Campinas, since 1988; presently as Full Professor. Dr. Swart has published 40 papers in Journals and 150 full papers in Proceedings of Conferences. He has advised 32 Dr. and MSc. degree students. He is a Senior Member of IEEE, member of

ECS, SBMicro, SBMO and SBPC and has been president of SBMicro twice, 1988-90 and 1998-2000.



1981, 1983 and 1986, respectively. He

Kazuo Tsutsui received the B.S., M.S., and Dr. of Engineering degree from the Dept. of Applied Electronics, Tokyo Institute of Technology, Japan, in

joined the Dept. of Physical Electronics (1986-1989) and Dept. of Applied Electronics (1989-1992), Tokyo Institute of Technology as a Research Associate. Since 1992, he has been Associate Professor of Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology. Currently, he is doing research on heteroepitaxial growth of dissimilar materials on semiconductors, integration of quantum effect devices, and process technologies for nano-CMOS. He is a member of IEEE EDS, Japan Society of

Applied Physics, and IEICE of Japan. He has been Secretary of the IEEE EDS Japan Chapter since 2004.

Once again, I thank the outgoing editors for their dedicated service to the Newsletter and welcome the new editors and wish them all success. Please contact your respective Regional Editor directly with news items.

Ninoslav D. Stojadinovic
EDS Newsletter Editor-in-Chief
University of Nis
Serbia and Montenegro

EDS Educational Activities Committee Report



Paul K.L. Yu

The objectives of the Educational Activities Committee are to provide the forum and opportunities for members to expand their knowledge of our technical fields.

The Committee also seeks to provide opportunities for the Society to attract new members and to promote membership and student activities. The Committee's membership strength in 2005 was sixteen, and its members were appointed by the President to reflect the worldwide geographical spread of the Society. The Vice President for Education who chaired the committee was Paul Yu of the University of California, San Diego, USA, and the other members were K. S. Chari (Electronics Niketan, India); Jamal Deen (McMaster University, Canada); Magali Estrada del Cueto (CINVESTAV-IPN, Mexico); Yoshiaki Hagiwara (Sony Corporation, Japan); Agis Illiadis (University of Maryland, USA); Kevin T. Kornegay (Cornell University, USA); Kei-May Lau (Hong Kong University of Science & Technology, Hong Kong); Juin Liou (University of Central Florida, USA); Rebecca J. Nikolic (Lawrence Livermore Nat. Lab., USA); Stephen A. Parke (Boise State University, USA); Jayasimha S. Prasad (Maxim Corporation, USA); Marcel D. Profirescu (Technical Uni-

versity of Bucharest, Romania); Arlene A. Santos (Department of Defense, USA); Sunit Tyagi (Intel, USA); and Philip Wong (Stanford University, USA). The committee physically met during the spring EDS Administrative Committee (AdCom) meeting in Madrid, Spain, and fall AdCom meeting in Washington, D.C. Committee business was conducted mostly by electronic means between the two meetings.

An important function of the Committee is to maintain a vibrant Distinguished Lecturer (DL) Program for the Society. The DL Program exists for the purpose of providing EDS chapters with a list of quality lecturers who can give talks at local chapter meetings and other occasions. The listing of Distinguished Lecturers along with their topics and travel schedules is maintained on the EDS homepage. The listing is reviewed yearly and to remain on the roster, a Distinguished Lecturer must actively perform lectures. The year 2005, ended with a roster of 139 lecturers. There were over 142 lectures conducted all over the world from Belarus to Egypt to Seoul to the United States by well over half of our Distinguished Lecturers. To arrange for a lecture, EDS chapters are encouraged to contact lecturers directly. A general guideline for the visit, but not the absolute rule, is that the lecturer should be able to include the meeting site with an already planned travel schedule at a small

incremental cost to the travel plan. Alternatively, a prior coincident travel plan would not be required if the lecturer is already located within an approximate fifty mile radius of a meeting site. Although the concept of the program is to have the lecturers minimize travel costs by combining their visits with planned business trips, however EDS will assist in subsidizing lecturers' travel as needed.

At the past EDS AdCom Meeting a few changes were approved in regards to the EDS Distinguished Lecturer Program. The nomination and selection process of DLs will now be approved twice a year at the June and December AdCom Meetings. Also, each DL must now give 2 lecture talks within 2 years to remain as an active EDS DL. A certificate of recognition will now be presented to the DLs who continue serving as a DL for 5 years.

In addition to the individual lectures, there were seven mini-colloquia conducted last year. The mini-colloquia concept generally involves sending about 2 or more Distinguished Lecturers to travel to a region/chapter and present the latest developments in a particular field. The chapters/regions would be responsible for handling all the arrangements of the event and only minimal financial support would be required of EDS and could be covered by the DL Program budget upon request. The seven were held in Hong Kong, Japan, Korea, Mexico,

Singapore, Taiwan, and Boise, Idaho, respectively. Several mini-colloquia are already being planned for 2006, and reports on the DL Program are presented frequently in this newsletter. For more information, please contact Laura Riello of the EDS Executive Office (l.riello@ieee.org). Feedbacks are actively solicited on the program from chapter chairs, lecturers, and members of the society.

The Graduate Student Fellowships Program (GSFP) for Ph.D. candidates was established five years ago under the auspices of the Committee. For 2005, the Chair of the GSFP sub-committee was Stephen Parke. There were four awards made last year with the winners being presented with their awards at the IEDM in Washington D.C. The winners were Elena Smotrova of the National Academy of Sciences of Ukraine, Ukraine; Christopher J. Morris of the University of Washington, U.S.A; and Sung Jung Kim and Tony A. S. Low of the National University of Singapore, the Republic of Singapore. Reports on these winners are published in this issue of

the Newsletter. Advertisement for the next competition with the qualifications required and the remunerations, are also published in this Newsletter and other EDS publications. We are appealing to all our members to advertise the program among potential candidates and nominators so that students are aware of this opportunity for funding and recognition. With these awards, we hope to assist the very best students in our fields and also to make a positive impact on the future leaders of our Society.

The EDS AdCom recently approved a new Masters level Graduate Student Fellowship. This new award is for graduating college seniors to encourage them to go to graduate school and reward their undergraduate research work. We are waiting for formal IEEE approval which may take place at the June 2006 IEEE Meeting Series.

The Committee worked with the IEEE Educational Activities Board (EAB) on the new Educational Products Initiative that was launched in 2003, entitled, IEEE

Expert Now (formerly XELL). This is a continuing education program which seeks to deliver short courses over the web. This is an experimental program and EDS is one of the societies assisting in validating this program. EDS is currently sponsoring four courses which contain lectures by Yuan Taur, Wayne Ellis, John Cressler, Curt Richter and Duncan Stewart. Arlene Santos has agreed to be the EDS Liaison to the EAB for the IEEE Expert Now program.

Lastly, the committee is continuously exploring ways and mechanisms of involving students and gold members in conferences and other activities of the Society. If you have any suggestions or information on these or any other activities that you may want us to engage in, please contact me at p.yu@ieee.org.

*Paul K.L. Yu
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EDS NANOTECHNOLOGY COMMITTEE REPORT



Philip Wong

The EDS Nanotechnology Technical Committee serves as the technical resource for the Electron Devices Society. We have continued renewal of our committee membership.

This year, the members are Mark Reed (Yale University), Karen Maex (IMEC), Edwin Kan (Cornell University), Joerg Appenzeller (IBM Research), Kaustav Banerjee (University of California, Santa Barbara), Toshiro Hiramoto (University of Tokyo), Hiroshi Iwai (Tokyo Institute of Technology), and H.-S. Philip Wong (Stanford University). The membership covers a broad range of expertise from nanoscale CMOS, nanowire, nanotubes, self-

assembly, molecular electronics, and other "nano" topics. They come from a variety of backgrounds (industry and academia) and geographic locations (U.S., Japan, Europe).

Nanotechnology is a vibrant and fast growing field. We work on getting EDS more involved in the nanotechnology field. In the past year, we have been active in several activities in the service of EDS. They include:

- reviewed several EDS meeting sponsorship proposals.
- Conducted a satisfaction survey of the IEEE Transactions on Nanotechnology Journal.
- Recommended a slate of candidates to *T-ED* Editor-in-Chief for possible replacement of Editor in the nanotechnology area
- Recommended a slate of candi-

dates to Transactions on Nanotechnology for possible replacement of 3 Editors in three major areas

- Recommended a slate of candidates to *EDL* Editor-in-Chief for possible addition to the editorial board in the molecular electronics area

In the coming year, we will continue to serve in the above areas. In addition, we will conduct a survey of key nanotechnology conferences that EDS should be actively involved in. We are always looking for new members and ideas for improvement. Please contact the committee chair, H.-S. Philip Wong, for suggestions and ideas.

*H.-S. Philip Wong
EDS Nanotechnology
Committee Chair
Stanford University
Stanford, CA, USA*

EDS Photovoltaic Devices Committee Report

Observations on Photovoltaics in China



Dennis J. Flood

If the nature of the 15th Photovoltaic Science and Engineering Conference (PVSEC-15) is any indication, the health of the PV industry in China is marching inexorably toward world-class status.

The meeting, held in Shanghai, October 10-14, 2005, is one of the largest in the history of the Asian conference series, and stands second only to the World Conference on Photovoltaic Energy Conversion held in Osaka in May 2003. (The World Conferences are joint meetings of the U.S. IEEE Photovoltaic Specialists Conference, the European Photovoltaic Solar Energy Conference and the Asian Photovoltaic Science and Engineering Conference and are held on an approximate 4-year rotation among the three conference organizations.) In addition to a technical program with nearly 700 presentations, the Conference also included an industrial exhibits area that was host to over

220 companies, about 100 of which came from China itself.

The technical program reflected China's rapid rise up the learning curve toward technical par with the three major PV communities, i.e. the United States, Europe and Japan. The majority of papers were on silicon solar cells of one material type or another (single crystalline and polycrystalline Si, amorphous Si, microcrystalline Si, etc.), but also included the full spectrum of topics normally found at the other conferences as well: fundamentals and novel devices; thin film solar cells; compound semiconductor solar cells; photovoltaic systems (both building integrated and grid connected); module manufacturing and field testing; and space solar cells and systems as well as sessions on policy and economics relating to photovoltaic energy conversion implementation and use. According to the Conference Chair, Professor Dinghuan Shi, President of the Chinese Solar Energy Society, the Chinese PV industry production capacity rose from about 100MW in 2004 to 250MW in 2005. This rapid growth is spurred by offi-

cial Chinese Government policy that calls for 10% of total power generation in China to be from renewable sources by 2020, with at least 1% guaranteed to be from PV alone. The plan also calls for the entire western part of China to be served by renewable energy sources by the above date.

While it is clear that China's internal market is huge and a first priority, the Chinese PV industry also has taken aim at the world export market. Products that were on display in the exhibits area were of sufficient quality to compete effectively with suppliers from the traditional "big three" producing areas (Japan, Europe and the U.S.). Beyond that, a cell and module manufacturing equipment industry has emerged within China and although its quality and capability could not be determined, it is reasonable to expect that lower cost Chinese equipment will enable lower module prices in world markets for Chinese modules. Time will tell.

Dennis J. Flood
EDS Photovoltaic Devices
Committee Chair
North Coast Initiatives, Ltd.
Oberlin, OH, USA

2005 EDS J.J. Ebers Award Winner



Bijan Davari

The 2005 J.J. Ebers Award, the prestigious Electron Devices Society award for outstanding technical contributions to electron devices, was presented to Dr. Bijan Davari of IBM, Yorktown Heights, NY, at the International Electron Devices Meeting in Washington, D.C., on December 5, 2005. This award recognizes Dr. Davari "for contributions to deep-submicron CMOS technology and their impact on the IC industry."

Bijan Davari was born in Tehran,

Iran. He received his B.S. degree in Electrical Engineering from Sharif University of Technology, Tehran in 1977, and his M.S. and Ph.D. degrees in Electrical Engineering from Rensselaer Polytechnic Institute, Troy, NY, in 1979 and 1984, respectively. He then joined IBM Research Division, Thomas J. Watson Research Center, Yorktown Heights, NY, where he first worked on various aspects of scaled CMOS and BiCMOS technologies, under the tutelage of Bob Dennard and Tak Ning.

Dr. Davari then became the technical leader of the research and development effort leading to the first generation of high-performance, low-voltage deep-submicron CMOS

which offered sufficient system level performance to displace bipolar technology in IBM mainframes and enable new faster UNIX servers. Previously, all high-speed computers used bipolar or BiCMOS technology. This 2.5V, 0.25 μm channel-length CMOS technology solved key device scaling and technical problems to integrate shallow-trench-isolation, dual-doped poly gates, and abrupt silicided source-drain junctions. This work, which Bijan presented at the 1988 IEDM, set the standard for performance-optimized, low-power CMOS and led to the adoption of low-voltage standards in JEDEC and in the industry, which before that time was firmly on a 3.3-5V path.

In the same period, Bijan and the IBM team demonstrated the first shallow trench isolation process, which he named STI in his 1989 IEDM paper. He then installed this process in manufacturing using chemical-mechanical-polish planarization. This STI process was first used in IBM's 0.5 μ m technology node for both high-performance CMOS logic and 16Mb DRAM, and is now used throughout the industry.

In 1992, Dr. Davari was appointed director of CMOS logic technology in IBM Microelectronics Division where he led the development of IBM's technology nodes from 0.35 μ m through 0.18 μ m CMOS. Bijan was appointed an IBM Fellow in 1996.

In 1998 he became Vice President of Technology and Emerging Products, leading IBM's

Semiconductor Research and Development Center (SRDC) at Hopewell Junction, NY. Bijan and his team were responsible for the definition and development of pioneering technologies such as copper interconnect, silicon on insulator (SOI) and high-performance logic based embedded DRAM (eDRAM). In 2003, he was named Vice President of Next Generation Computing Systems/Technology. In this capacity, Dr. Davari leads efforts for the definition and development of IBM's future generation systems.

Bijan Davari has authored or co-authored over 70 publications in various aspects of semiconductor devices and technology. He is an IEEE fellow, and he was IEDM Device Technology Committee Chairman and Short Course Chairman during 1990-1995.

Bijan and his wife Andrea live in Mahopac, NY with their daughter Danielle who is 15. Bijan enjoys swimming, cycling, and spending time with his family. He is an avid fan of Pink Floyd, Rachmaninoff, Charles Darwin and Omar Khayyam!!

*Louis C. Parrillo
EDS J.J. Ebers Award Chair
Parrillo Consulting, LLC
Austin, TX, USA*

2006 EDS J.J. EBERS AWARD CALL FOR NOMINATIONS

The IEEE Electron Devices Society invites the submission of nominations for the 2006 J.J. Ebers Award. This award is presented annually for outstanding technical contributions to electron devices. The recipient(s) is awarded a certificate and a check for \$5,000, presented in December at the International Electron Devices Meeting (IEDM).

Nomination forms can be requested from the EDS Executive Office (see contact information on page 2) or is available on the web at www.ieee.org/eds/. The deadline for the submission of nominations for the 2006 award is 1 July.

2005 EDS Distinguished Service Award



Cary Y. Yang

The IEEE Electron Devices Society is extremely proud of the services that it provides to its members. Its members generate the premier new developments in the field of electron devices

and share these results with their peers and the world at large by publishing their papers in EDS journals and presenting results in its meetings. This is a global activity that is effective because of the efforts of numerous volunteers. Many of these volunteers labor in relative obscurity, with their only reward being the satisfaction that they receive in being an important part of a successful organization, namely of the Electron Devices Society. They should be thanked.

The 2005 EDS Distinguished Service Award was presented to Cary Y. Yang at the International Electron Devices Meeting in Washington, D.C., on December 5, 2005.

Cary Yang was born in China, in 1948. He first arrived in the United States in 1967 and received the B.S., M.S., and Ph.D. degrees in electrical engineering from the University of Pennsylvania in 1970, 1971, and 1975, respectively. For his doctoral research, he studied the electronic and optical properties of IV-VI narrow-gap semiconductors. His postdoctoral work at M.I.T. introduced him to the field of surface science, where he examined the detailed electronic structure of chemisorbed molecules on heavy transition metal surfaces.

He joined NASA Ames Research Center in Moffett Field, California in 1976 and extended his chemisorption study to include surfaces of submicron metal particles. Working with theoretic

cal chemists as well as electron microscopists at Ames, he was able to model and verify the five-fold (hence non-bulk) symmetry of these particles. After a brief stay at Stanford University in the Stanford-NASA Ames Joint Institute on Surface and Microstructure Research, he founded Surface Analytic Research, Inc. in Mountain View, California, and directed sponsored research in surface and nanostructure science. In 1983 he joined Santa Clara University and founded the Microelectronics Laboratory, for teaching and research on silicon-based devices and circuits. He currently holds the positions of Professor of Electrical Engineering, Associate Dean of Engineering, and Director of the Center for Nanostructures. At present, he is spending his sabbatical quarter as Visiting Professor at the University of California, San Diego. His current research is on nanostructure interfaces and interconnects in electronic and biological systems.

Over the past two decades, he has initiated innovative programs to educate and train technical professionals in various stages of their careers. In the eighties, he developed and organized short courses on timely topics in silicon technology to Silicon Valley professionals. In the mid-nineties, he offered short courses on semiconductor technology for SEMI as part of a retraining program for professionals in other fields. Since the mid-eighties, he has provided opportunities for his students to spend extended periods in companies in Japan, where they collaborated with their hosts on their thesis research. More recently, he founded the Center for Nanostructures at Santa Clara, which offers interdisciplinary research and education opportunities in the field of nanoscience and nanotechnology for university students and faculty,

high school students and teachers, as well as Silicon Valley technical professionals.

He has been a consultant to industry and government, and a visiting professor at Tokyo Institute of Technology, University of Tsukuba, National University of Singapore, University of Pennsylvania, University of California, San Diego, and University of California, Berkeley. He was elected Fellow of IEEE in 1999. He served as an editor of the *IEEE Transactions on Electron Devices*, in the area of MOS devices. In 2001, on behalf of People to People Ambassadors Program, he led an Electron Devices Delegation to visit universities, government institutes, and companies in the People's Republic of China. In 2004, he was named the recipient of the IEEE Educational Activities Board Meritorious Achieve-

ment Award in Continuing Education "for extensive and innovative contributions to the continuing education of working professionals in the field of micro/ nanoelectronics".

Cary resides in Cupertino, California with his partner, Marie, a classical singer. His elder daughter, Elaine, an aspiring impressionist painter, works as a technical recruiter in a Silicon Valley semiconductor company. His younger daughter, Jocelyn, studies computer science and biology at the University of California, San Diego. He spends his spare time playing tennis and hiking on various trails in Silicon Valley.

*H. Craig C. Casey, Jr.
EDS Distinguished
Service Award Chair
Duke University
Durham, NC, USA*

2006 Charles Stark Draper Prize

The National Academy of Engineering awarded the 2006 Charles Stark Draper Prize to Willard S. Boyle and George E. Smith in recognition of their patent, "Information Storage Devices", which describes the basic technology concept of Charge-Coupled Devices. The citation reads, "For the invention of the Charge-Coupled Device (CCD), a light sensitive component that is at the heart of digital cameras and other widely used imaging technologies." The prize of \$500,000 is shared by the recipients and is an annual award that honors engineers whose accomplishments have significantly benefited society.

CCDs are the key component in digital cameras and camcorders, fax machines and scanners, reconnaissance and weather forecasting satellites, space and terrestrial telescopes, and miniature medical imaging devices. The digital output of a CCD is readily processed to enhance images, capable of being transmitted over great distances and stored for future use. Our easy ability to improve and manipulate images is a delightful benefit of using digital cameras. Photographic film cameras are rapidly being replaced by these CCD based

cameras in the consumer product market-place. It goes without saying that a CCD is in billions of dollars of product that are shipped every year.



PHOTO COURTESY OF LUCENT TECHNOLOGIES, BELL LABS

William Boyle (left) and George Smith (right) demonstrating a TV camera that uses a CCD.

George Smith is well known by IEEE Electron Devices Society members as the first and long time editor of the rapid publication; peer reviewed and widely read "Electron Device Letters". Indeed, the EDS George E. Smith Award is given annually for the best paper in this journal.

As the story of the CCD goes, Jack

Morton, then Vice President of the Electronic Material and Components Area of Bell Telephone Laboratories asked Bill Boyle, one of his Executive Directors, if there were an electrical analog to the magnetic bubble device, where small magnetic domains, or bubbles, were moved under the influence of a magnetic field. Research on magnetic bubble materials and their application to static memory and logic devices was actively pursued at Bell Labs at that time. Bill Boyle went to George Smith, then Head of the Imaging Device Department, and their brainstorming session resulted in the basic concept of the CCD. The apparent simplicity of the CCD was appealing. The Bell Labs organization supported and encouraged such innovation - and it thrived in this environment. Every new idea is the product of its time and CCDs were no exception. These were exciting times at Bell Labs and the semiconductor institutions of the world.

*Alfred U. Mac Rae
EDS Vice-President of Awards
Mac Rae Technologies
Berkeley Heights, NJ, USA*

23 EDS Members Elected to the IEEE Grade of Fellow - Effective 1 January 2006

Muhammad Alam, Purdue University, West Lafayette, IN, USA
- for contributions to complementary metal oxide semiconductors (CMOS) circuit reliability and computational models for electronics and optoelectronics

Jesus del Alamo, Massachusetts Institute of Technology, Cambridge, MA, USA
- for contributions to microelectronic devices

Seshu Desu, University of Massachusetts-Amherst, Amherst, MA, USA
- for contributions to development of ferroelectric thin film devices

Andreas Andreou, Johns Hopkins University, Baltimore, MD, USA
- for contributions to energy efficient sensory microsystems

Gary Bernstein, University of Notre Dame, Notre Dame, IN, USA
- for contributions to techniques for fabricating nanoscale devices and circuits

Steve Chung, National Chiao Tung University, Hsinchu, Taiwan
- for contributions to reliability in ultra-thin-oxide complementary metal oxide semiconductor (CMOS) devices

Simon Deleonibus, CEA LETI, Grenoble Cedex 9, France
- for contributions to nanoscaled complementary metal oxide semiconductor (CMOS) devices technology

Hector De Los Santos, NanoMEMS Research, LLC, Irvine, CA, USA
- for contributions to radio frequency (RF) and microwave micro electro-mechanical systems (MEMS) devices and applications

Martin Giles, Intel Corporation, Hillsboro, OR, USA
- for contributions to technology computer aided design (TCAD) modeling of processes and devices

Hideki Hayashi, Sumitomo Electric Industries, Tokyo, Japan
- for contributions to and leadership in compound semiconductor device technologies

Larry Hornbeck, Texas Instruments DLP Products, Van Alstyne, TX, USA
- for invention, development, and applications of the Digital Micromirror Device

Qin (Alex) Huang, North Carolina State University, Raleigh, NC, USA
- for contributions to emitter turn-off thyristor technology and its applications

Muhammad Khan, University of South Carolina, Columbia, SC, USA
- for contributions to the development of III-nitride electronic sensor systems

Mong-Song Liang, TSMC (Taiwan Semiconductor Manufacturing Company, Ltd), Hsin Chu, Taiwan, ROC
- for contributions to semiconductor manufacturing technologies

Gary May, Georgia Institute of Technology, Atlanta, GA, USA
- for contributions to semiconductor manufacturing and engineering education

David Seiler, National Institute of Standards and Technology, Gaithersburg, MD, USA
- for leadership in the development of critical metrology and measurement science at the micro and nano levels

Goran Stemme, Royal Institute of Technology, Stockholm, Sweden
- for contributions to micro electro-mechanical systems (MEMS)

Yu-Chong Tai, California Institute of Technology, Pasadena, CA, USA
- for contributions to integrated nano/micro electro-mechanical systems (MEMS) and nano/microfluidics for Lab-on-a-Chip applications

Katsuyoshi Washio, Central Research Laboratory, Hitachi, Ltd., Kokubunji, Tokyo, Japan
- for contributions to high-speed silicon and silicon germanium bipolar/Bi complementary metal oxide semiconductors (CMOS) device and circuit technologies

Werner Weber, Infineon Technologies, Munich, Germany
- for contributions to metal oxide semiconductors (MOS) device physics

Burnell West, Credence Systems Corporation, San Jose, CA, USA
- for contributions to high-performance automatic test equipment

Gerald Witt, Air Force Office Scientific Research, Arlington, VA, USA
- for the promotion of research in compound semiconductor devices

Usha Varshney, National Science Foundation, Arlington, VA, USA
- for technical leadership in sensor technologies and systems

*Steven J. Hillenius
2005 EDS Fellows Chair
Agere Systems
Allentown, PA, USA*

2005 CLASS OF EDS FELLOWS HONORED AT IEDM

On December 5, 2005, at the Plenary session of the IEEE EDS International Electron Devices Meeting (IEDM) in Washington, D.C., the 2005 EDS President, Hiroshi Iwai, presented a number of 2005 IEEE/EDS Fellows with certificates to congratulate them on being elected IEEE Fellows. Fourteen of the 40 EDS members elected to the IEEE grade of Fellow for 2005 attended the presentation.



EDS President, Hiroshi Iwai (bottom row, 2nd from right), along with 14 EDS members who were elected IEEE Fellow for 2005 at the 2005 IEDM.

EDS MEMBERS NAMED WINNERS OF THE 2006 IEEE TECHNICAL FIELD AWARDS

Four EDS Members were among the winners of the 2006 IEEE Technical Field Awards. They are:



Louis C. Parrillo of Parrillo Consulting, LLC., Austin, Texas, won the 2006 IEEE Frederik Philips Award. His citation states, "For leadership in advancing CMOS and Bipolar technology through technical and managerial contributions".

Louis C. Parrillo received his BSEE from the University of Connecticut and his MSEE, MA and Ph.D. degrees in Electrical Engineering from Princeton University.

He joined Bell Laboratories in Murray Hill, New Jersey (1972), where he and his colleagues developed AT&T's first all-implanted,

high-speed bipolar technology, including solutions to yield-limiting mechanisms that became widely adopted. With Dr. Richard Payne and their colleagues, he developed the original and several generations of "Twin-Tub CMOS" technology which became an industry standard for high-performance CMOS.

In December, 1984 he joined Motorola's Advanced Products Research and Development Laboratory (APRDL) in Austin. In 1988 he was appointed Vice President and Director of APRDL, building it to be an effective, internationally-recognized team. With TRW, the team produced the world's largest and most advanced "Superchips" (~1,500mm² die size, 0.5um, triple-level-metal technology), successfully completing the US government's CMOS VHSIC program (1989).

With manufacturing he drove the creation of Motorola's Research, Development and Manufacturing complex known today as the Dan Noble Center. This effort enabled Motorola to independently manufacture leading-edge Power-PC products and laid the groundwork for several external technology alliances. As a Corporate Officer (1994) and Division General Manager (1997) he drove the development of ultra-fast SRAM products that were the fastest, most compact and the first in the industry using copper-interconnect technology. As Semiconductor's Chief Technology Officer and Director of the DigitalDNA% Labs (2001), he and his colleagues drove the alliance among Motorola, ST Microelectronics, Philips Semiconductor and TSMC for 300 mm research and development in Crolles, France.

After retiring from Motorola, he established Parrillo Consulting, LLC (2004) to provide technical, managerial and business value to diverse clients.

He has 27 patents and over 40 publications. He is an IEEE Fellow (1989), a recipient of the Electron Devices Society (EDS) J.J. Ebers Award (with Dr. Richard Payne, 1992), a past President of EDS (1996, 1997), a member of The United States National Academy of Engineering (1996), and a recipient of the EDS Distinguished Service Award (2004).

Dr. Parrillo and his wife Kathleen reside in Austin. Their children, Jeffrey and Lisa are students. His outside interests include track driving in High-Speed Drivers Education events, photography and hiking with his family in Colorado.



Chang-Gyu Hwang of Samsung Electronics Co., Ltd, Gyeonggi-Do, Korea, won the 2006 IEEE Andrew S. Grove Award. His citation states, "For contributions to the development of advanced memory products".

Dr. Chang-Gyu Hwang received the B.S. and M.S. degrees in electrical engineering from Seoul National University in 1976 and 1978, respectively, and the Ph.D. degree in electrical and computer engineering from the University of Massachusetts in 1985.

From 1978 to 1981, Dr. Hwang served as a faculty member in the Korea Naval Academy. From 1985 to 1989, he was a Research Associate in the Integrated Circuit Laboratory at Stanford University. He also served as a consultant of Hewlett Packard from 1986 to 1987 and held a consulting staff position in the TCAD Department of Intel Corporation from 1988 to 1989.

In 1989, Dr. Hwang joined the Semiconductor Business, Samsung Electronics Co., Ltd. as Director of device technology development.

Currently, he is President & CEO of Semiconductor Business of Samsung Electronics and responsible for research, development, manufacturing of all semiconductors, OMS (Optical Media Solution) and HDD (Hard Disk Drive) products.

Dr. Hwang has been an IEEE Fellow since Feb. 2002. He has also served actively as a senior member of the IEEE Electron Devices Society and the Circuits and Systems Society since 1992. He has served on the Program Committees of International Conference on VLSI and CAD (ICVC), and International Workshop on Statistical Modeling (IWSM), and International Electron Devices Meeting (IEDM). He served as Chairman for Memory division of IEDM from 1994 to 1996, Technical Program Chairman of 1997 ICVC, a guest editor of the IEEE Transactions on Electron Devices in 1998. He has also served on the Executive Committees of VLSI Symposium since 1998.

Dr. Hwang holds several international patents related to the semiconductor design and process and authored and co-authored more than 50 technical papers in international journals and conferences. And he was conferred a decoration of Gold Tower (Order of Industrial Service Merit) by The Patent Bureau of Korea and Korea Invention Promotion Association (May 19th, 2004). He also received Grand Prize of Samsung Technology Award (1994), Samsung Special Prize for Developing the World 1st 256M DRAM (1994), the ISI Citation Classic Award (2000), ISSCC Takuo Sugano Outstanding Paper Award (2002), and EIA Leadership in Technology and Innovation Award(2005).

Dr. Hwang has lectured on the topics such as market, technology, driving force, and future trend of DRAM and Semiconductor Industry in Harvard University, Cambridge University, Stanford University, U.C. Berkeley, MIT, Seoul National University and some other world renowned universities and technology institutions.



Susumu Namba of Nagasaki Institute of Applied Science, Nagasaki, Japan won the 2006 IEEE Cleo Brunetti Award. His citation states "For contributions to ion-beam and optical technologies for application to semiconductor devices, 1950 in communication engineering.

Susumu Namba was born in February 1928 in Okayama, Japan. He graduated from the Osaka University in 1950 in communication engineering.

In 1950, Dr. Namba joined the RIKEN, The Institute of Physical and Chemical Research, where he was a research member in the semiconductor laboratory. In 1966 he became a chief scientist at RIKEN. In 1967, he was also appointed to the professor of electrical engineering at the Osaka University. He started his research with the photoelectric recording interferometer-type gas analyzer for which he received the Dr. Engineering from the University of Tokyo (1959), and in 1959 he made the first experiment on the light modulation with an electro-optic crystal for which he received the Dr. Science from Kyoto University (1962). In 1969, he made the first ion implantation machine in Japan, and established a scientific basis of the ion implantation in semiconductors. In 1986, he became a director of the Frontier Material Group in RIKEN, and currently he is a professor emeritus both of the Osaka Univ. and the Nagasaki Institute of Applied Science, and the Honorary scientist of RIKEN.

Dr. Namba has pioneered various microfabrication techniques applied for semiconductor devices. These include the development of the electron and laser microfabrication machines, et al. but, the most remarkable achievement is the Japanese first development of the ion implantation

machine in 1969, and the development of the ion etching technique that enabled the submicron processing and was industrially applied for the fabrication of the diffraction grating. He has also made pioneering works on the excimer laser lithography and synchrotron lithography. Besides, he has developed the focused ion beam system and the nanometer electron beam lithography system. Many of the above technologies he developed have been introduced in the semiconductor device processing in industries.

Dr. Namba is a Fellow of the IEEE and OSA, and an Emeritus Member of the Japan Society of Applied Physics (JSAP). He has received a number of awards, partly including the Ichimura Prize in Industry (1973); the Electrochemical Society Award (1982); the Ohkochi Memorial Award (1983); and the JSAP Outstanding Achievement Award (2004).



Carlos A. Paz de Araujo of the University of Colorado, Colorado Springs, CO, won the 2006 IEEE Daniel E. Noble Award. His citation states, "For

fundamental contributions and commercialization in the field of Ferroelectric Random Access Memory (FeRAM)."

Dr. Carlos A. Paz de Araujo was born on the 9th of December, 1952, in Natal, RN, Brazil. He obtained a B.S.E.E., a M.S.E.E., and a Ph.D. from The University of Notre Dame, Indiana, in 1977, 1979, and 1982 respectively.

Dr. Paz de Araujo joined the Department of Electrical and Computer Engineering at the University of Colorado at Colorado

Springs in 1982. He has focused his research in areas such as device modeling, integration and novel materials for non-volatile memories. His initial research was in high-K materials for GaAs MMICs which received acceptance in the market with over 500 million devices. His involvement with Ferroelectric nonvolatile memories led to the discovery of high endurance materials from which nonvolatile FeRAMs of over 100 billion erase/write cycles can be made. Over 100 million of such devices have already entered the market using these novel materials based on bismuth compounds. Most of Dr. Paz de Araujo's research in this area has been across national boundaries involving many engineers especially from Matsushita Corporation of Osaka, Japan.

Dr. Paz de Araujo is the author or co-author of 286 papers and 146 U.S. Patents. He has received a number of awards including the American Electronics Association Outstanding Educator/Researcher of the Year, the IEEE Outstanding Branch Counselor, and the Lifetime Achievement Award of the International Symposium on Integrated Ferroelectrics.

Dr. Paz de Araujo and his wife, Maureen, reside in Colorado Springs, Colorado. They have three children, Mara, Alyssa and Daniel. His outside interests include philosophy, theology, traveling, and bridging areas between theory and applications in Electrical Engineering in which industry and academia can cooperate and innovate at a fundamental level.

*Alfred U. Mac Rae
EDS Vice-President of Awards
Mac Rae Technologies
Berkeley Heights, NJ, USA*

Congratulations to the EDS Members Recently Elected to IEEE Senior Member Grade!

Anant Agarwal	Sung Kim
Egor Alekseev	Young Pil Kim*
Simone Bell	Tsunenobu Kimoto*
Benjamin Blalock	Lixia Li
Sudhakar Bobba*	Yo Lin
Tarik Bourouina	Sailesh Merchant
Walter Braddock*	James M. Mikkelsen
Richard Burell	Jawad Nasrullah*
Kristy A. Campbell	Susumu Noda*
Sung-hoon Choa	Kunal Parekh
Ronald Coutu*	Gerd Pfeiffer
Paul C. Davis	Arvind Raghavan
Karen Deng	David A. Rivkin
Patrick G. Drennan*	Andre Sayles
Daniel C. Diana	James Schlafler
William Evans	Anna Sigurdardottir
Barton Gordon	Renate Sitte
Arthur H. Greenberg	John Stankus
Wilfried Haensch	Daisuke Ueda*
Luther P. Hendrix	Ryan Umstatt
Gregg Higashi	Eric Vogel
Archie Holmes	Katalin Voros
Yue-ming Hsin*	Robert M. Weikle
Jin-Biao Huang	R. Clive Woods
Robert Huang	Weize Xiong
Daniel Kadosh	Kenji Yonei*
Chang-Soo Kim	Chen-Hua Yu*

* = Individual designated EDS as nominating entity

If you have been in professional practice for 10 years, you may be eligible for Senior Membership, the highest grade of membership for which an individual can apply. New senior members receive a wood and bronze plaque and a credit certificate for up to US \$25 for a new IEEE society membership. Upon request, a letter will be sent to employers, recognizing this new status.

For more information on senior member status, visit http://www.ieee.org/membership/grades_cats.html#SENIORMEM. To apply for senior member status, fill out an application at <http://www.ieee.org/organizations/rab/m/d/smelev.htm>.



Final Call For Nominations - 2006 IEEE Electron Devices Society Graduate Student Fellowship

Description: One year fellowships awarded to promote, recognize, and support graduate level study and research within the Electron Devices Society's field of interest: The field of interest for EDS is all aspects of the physics, engineering, theory and phenomena of electron and ion devices such as elemental and compound semiconductor devices, organic and other emerging materials based devices, quantum effect devices, optical devices, displays and imaging devices, photovoltaics, solid-state sensors and actuators, solid-state power devices, high frequency devices, micromechanics, tubes and other vacuum devices.

The society is concerned with research, development, design, and manufacture related to the materials, processing, technology, and applications of such devices, and the scientific, technical and other activities that contribute to the advancement of this field.

At least one fellowship will be awarded to students in each of the following geographical regions every year: Americas, Europe/Middle East/Africa, and Asia & Pacific.

Prize: US\$7,000 to the student and a travel subsidy of up to US\$3,000 to each recipient to attend the IEDM for presentation of award plaque. The EDS Newsletter will feature articles about the EDS Graduate Fellows and their work over the course of the next year.

Eligibility: Candidate must: be an IEEE EDS student member at the time of nomination; be pursuing a doctorate degree within the EDS field of interest on a full-time basis; and continue his/her studies at the current institution with the same faculty advisor for twelve months after receipt of award. Sponsor must be an IEEE EDS member. Previous award winners are ineligible.

Basis for Judging: Demonstration of his/her significant ability to perform independent research in the fields of electron devices and a proven history of academic excellence.

Nomination Package:

- Nominating letter by an EDS member
- Two-page (maximum) statement by the student describing his or her education and research interests and accomplishments
- One-page biographical sketch of the student (including student's mailing address and email address)
- One copy of the student's under-graduate and graduate transcripts/grades. Please provide an explanation of the grading system if different from the A-F format.
- Two letters of recommendation from individuals familiar with the student's research and educational credentials. Letters of recommendation can not be from the nominator.

Timetable:

- Nomination packages are due at the EDS Executive Office no later than May 15, 2006
- Recipients will be notified by July 15, 2006
- Monetary awards will be given by August 15, 2006
- Formal presentation of the awards will take place at the IEDM Awards Ceremony in December 2006.
- Nomination packages can be submitted by mail, fax or e-mail, but a hard copy must be received at the EDS Office.

Send completed package to:
IEEE Operations Center
EDS Executive Office
EDS Graduate Student Fellowship Program
445 Hoes Lane, Piscataway, NJ 08854 USA

For more information contact:
edsfellowship@ieee.org
or visit: <http://www.ieee.org/society/eds/education/fellowship.xml>

EDS Regions 1-3 & 7 Chapters Meeting Summary

The Electron Devices Society (EDS) Regions 1-3 & 7 Chapters Meeting was held on Sunday, December 4, 2005, in the Washington Hilton, Washington, D.C. Ayman Shibib, Chairman of the Sub-Committee on Regions/Chapters – North America East (SRC-NAE), welcomed the 21 attendees. He stated the goals of the meeting, which occurs biannually, as: 1) to share the experiences and best practices among the ED chapters in the four regions of IEEE, extending from Eastern U.S. to all of Canada, 2) to explore ways of supporting chapter activities by thinking out-of-the-box about ways to involve more members into chapter activities.

The sharing of information among chapters focused primarily on Chapter Chairs' reports on their activities for the past year. Ayman introduced the first chapter presentation from the ED/SSC Bangalore Chapter, India, selected as the winner of the EDS Chapter of the Year Award. P.R. Suresh, Chapter Chair, was congratulated for receiving the award, and he presented a summary of the activities of his chapter. The activities had a good balance among several types; Distinguished Lectures (DL), technical presentations and a workshop. In addition, the Chapter supported student activities and local involvement with the community by arranging industry tours. Suresh mentioned the support from local industry in participating with the Chapter's activities.

Durga Misra, Vice Chapter Chair, presented the activities of the ED/CAS North Jersey Chapter. The activities involved eight technical talks and a software training session for university students. He mentioned that their Chapter does not usually charge fees for technical courses to members, except when the Chapter incurs some speaker fees.

Next, Fernando Guarin, Chapter Chair, reported the goals and activities of the ED Mid-Hudson Chapter. The goals of the chapter are to: provide professional and social networking, provide support to local student chapters, increase membership among professionals and students, and to establish



From left to right: Murty Polavarapu, Vice-Chairman, SRC-NAE; Hiroshi Iwai, EDS President; Ayman Shibib, Chairman SRC-NAE; Cor Claeys, Vice-President Regions and Chapters Committee and EDS President-Elect; Juin Liou, Vice-Chairman SRC-NAE; at the IEEE EDS SRC-NAE meeting at the Washington Hilton, December 4, 2005..

relations with the community. Their activities included; several technical talks with participation from remote locations, a camp to introduce student to engineering, support of Engineer's Day at local schools, a tour of IBM fabrication facility and use of EDS videotape library for focused seminars.

Vijay Arora, Chapter Chair for the ED Lehigh Valley, commented on the effect of industry's moving or reducing its industrial base in an area on the chapter's activities. He mentioned that the Lehigh Valley had many chapter activities in the past, but with downsizing and closing of some manufacturing sites, the chapter lost many of its activities. Despite this, some start up activities supported by the State of Pennsylvania and Lehigh University may spur some activities next year.

Murty Polavarapu, Chapter Chair of ED Washington and Northern Virginia, expressed some of the difficulty experienced

by members in attending chapter meetings due to a lot of traffic and industry's spread over large areas of the Chapter. He relayed the Chapter's successful launch of their own web site. He also tried the IEEE e-Notice service where meeting notices are distributed to members by email. He also reported that many chapter meetings were co-sponsored with the Atlantic Nano Forum.

Next, Paul Berger, ED/LEO Columbus Chapter Chair, presented the Chapter's activities in the mid Ohio area. Most of the Section meetings were held at Ohio State University with student and alumni participation in attending and speaking.

Tony Ivanov, ED/LEO Central North Carolina Chapter Chair, reported on the activities of this joint chapter established in 2004/2005 with members affiliated with several industries in the area. Tony expressed the challenges faced by many chapters in bringing more value to their membership. He drew on many resources available to chapters such as the DL program and the ability of chapters to request funding from ED, MTT and SSC societies. He set forth a goal of having at least ten meetings in 2006 at about the rate of one meeting a month, except for July and December.

Dev Palmer, AP/CPMT/MTT/ED (ACME) Eastern North Carolina Chapter Chair, presented the activities of the chapter in 2004-2005. Technical meetings were rotated among the four societies focusing on each of the society's interest and were held jointly with the student chapters at the work facility of the meeting organizer or chapter members.

Ravi Todi, Chapter Chair of the Orlando ED/CPMT Chapter, described the variety of activities supported by the chapter. The activities included nine talks from academia, five talks from industry

and two EDS video library presentations. He also discussed plans to hold several talks in 2006 and to sponsor a colloquium on devices and materials.

The last technical presentation was given by Colombo Bolognesi, representing the ED Vancouver Chapter. Their activities included two DL lectures and four other invited talks. Seven more talks are already scheduled for 2006.

After the presentations, Ayman opened the meeting for questions

and discussions. Among the issues discussed was chapter funding and support of activities on a limited budget. Ayman pointed out that the SRC-NAE has responded positively to all the chapter requests for funding and in some cases worked with the DL program to support the requests. Also, another possible source for support could be the local IEEE section, especially if a chapter's meetings are coordinated with the Section. Ayman also encouraged

the chapter chairs to look for creative ways to increase their activity levels with low cost such as using the DL program, IEEE web conferencing and sending meeting announcements to members using IEEE e-Notice. Ayman then thanked all the attendees and presenters and closed the meeting.

*M. Ayman Shibib
EDS Chairman SRC-NAE
International Rectifier
El Segundo, CA, USA*

2005 EDS Chapter of the Year Award

The EDS Chapter of the Year Award is presented annually to recognize an EDS chapter for the quality and quantity of the activities and programs implemented during the prior July-June period.

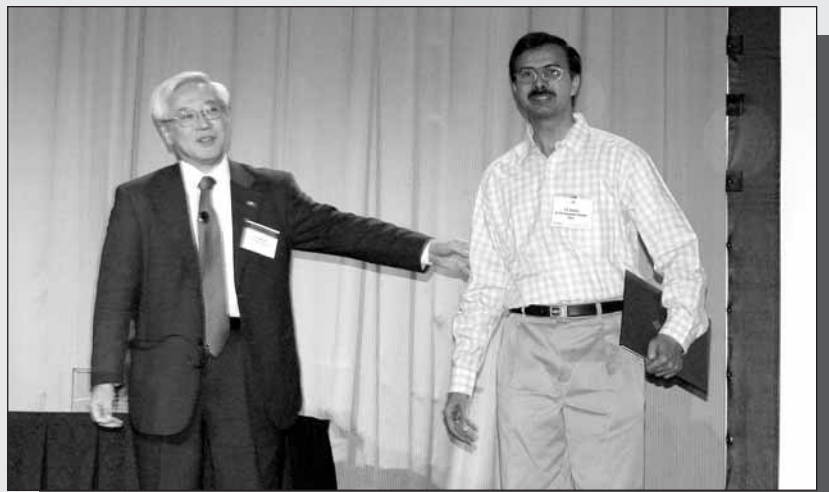
On December 5, 2005, at the IEDM held in Washington, D.C., the ED/SSC Bangalore Chapter received the EDS Chapter of the Year Award, which includes a certificate and check for \$1,000. The award was received by the Chapter Chair, P.R. Suresh, Texas Instruments India Ltd.

The Chapter, formed in 2001, has been very active to stimulate the growth of the Society and to increase the membership value. Over the last 4 years the EDS membership increased from 50 to 125. The strong mentorship of the students results in the formation of the first EDS student chapter in India. Different workshops have been organized, which are highly appreciated by both professionals and students and therefore also well attended. In the so-called

Indian Silicon Valley, there is a strong industrial involvement in the chapter's activities as reflected in the composition of the chapter's Executive Committee. Technical seminars are organized on a regular basis and a few times a year Distinguished Lecturers are invited to give a presentation.

There is also a strong incentive to organize joint activities with other chapters in the region.

*Cor L. Claeys
EDS Vice-President of
Regions/Chapters
IMEC
Leuven, Belgium*



The Chair of the ED/SSC Bangalore Chapter, P.R. Suresh, accepting the 2005 EDS Chapter of the Year Award from EDS President, Hiroshi Iwai.

Regional and Chapter News

USA, CANADA & LATIN AMERICA (Regions 1-6, 7 & 9)

IEEE World Conference on Photovoltaic Energy Conversion (WCPEC-4)

- by Jeffrey L. Gray

The 4th IEEE World Conference on Photovoltaic Energy Conversion (WCPEC-4) will be held May 7-12, 2006, at the Hilton Waikoloa Village in Waikoloa, Hawaii, which was also the location of the 1st World Conference on Photovoltaic Energy Conversion in December 1994. The world's leaders in photovoltaics will be attending and presenting the latest information on photovoltaic research and applications. More information regarding this exciting conference can be found at <http://www.wcpec.org>.

The conference, hosted by the IEEE PVSC and sponsored by the IEEE Electron Devices Society, is a joint conference of the 32nd IEEE PVSC, the European PVSEC, and the 16th Asia/Pacific PVSEC. The conference co-chairs are Sheila Bailey of the NASA Glenn Research Center in Cleveland, Ohio, Makoto Konagai of the Tokyo Institute of Technology, Japan, and Heinz Ossenbrink of the European Commission DG JRC in Ispra, Italy.

Papers will be presented not only in the traditional areas of photovoltaics-crystalline silicon, amorphous and nano/microcrystalline silicon, CIGS, CdTe and III-V materials - but also in fundamentals and new materials, modules and system development, concentrators, space applications and national programs and policies.

~ Sunit Tyagi, Editor

ED Puebla

- by Claudia Reyes Betanzo

The technical chapters of the IEEE Puebla Section organized a series of lectures to celebrate the 5th anniversary of the Section. The lectures were carried out at the University of the Americas (UDLA) in Puebla City on

November 14 and 15, 2005. There were a total of seven invited speakers, three were provided by other chapters, and two invited talks were provided by the Electron Devices Puebla Chapter. EDS Member, Dr. Rodolfo Quintero Romo from the Department of Electric Engineering and Solid State - CINVESTAV in Mexico, presented the talk entitled "Electronic Simulation: Electric transport in devices". EDS Distinguished Lecturer, Prof. Jacobus Swart from the CCS and FECC - UNICAMP in Brazil, gave his talk titled, "History of Microelectronics in Brazil and Recent Activities". The lectures were attended by several members and students of the IEEE in Puebla. This event was the second technical activity for the ED Puebla Chapter since it was formed in August 2004. All members of the ED Puebla Chapter are grateful to the invited speakers for their participation in this important event.

ED UNICAMP Student Branch

- by Ricardo Cotrin



Lectures on Micro/Nano Fabrication at the University of Campinas

On November 11th, the Student Chapter of EDS at UNICAMP held the last of a series of lectures about micro/nano technology. The "Lectures on Micro/Nano Fabrication" were held at the University of Campinas (Brazil) by invited speakers from our university and labs nearby and has the main goal to diffuse the research about this subject and to promote the knowledge among undergraduate students. From May to November 2005, the following lectures were delivered:

- May 23: Methodological aspects

of miniaturization; by Dr. Carlos I. Z. Mammanna (Head of Renato Archer Research Center)

- June 06: The evolution from micro to nano electronics; by Prof. Dr. José A. Diniz (School of Electrical Engineering/Unicamp)
- June 20: Microsystems; Can I have my own enterprise?; by Prof. Dr. Luis Otávio S. Ferreira (School of Mechanical Engineering/Unicamp)
- August 08: Introduction to optoelectronics; by Prof. Dr. Newton C. Frateschi (Physics Institute/Unicamp)
- August 29: Biomedical engineering; by Prof. Dr. José Wilson M. Bassani (School of Electrical Engineering/Unicamp)
- September 09: Carbon nanotubes; by Prof. Dr. Stanislav A. Moshkalyov (Center for Semiconductor Components/Unicamp)
- November 11: Nanotechnology: fundamentals, opportunities and challenges; by Prof. Dr. Osvaldo Alves (Chemistry Institute/Unicamp)

The lectures had an average attendance of 30 people among graduate and undergraduate students, professors and researchers and a certificate was given for those who attended 5 or more presentations.

~ Jacobus W. Swart, Editor

EUROPE, MIDDLE EAST & AFRICA (REGION 8)

ED Germany

- by Holger Vogt

Starting January 2006, Holger Vogt will chair the ED German Chapter. He has many years of experience with silicon based semiconductor processing and device development.

In 2005 an extended chapter meeting was organized to assemble members from the many research fields and to discuss new visions and missions of IEEE EDS in Germany. Combining or even merging electrical/electronic, mechanical and optoelectronic/photonic functions in the

micro and nano scale, top down and bottom up, offers potential for application in future high performance systems, and shall be considered in ED chapter activities. A newsletter distributed to all German EDS members summarized the main topics.

In 2006, a workshop on 'Advanced Electron Devices' shall provide a forum to continue the discussions. It will take place at Duisburg, June 13-14, at Fraunhofer IMS. The workshop will offer an informal atmosphere to exchange recent research results and bridge the gap between novel nano concepts and the silicon world. We especially encourage students to report on their actual work in progress. Further information is available from holger.vogt@ims.fraunhofer.de.

SAFE Workshop

- by Helga Varwijk

On November 17-18, 2005, the Dutch Technology Foundation organized two parallel workshops in Veldhoven, The Netherlands, co-sponsored by IEEE EDS. The SAFE (semiconductor advances for future electronics and sensors) Workshop, focused on RF devices and modeling, devices characterization and technology and materials related topics. This year's workshop dedicated special attention to the particle detection and medical applications. In total, there were 10 oral and 43 poster presentations. In parallel, the more systems oriented workshop on circuits, systems and signal processing took place. For this workshop, 10 oral and 111 posters were presented. A combined evening session entitled, "Giga sensors for atto objects" dealt with the new challenges for the next generation particle detectors at CERN (Geneva). The combined number of attendees was 225.

~Cora Salm, Editor

ED Israel

- Gady Golan

On Thursday, November 24, 2005, at the Holon Institute of Technology (HAIT), Holon, Israel.

Lecturer: Dr. Alex Axelevich, Staff member at HAIT, Israel.

Subject of meeting: "Hot-Probe Method for Evaluation of Impurities Concentration in Semiconductors"

Abstract:

Electrical, optical, and mechanical properties of thin films significantly differ from those of bulk materials. Also, these properties are very influenced on the technological parameters of the films deposition. Therefore, characterization methods for evaluation of thin film properties become highly important. A novel approach to the well known "Hot-Probe" method is proposed and applied in our work. The conventional Hot Probe characterization method enables only the definition of a semiconductor type, P or N, by identifying the majority charged carriers. According to the new Hot Probe technique, one can measure and calculate the impurities concentration and charged carriers dynamic parameters. Feasibility proof the upgraded Hot Probe method was done in Si and Ge bulk, and in thin film semiconductor samples.

Chairman of the meeting: Professor Gady Golan. Seventy people, students and academic staff, attended the meeting at HAIT.

On Thursday, January 5, 2006, at the Holon Institute of Technology (HAIT), Holon, Israel.

Lecturer: Dr. Boris Axelrod, Staff member at HAIT, Israel.

Subject of meeting: "A Cascade Boost-Converter - Inverter with Optimized Output Waveform"

Abstract:

Two structures, a switched-capacitor-boost converter and a two-level inverter, are connected in cascade. As a result, a staircase waveform of the output voltage is provided. Such a multilevel waveform is close to a sinusoid; its harmonics content can be reduced by multiplying the stage number as well as by optimization of stage duration. A Fourier analysis of the output waveform is performed. The design is optimized for minimizing factor THD. Simulations and experiments on two prototypes confirm the theoretical analysis.

Chairman of the meeting: Professor Gady Golan. Sixty people, students and academic staff, attended the meeting at HAIT.

~ Zhirun Hu, Editor

ED Poland

- by Andrzej Napieralski

The ED Poland Chapter is a co-organizer of the International Conference MIXDES 2006, which will be held on June 22-24, 2006, in Gdynia, Poland. During the conference two special sessions are planned:

- "Compact Models - The Heart of Mixed-Signal Design Flow" organized by Prof. Hiroshi Iwai (Tokyo Institute of Technology, JAPAN) and Dr. Wladyslaw Grabinski (Freescale, Switzerland)
- "Coordinated Accelerator Research in Europe Project" organized by Mariusz Grecki (Technical University of Lodz, Poland) and Stefan Simrock (DESY, Germany)

For the opening plenary session the following presentations are planned:

- "Physical Models for Smart-Power Devices" - Massimo Rudan (University of Bologna, ITALY)
- "Silicon Carbide Devices and Processes - Present Status and Future Perspective" - Mikael Östling (Royal Institute of Technology, SWEDEN)
- "The New Generation of the Photoelectric Measurement Methods of MOS Structure Parameters" - Henryk M. Przewlocki (Institute of Electron Technology, POLAND)
- "TUNNETT Diode Oscillators for mm-Wave Wideband Communication and for Terahertz Electronics" - Piotr Plotka (Semiconductor Research Institute, JAPAN)

During the conference a meeting of the Poland Section of the IEEE ED Poland Chapter and Microelectronics Section of Electronics and Telecommunication Committee of the Polish Academy of Sciences will take place. More information about the conference can be found at the web site <http://www.mixdes.org>.

~ Andrzej Napieralski, Editor

ED/MTT/CPMT/COM/SSC Novosibirsk

- by Viatcheslav P. Shuvalov

The fifth IEEE Russia Conference on Microwave Electronics: Measurement, Identification, Application (MEMIA'2005) was successfully held



Invited lecturers of the 2006 MEMIA plenary meeting (NSTU, Novosibirsk, December 12, 2005)

at Novosibirsk State Technical University December 12-15, 2005. This conference is one of the main events of 2005 for our chapter. Due to great international support from the IEEE MTT Society, as well as the Harbin Institute of Technology (Harbin, China), this conference has received real international status.

Modern problems of microwave electronics, theory of circuits, telecommunications technology and their applications were discussed in this conference. A separate session was devoted to the problems of designing the electron devices and physical effects in these devices.

The volume of proceedings was prepared and issued. In comparison with the 4th MEMIA conference (in 2003), this volume was higher due to an increase in the number of papers and participants, especially from China. We hope, due to this conference, that the co-operation with the Harbin Institute of Technology will be developed and increased next time.

The MEMIA'2005 Organizing Committee is thankful to IEEE MTT representative, Prof. Jozef Modelski, who has provided the special technical support to our conference. We are thankful to the Harbin Institute of Technology representative, Prof. Qiu Jing Hui, for technical and financial co-sponsorship. We are especially thankful to Prof. Irina B. Vendik (St. Petersburg, Russia), for her participation and beautiful invited report.

The Organizing Committee for MEMIA'2005 is also thankful to all who have invested their time and efforts into the success of the conference. Especially to the invited foreign participants, who have visited our conference 'in the heart of Siberia', in

spite of 'pure Siberian' weather (very cold and windy with temperatures 27 degrees below zero). We hope, having visitors even with these extreme conditions, will help to attract the interests of many other potential foreign participants.

AP/ED/MTT/COM/EMC Tomsk

- by *Oleg V. Stukach*



Participants of the 2005 SIBCON conference (TUCSR, Tomsk, October 21, 2005)

The sixth IEEE Siberian Conference on Control and Communications (SIBCON) was held October 21-22, 2005, in Tomsk, Russia. The conference was organized by the Tomsk Joint Chapter, the GOLD Affinity Group of the IEEE Siberia Section; Tomsk Polytechnic University; sponsored by IEEE and the Russian Foundation for Basic Research. Topics included Mathematical Simulation and Modeling in Modern Technologies of Control and Information Processing; the Basic Problems of Communication and Control Theory, Cryptology; and Digital Video and Image Processing. There was also a special session on Materials for Electron Devices and X-Ray Detectors.

The technical program consisted of paper presentations and discussions, and the social program included an excursion, banquet and bowling. We cordially invite you and your colleagues to join the Scientific Program Committee of the next SIBCON in 2007. Please find the Call for Papers at our Web site <http://www.comsoc.org/tomsk>.

~ *Alexander V. Gridchin, Editor*

ASIA & PACIFIC (REGION 10)

ED Kansai

- by *Toshimasa Matsuoka*

The 5th Kansai Colloquium Electron

Devices Workshop was successfully held at the Osaka University Nakanoshima Center, Osaka, Japan, on October 26, 2005. The Workshop was sponsored by the ED Kansai Chapter and the Graduate School of Engineering, Osaka University, which offered a good opportunity for students and researchers in the Kansai area to touch the up-to-date world-class researches and developments. Eleven papers about silicon and compound semiconductor device technologies were selected for the presentation. The Award Committee selected three papers for the 5th MFSK (Message From Spirited Kansai) Award. The winners were Prof. Tsunenobu Kimoto for his paper entitled "Design and Fabrication of RESURF MOSFETs on 4H-SiC(0001), (1120), and 6H-SiC(0001)," Dr. Kenji Komiya for "Detailed Investigation of Geometrical Factor for Pseudo-MOS Transistor Technique," and Dr. Yasuhiro Fujii for "Soft Error Free, Low Power and Low Cost Super SRAM with 0.98 um² Cell by Utilizing Existing 0.15um-DRAM Process." They were honored with a memorial wall plaque engraved with their name.

ED Japan

- by *Hiroshi Ishiwara*



Prof. Kenji Taniguchi (Osaka Univ., Chair of EDS Kansai) and Dr. Kenji Komiya at the 5th Kansai Colloquium Electron Devices Workshop, October 26, 2005, Osaka, Japan

The ED Japan Chapter organized the 9th IEEE EDS Mini-colloquium on Nanometer CMOS Technology (WIM-NACT-9), held on October 25, 2005, at the Tokyo Institute of Technology, Yokohama, Japan, as a co-sponsor. It was reported in the January 2006 issue of the EDS Newsletter in detail.

Seventeen professors/experts, including eight EDS Distinguished Lecturers from Taiwan and Japan, were invited to deliver the outstanding talks. The scope was rather wide covering not only CMOS technology but also emerging new device technology, display, organic electronics and MEMS. Over 120 professors, students, research staffs, and engineers from companies and organizations, participated in the workshop. It was the largest event organized by the ED Japan Chapter for the year 2005.

A Distinguished Lecturer Meeting was organized by the ED Japan Chapter on December 26, 2005, at Hiroshima University. Prof. Mitiko Miura-Matsumoto (Hiroshima University), delivered the lecture entitled "Circuit Simulation Models for Coming MOS-FET Generations".

- Hisayo S. Momose, Editor

ED/SSC Bangalore

- by P. R. Suresh

The following event happened during the period of October through December 2005:

The chapter organized a press conference to provide a preview of the 2006 International Solid State Circuits Conference (ISSCC). This event was the first Indian ISSCC Press Conference. The goal of this event was both to inform the local press of the goals, roles and importance of ISSCC, and thereby to encourage participation by Indian engineers in conference attendance, paper presentation and IEEE volunteer work. The press conference was addressed by Dr. Kunihiro Iizuka, Dr. Tim Tredwell, Prof. Kenneth C Smith, Dr. Takayuki Kawahara, Prof. Navakant Bhat, Dr. C. P. Ravikumar, Prof. Jamadagni and Dr. Sreedhar Natarajan. This event received good response from the press and technical community. In addition to the press conference, the visiting delegates were taken around Bangalore to some of the leading semiconductor companies and to the Indian Institute of Science to address technical leaders. Based on the success of this press conference in attracting the attention of the technical community on ISSCC, there is a proposal to conduct a similar event for IEDM.

AP/ED Bombay

- by Mahesh Patil

During the last quarter, the Chapter had the following activities:

1. The DVD entitled "50 years in 50 minutes" (from EDS) was screened at IIT Bombay on October 18, 2005.
2. On November 24, 2005, Prof. M. Paranjpe, GAEL Health Microsystems and the Department of Physics, Georgetown University, gave a talk on "Non-Invasive and Blood-Free Diabetic Monitoring Using Novel Transdermal Patch Technologies."
3. On November 28, 2005, Prof. Shreepad Karamalkar, IIT, Madras, gave a talk on "Device Modeling - The art of making approximations."
4. Members of the Chapter participated in the 2005 IINC conference (IMAPS India National Conference), organized by the International Microelectronics & Packaging Society, at IIT Bombay, December 19-21, 2005.
5. Mr. Saurabh A. Chandorkar, Stanford University, talked on "Entropic modeling of thermoelastic dissipation in microstructures" on December 22, 2005.

REL/CPMT/ED Singapore

- by K. L. Pey



Prof. Christian Enz (middle) with Xing Zhou (left, Chapter committee member) and Siek Liter (right, SSC Singapore Chapter Vice-Chair)

Technical Talks

On November 30, 2005, Prof. Christian Enz, Swiss Center for Electronics and Microtechnology (CSEM) and Swiss Federal Institute of Technology (EPFL), Switzerland, gave a technical talk on "Compact Modeling of Thermal Noise in the MOS Transistor Using the EKV Model," jointly organized by the Rel/CPMT/ED and SSC Singapore Chapter.

Conferences

- 13th IPFA (IPFA '06) will be held from July 3-7, 2006, at Meritus Mandarin, Singapore. The second Call for Papers has been announced recently.
- The 7th Electronics Packaging Technology Conference (EPTC 2005), was successfully organized on December 7-9 at the Grand Capthorne Waterfront Singapore. The conference was well attended over the 3 days. A total of 87 delegates participated in the short courses on December 7, 2005. This is by far the best turn-out for any EPTC organized short course. The conference on December 8-9, was attended by a total of 265 delegates from over 19 countries. EPTC 2005 was organized by the IEEE Rel/CPMT/ED Singapore Chapter. In the plenary session, Dr. Robert Darveaux, from Amkor Technology, discussed the "Current Trends and Critical Issues in Flip Chip Packaging" and Dr. Chiang Shih-Kao from Prismark, gave an insight on "The Global Packaging Business and Technology". An invited talk, "CPMT and EPTC: A study in Symbiosis", was delivered by the CPMT representatives, Dr. William Chen, Prof. Klaus-Jurgen Wolter and Dr. Ricky Lee, during the conference luncheon on day one.

Others

- Dr. Alastair Trigg represented the IPFA Board and the Chapter to attend the ESREP '05 meeting, held October 2005 in France.
- Dr. Radhakrisnan represented the IPFA Board and the Chapter to attend the ISTFA '05 meeting, held November 2005 in the U.S.A.
- The Chapter donated a book prize of U.S. \$2,500 to the School of Mechanical & Aerospace Engineering, Nanyang Technological University. This book prize entitled, "IEEE Reliability, CPMT/ED Singapore Chapter Book Prize" is awarded to the student who has distinguished himself in the Electronics Manufacturing and Packaging Technology, final year specialization of the 5 year Engineering (Mechanical) course.

Special Report of Singapore REL/CPMT/ED Chapter

- by K. L. Pey

On 16 December 2005, the IEEE Singapore REL/CPMT/ED Chapter hosted a farewell and appreciation function for Dr. Soon-Huat Ong, who just retired in July 2005. Dr. Ong is a senior member of IEEE and has made significant contributions towards the activities of the IEEE Singapore REL/CPMT/ED Chapter, the International Physical and Failure Analysis Symposium (IPFA) and the Electronics Packaging Technology Conference (EPTC), over the past 19 years.

Below are some of the important highlights and contributions of Dr. Ong to the IEEE:

- Dr. Ong was one of the founding members of the IEEE IPFA. In 1986-87, as a core member in the Failure Analysis interest group consisting of Dr. Ong himself, Mr. Swee Yong Khim, Prof. Daniel Chan and Dr. Philip Ho, the group initiated the first IPFA (i.e., IPFA'87), in Singapore, which was the first such conference on FA and Reliability of ICs outside the U.S.A.
- Dr. Ong was part of the IPFA organizing committee since IPFA'87 and held many key responsibilities, including the General Chair of IPFA'95 and the Technical Chair for IPFA'93.
- In 1994, together with Mr. Swee Yong Khim, Prof. Daniel Chan, Dr. Philip Ho and Dr. MK Radhakrishnan, the team initiated a new IEEE Chapter on reliability and CPMT in Singapore. The IEEE Reliability/CPMT Singapore Chapter was officially formed in 1994. In 1996, with



Dr. Ong and some of the Executive members of Chapter and IPFA at the farewell function.

the leadership of Dr. Ong, the Chapter on Reliability/CPMT incorporated the Electron Device Chapter as a new joint Chapter called IEEE REL/CPMT/ED Singapore Chapter. Between 1994 and 2005, Dr. Ong played an instrumental role in shaping the IC reliability, packaging and electron device activities in the Chapter as well as in Singapore, holding various key appointments in the Executive Committee.

- Also in 1994, as an Executive Committee member of the Chapter, Dr. Ong was a key person in formulating a continuing education program on the Failure Analysis and Reliability (FAR). Together with Prof. Daniel Chan, Prof. Jacob Phang, Mr. Swee Yong Khim and Dr. MK Radhakrishnan, a series of FAR short courses was conducted. The program was so successful that it was repeated in 1995 and 1997. This was probably the first structured educational training program on IC FAR courses conducted for industrial engineers and managers.
- During the period 1996-97, based on the feedback of the participants of IPFAs, the Chapter felt that there was a growing interest in packaging technology and a need to organize a Packaging Conference in the Asia Pacific rim. Thus, a new conference focusing on Electronics Packaging Technology, called Electronics Packaging Technology Conference (EPTC), was formed in 1997 by Mr. Swee Yong Khim, Dr. Ong, Prof. Andrew Tay and some interested members from the Singapore industry. Since then, EPTC has become a premier conference in packaging technology and has

drawn a regular attendance of about 250 participants over the past two conferences.

- Between 1998 and 2000, Dr. Ong was the Chair of the IEEE REL/CPMT/ED Singapore Chapter. With his leadership, the Chapter received significant recognitions from all the three societies. For example, the Chapter received the first Best Chapter Award from the Electron Devices Society in 1998.
- In 2004, Dr. Ong received a Special Presidential Recognition Award from the CPMT Society for his contributions towards the CPMT activities in Singapore.

Dr. Ong has indeed been an instrumental person in the development of IC failure analysis and reliability, and packaging technology activities in Singapore for the past 20 years. There are many other contributions and achievements of Dr. Ong which are impossible to be mentioned here. On behalf of the IEEE REL/CPMT/ED Singapore Chapter, we wish Dr. Ong a very happy retirement ahead.

MTT/AP/ED Thailand

- by Monai Krairiksh

The IEEE MTT/AP/ED Thailand Chapter organized a seminar on Circuits and Systems for Wireless Communications on November 7, 2005, at King Mongkut's Institute of Technology, Ladkrabang. There were nine oral presentations and ten poster presentations. On this occasion, Professor Tapan Sarkar (Syracuse University), gave a special lecture on "Signal Enhancement through Polarization Adaptivity on Transmit in a Near-Field MIMO Environment". There were ninety attendances at this lecture.

~ Xing Zhou, Editor



Dr. Soon-Huat Ong receiving a token of appreciation from Dr. Kin-Leong Pey, Chair of the IEEE Singapore REL/CPMT/ED Chapter.



Professor Tapan Sarkar gave a lecture on multiple input, multiple output system.

EDS MEETINGS CALENDAR

(As of February 24, 2006)

The complete EDS Calendar can be found at our web site:
http://www.ieee.org/society/eds/meetings/meetings_calendar.xml Please visit!

April 14 - 14, 2006, T **IEEE Workshop on Microelectronics and Electron Devices**, Location: Boise Center on the Grove, Boise, ID, USA, Contact: Roy Meade, E-Mail: rmeade@micron.com, Deadline: 2/17/06, www: <http://www.ewh.ieee.org/r6/boise/wmed2006/VWelcome.htm>

April 25 - 27, 2006, @ **IEEE International Vacuum Electron Sources Conference**, Location: Portola Plaza Hotel, Monterey, CA, USA, Contact: Ralph Nadell, E-Mail: rnadell@pcm411.com, Deadline: 1/6/06, www: www.ivec2006.org

April 25 - 27, 2006, @ **IEEE International Vacuum Electronics Conference**, Location: Portola Plaza Hotel, Monterey, CA, USA, Contact: Ralph Nadell, E-Mail: rnadell@pcm411.com, Deadline: 1/6/06, www: www.ivec2006.org

April 26 - 28, 2006, T **International Symposium on VLSI Design, Automation and Test**, Location: Ambassador Hotel, Hsinchu, Taiwan, Contact: Amy Wu, E-Mail: amywu@itri.org.tw, Deadline: 10/15/05, www: <http://vlsidat.itri.org.tw>

April 26 - 28, 2006, T **International Caribbean Conference on Devices, Circuits and Systems**, Location: Park Royal Hotel, Cozumel, Mexico, Contact: Roberto Murphy Arteaga, E-Mail: rmurphy@ieeee.org, Deadline: 11/18/05, www: <http://iccdcs.uib.es>

April 26 - 28, 2006, T **International Symposium on VLSI Technology, Systems and Applications**, Location: Ambassador Hotel, Hsinchu, Taiwan, Contact: Amy Wu, E-Mail: amywu@itri.org.tw, Deadline: 10/15/05, www: <http://vlsitsa.itri.org.tw/2006/>

May 15 - 16, 2006, T **International Workshop on Junction Technology**, Location: Hotel Equatorial, Shanghai, China, Contact: Xin-Ping Qu, E-Mail: xpqu@fudan.edu.cn, Deadline: 1/15/06, www: <http://www.iwjt2006.com>

May 22 - 24, 2006, * **IEEE/SEMI Advanced Semiconductor Manufacturing Conference and Workshop**, Location: The Sheraton Hotel, Boston, MA, USA, Contact: Margaret Kindling, E-Mail: mkindling@semi.org, Deadline: 9/22/05, www: www.semi.org/asmc

May 22 - 24, 2006, T **International Conference on Microwaves, Radar and Wireless Communication**, Location: Sympozjum Hotel, Krakow, Poland, Contact: Elzbieta Godlewska-Sedek, E-Mail: godlewska@pit.edu.pl, Deadline: 1/15/06, www: www.mikon-2006.pl

May 24 - 27, 2006, T **International Conference on Perspective Technologies and Methods in MEMS Design**, Location: Transkarpathian spa Polyana, Lviv-Polyana, Ukraine, Contact: Mykhalyo Andriychuk, E-Mail: andr@iap-mm.lviv.ua, Deadline: 3/1/06, www: <http://www.lp.edu.ua/Institute/IKN/CAD/MEMSTECH>

May 25 - 27, 2006, T **International Workshop on Computational Electronics**, Location: Vienna University of Technology, Vienna, Austria, Contact: Hans Kosina, E-Mail: kosina@iue.tuwien.ac.at, Deadline: 1/15/06, www: <http://www.iwce.org>

June 4 - 8, 2006, @ **IEEE International Symposium on Power Semiconductor Devices & Integrated Circuits**, Location: University of Naples "Federico II", Naples, Italy, Contact: Paolo Spirito, E-Mail: paolo.spirito@unina.it, Deadline: 10/24/05, www: www.ispsd2006.it

June 4 - 7, 2006, * **IEEE International Interconnect Technology Conference**, Location: Hyatt Regency at San Francisco Airport, Burlingame, CA, USA, Contact: Wendy Walker, E-Mail: wendyw@widerkehr.com, Deadline: Not Available, www: www.ieee.org/conference/iltc

June 11 - 12, 2006, @ **IEEE Silicon Nanoelectronics Workshop**, Location: Hilton Hawaiian Village, Honolulu, HI, USA, Contact: Wolfgang Porod, E-Mail: porod@nd.edu, Deadline: 2/1/06, www: <http://nano-nd.edu/si-nano/SNW06>

June 11 - 13, 2006, T **IEEE Radio Frequency Integrated Circuits Symposium**, Location: Moscone Center, San Francisco, CA, USA, Contact: John Barr, E-Mail: j.barr@ieeee.org, Deadline: 12/2/05, www: <http://www.ims2006.org>

June 13 - 17, 2006, @ **IEEE Symposium on VLSI Technology**, Location: Hilton Hawaiian Village, Honolulu, HI, USA, Contact: Phyllis Mahoney, E-Mail: phyllism@widerkehr.com, Deadline: 1/8/06, www: <http://www.vlssymposium.org>

June 15 - 17, 2006, T **IEEE Symposium on VLSI Circuits**, Location: Hilton Hawaiian Village, Honolulu, HI, USA, Contact: Phyllis Mahoney, E-Mail: phyllism@widerkehr.com, Deadline: 1/8/06, www: <http://www.vlssymposium.org>

June 21 - 23, 2006, T **International Workshop on Low Temperature Electronics**, Location: European Space & Technology Center, Noordwijk, The Netherlands, Contact: Bruno Leone, E-Mail: bruno.leone@esa.int, Deadline: 12/15/05, www: <http://www.congrex.nl/O6c01>

June 22 - 24, 2006, T **International Conference on Mixed Design of Integrated Circuits and Systems**, Location: Orbis Hotel Gdynia, Gdynia, Poland, Contact: Andrzej Napieralski, E-Mail: napier@DMCS.p.lodz.pl, Deadline: 2/28/06, www: <http://www.mixdes.org>

June 26 - 30, 2006, T **Future Trends in Microelectronics Workshop**, Location: Cap-sis Hotel and Conference Center, Heraklion, Greece, Contact: Serge Luryi, E-Mail: serge@ece.sunysb.edu, Deadline: Not Available, www: <http://www.ee.sunysb.edu/~serge/FTM.html>

June 27 - 29, 2006, T **Industry/Government/Industry Microelectronics Symposium**, Location: San Jose State University, San Jose, CA, USA, Contact: David Parent, E-Mail: dparent@email.sjsu.edu, Deadline: 2/17/06, www: www.engr.sjsu.edu/dparent/ugim2006

July 1 - 5, 2006, T **Siberian Russian Workshop and Tutorial on Electron Devices and Materials**, Location: Novosibirsk State Technical University, Novosibirsk, Russia, Contact: Alexander Gridchin, E-Mail: ieeensk@yandex.ru, Deadline: Not Available, www: Not Available

July 3 - 7, 2006, T **IEEE International Symposium on the Physical and Failure Analysis of Integrated Circuits**, Location: Meritus Mandarin, Singapore, Singapore, Contact: Jasmine Leong, E-Mail: ipfa@pacific.net.sg, Deadline: 2/3/06, www: <http://www.ieee.org/ipfa>

July 11 - 20, 2006, T **IEEE Conference on Nanotechnology**, Location: Westin Cincinnati, Cincinnati, OH, USA, Contact: Clifford Lau, E-Mail: lauc@onr.navy.mil, Deadline: 2/28/06, www: <http://ewh.ieee.org/tc/nanotech/>

August 28 - September 1, 2006, T **Symposium on Microelectronics Technology & Devices**, Location: Ouro Preto, Brazil, Contact: Jacobus Swart, E-Mail: jacobus@led.unicamp.br, Deadline: 3/5/06, www: Not Available

September 6 - 8, 2006, @ **IEEE International Conference on Simulation of Semiconductor Processes and Devices**, Location: Monterey Plaza Hotel, Monterey, CA, USA, Contact: Fely Barrera, E-Mail: sispad06@gloworm.stanford.edu, Deadline: 2/24/06, www: www_tcad.stanford.edu/sispad06

September 10 - 13, 2006, T **IEEE Custom Integrated Circuits Conference**, Location: Double Tree Hotel, San Jose, CA, USA, Contact: Melissa Widerkehr, E-Mail: melissaw@widerkehr.com, Deadline: 4/7/06, www: <http://www.ieee-cicc.org>

September 11 - 15, 2006, T **International Crimean Microwave Conference "Microwave & Telecommunication Technology"**, Location: Sevastopol National Technical University, Sevastopol, Ukraine, Contact: Sergey Smolskiy, E-Mail: smolskiysm@mail.ru, Deadline: 5/11/06, www: <http://iee.orbita.ru/aps/crim063.htm>

September 12 - 15, 2006, T **International Conference on Solid-State Devices and Materials**, Location: Pacifico Yokohama, Yokohama, Japan, Contact: SSDM Conference Secretariat, E-Mail: ssdm@intergroup.co.jp, Deadline: 5/1/06, www: <http://www.ssdm.jp>

September 17 - 20, 2006, T **IEEE Conference on Intelligent Transportation Systems**, Location: Toronto Marriott Downtown Eaton Centre, Toronto, Canada, Contact: Baher Abdulhai, E-Mail: baher.abdulhai@utoronto.ca, Deadline: 3/1/06, www: www.itsc2006.org

September 18 - 22, 2006, T **European Solid-State Device Research Conference**, Location: Montreux Convention Center, Montreux, Switzerland, Contact: Yusuf Leblebici, E-Mail: yusuf.leblebici@epfl.ch, Deadline: 4/7/06, www: <http://www.essdrc2006.com>

September 20 - 21, 2006, T **International Conference on Actual Problems of Electron Device & Engineering**, Location: Saratov State Technical University, Saratov, Russia, Contact: Alexei Miroshnichenko, E-Mail: alex@sstu.saratov.su, Deadline: Not Available, www: <http://www.sstu.ru/sstu/win/konf/apede2005.html>

September 27 - 29, 2006, * **International Semiconductor Conference**, Location: Sinaia Hotel, Sinaia, Romania, Contact: Dan Dascalu, E-Mail: dascalu@imt.ro, Deadline: Not Available, www: www.imt.ro/CAS

October 2 - 5, 2006, * **IEEE International SOI Conference**, Location: Holiday Inn Select Niagara Falls, Niagara Falls, NY, USA, Contact: Bobbi Armbruster, E-Mail: bacm@comcast.net, Deadline: 5/5/06, www: www.soiconference.org

October 4 - 6, 2006, T **International Symposium on Low-Power Electronics and Design**, Location: Rothach-Egern Conference Center, Tegernsee, Germany, Contact: Mircea Stan, E-Mail: mircea@virginia.edu, Deadline: 3/3/06, www: <http://www.islped.org>

October 8 - 10, 2006, @ **Bipolar/BiCMOS Circuits and Technology Meeting**, Location: Maastricht Exposition and Congress Centre, Maastricht, The Netherlands, Contact: John Long, E-Mail: j.r.long@ewi.tudelft.nl, Deadline: Not Available, www: www.ieee-bctm.org

October 10 - 13, 2006, T **International Conference on Advanced Thermal Processing of Semiconductors**, Location: Kyoto Brighton Hotel, Kyoto, Japan, Contact: Bo Lojek, E-Mail: blojek@atmel.com, Deadline: 5/31/06, www: www.ieeertp.org

October 12 - 13, 2006, T **IEEE International Seminar/Workshop on Direct and Inverse Problems of Electromagnetic and Acoustic Wave Theory**, Location: Tbilisi State University, Tbilisi, Ukraine, Contact: Mykhalyo Andriychuk, E-Mail: andr@iap-mm.lviv.ua, Deadline: 7/1/06, www: <http://www.ewh.ieee.org/soc/cpmt/ukraine/>

October 16 - 19, 2006, * **IEEE International Integrated Reliability Workshop**, Location: Stanford Sierra Conference Centers, Contact: Roy Walker, E-Mail: rwalker@twcny.rr.com, Deadline: 7/12/06, www: www.iirw.org

October 22 - 25, 2006, T **IEEE International Conference on Sensors**, Location: Daegu Exhibition & Convention Center, Daegu, Korea, Contact: Sukhan Lee, E-Mail: lsh@ece.skku.ac.kr, Deadline: 4/7/06, www: www.ieee-sensors2006.org

October 23 - 26, 2006, T **International Conference on Solid-State & Integrated Circuits Technology**, Location: Hotel Equator Shanghai, Shanghai, China, Contact: Mengqi Zhou, E-Mail: mqzhou@public3.bta.net.cn, Deadline: 5/31/06, www: <http://www.ICSICT2006.com>

November 5 - 9, 2006, T **IEEE International Conference on Computer Aided Design**, Location: DoubleTree Hotel, San Jose, CA, USA, Contact: Kathy MacLennan, E-Mail: kathy@mpassociates.com, Deadline: 4/19/06, www: <http://www.iccad.com/future.html>

November 8 - 10, 2006, T **International Workshop on Dielectric Thin Films for Future ULSI Devices: Science and Technology**, Location: Kawasaki City Industrial Promotion Hall, Kanagawa, Japan, Contact: Takano Watanabe, E-Mail: watanabe-t@waseda.jp, Deadline: 7/24/06, www: <http://home.hiroshima-u.ac.jp/iwdtf/>

November 12, 2006, T **Reliability of Compound Semiconductors Workshop**, Location: Marriott Riverwalk Hotel, San Antonio, TX, USA, Contact: Anthony Immorlica, E-Mail: anthony.a.immorlica@baesystems.com, Deadline: Not Available, www: <http://www.jedec.org/home/gaas>

November 12 - 15, 2006, * **IEEE Compound Semiconductor IC Symposium**, Location: Marriott Riverwalk Hotel, San Antonio, TX, USA, Contact: Mitchell Shifrin, E-Mail: mitchs@hittite.com, Deadline: Not Available, www: <http://www.csics.org>

December 11 - 13, 2006, * **IEEE International Electron Devices Meeting**, Location: San Francisco Hilton and Towers, San Francisco, CA, USA, Contact: Phyllis Mahoney, E-Mail: phyllism@widerkehr.com, Deadline: Not Available, www: www.ieee.org/conference/iedm

December 18 - 21, 2006, T **International Conference on Computers and Devices for Communication**, Location: SINP Convention Center, Kolkata, Kolkata, India, Contact: Animesh Maitra, E-Mail: codec2006@yahoo.com, Deadline: 5/31/06, www: <http://www.irpel.org/codec/codec04.html>

March 19 - 22, 2007, @ **IEEE International Conference on Microelectronic Test Structures**, Location: Takeda Hall, University of Tokyo, Bunkyo-ku, Japan, Contact: Yoichi Tamaki, E-Mail: yoichi.tamaki.ga@hitachi.com, Deadline: 9/15/06, www: <http://www.ee.ed.ac.uk/ICMTS>

May 14 - 18, 2007, @ **IEEE International Conference on Indium Phosphide and Related Materials**, Location: Kunibiki Messe, Matsue, Japan, Contact: Shigehisa Arai, E-Mail: arai@pe.titech.ac.jp, Deadline: Not Available, www: <http://www.iprm.jp/index.html>

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