

IEEE ELECTRON DEVICES SOCIETY

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2004 IEEE INTERNATIONAL VACUUM ELECTRONICS CONFERENCE (IVEC)



The Fifth International Vacuum Electronics Conference (IVEC 2004) is returning to the picturesque city of Monterey, California April 27-29, 2004. The meeting will be held at the Monterey Conference Center at the Doubletree Hotel under the sponsorship of the IEEE Electron Devices Society (EDS). Dr. Dan M. Goebel of the NASA Jet Propulsion Laboratory will serve as the General Chair, and Dr. Carol L. Kory of CCR and Analex Corp/NASA GRC will serve as Technical Program Chair. The EDS Technical Committee on Vacuum Devices provides oversight of the conference; an international committee chaired by Dr. James Dayton, Jr.

Since its inception in 2000, IVEC has become the premier international venue for presentations in the field of vacuum electronics. IVEC 2004 continues the tradition of the U.S. "Power-Tube" Conference in Monterey, which has become the US home of IVEC, in providing a forum for presentation and discussion of topics on vacuum devices, vacuum microelectronics, applications of vacuum devices, and the theory and technological developments of vacuum electron devices. IVEC meets in the U.S. every other year and in Europe and Asia alternately every fourth year. A highlight of the meeting will be the presentation of the IVEC Award for Excellence in Vacuum Electronics, given at the conference banquet. Complete details about the meeting and this award can be found on the conference web site at <http://www.ivec2004.org>.

The IVEC 2004 conference will begin with a half-day plenary session followed by two and a half days of oral and poster sessions. Two page abstracts for IVEC 2004 should be submitted electronically to Mr. Ralph Nadell of Palisades Convention Management at Rnadell@pmc411.com by January 5, 2004. Information on the preparation and submission of the abstracts can be found on the conference web site.

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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MESSAGE FROM THE EDS PRESIDENT



Steven J. Hillenius

It has been my privilege and honor to serve as the President of the Electron Devices Society for the last two years. It has also been two years of tremendous challenge and change. This will be the last message I write to you as President, so it is a time to reflect back over this period. I hope that I am leaving the position with the Society in better shape to face the future. I can look at some of the high points of the last two years with pride and satisfaction. These include; the celebration of EDS' 50th Anniversary; the development of a strategic plan with a primary focus on our technical committees, and the progress towards fulfilling our goal of providing our members with on-line access to a 'complete' set of EDS publications by digitizing all legacy content (pre-1988) for *Electron Device Letters*, *Transactions on Electron Devices* and the IEDM proceedings.

The challenge over the last two years has been one of responding to the dramatic change in our businesses and the economy within the world of electron devices. The change has been one where a dramatic decrease in the amount of commercial research and development has occurred. The result of this decrease has reduced our pool of traditional members; and in turn, has decreased the attendance at our technical meetings and the number of subscribers to our publications. These challenges and the fact that the IEEE as a whole was experiencing a budget crisis drove much of the behavior over the last two years and it was mostly one of belt tightening and deferring plans for expansion.

In my last message, I said that the challenges that we are confronted within the research and businesses that the Society represents are greater now than they have been for our entire history. We are looking at the end of the roadmap for the transistor scaling, a globalized economy that is making many of our technology innovations a widely available commodity and new technology developments that will challenge and disrupt our established institutions. The viability of the Society will be determined by how quickly we will be able to adapt to these changes and position the technical component of the Society to the interests and needs of the people who will be driving these changes.

I think that we have made significant steps to position the Society in such a way that it will maintain a technical edge. We have created the position of Technical Committees Chair that has AdCom voting rights and is included as a member of the EDS Executive Committee (ExCom). The key purpose of

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CONTRIBUTIONS WELCOME

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

Newsletter Deadlines

Issue	Due Date
January	October 1st
April	January 1st
July	April 1st
October	July 1st

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UPCOMING TECHNICAL MEETINGS

2004 IEEE INTERNATIONAL SYMPOSIUM ON PLASMA- AND PROCESS-INDUCED DAMAGE (P2ID)

The ninth annual International Symposium on Plasma- and Process-Induced Damage will be held May 17-19 in Austin, Texas. This conference, popularly known as P2ID, has served for nearly a decade to highlight issues surrounding all aspects of process-induced damage in semiconductor fabrication. Since its inception in 1996, this



conference has been held in California, Hawaii, and Paris, making it truly international. This will be the first time the conference will be held in Texas, and the venue will be Motorola University. Participants have historically been drawn from the full spectrum of academia, research, development, and manufacturing, and from all over the world.

Process-induced damage may be properly regarded as the unintended (and presumably undesirable) consequence of a fabrication step. This may be because the process was poorly designed at the outset and invariably induces damage, or it may be because the control of the process variables is inadequate, and occasionally damage is induced, or it may be because a specific structure on the wafer is uniquely sensitive. Although the distinction may become blurry in the details, damage is often categorized as either "physical"

or "electrical." One example of physical damage is a notch etched at the bottom of a polysilicon gate. Another would be the implant-induced damage at the edge of the gate. The most common example of electrical damage is the degradation of the gate insulator due to a charge buildup during a subsequent fabrication process such as a contact etch step. Phenomena such as the above examples have been extensively discussed at previous P2ID conferences from a broad perspective. Fundamental to the effort is to understand the mechanism by which the damage occurs, but there are myriad approaches to the appropriate solution. Proper process conditions may address the problem, but careful design of the tool itself may be more relevant. Design rules may also be incorporated to limit the damage on real circuits, and the robustness of the semiconductor materials may also alleviate the consequences. All of

these aspects of damage – mechanisms, processes, tooling, design rules, materials – are the province of this conference and it is why the study of these phenomena is multi-disciplinary.

There are several trends in the industry that signal an evolution of this field of study. For example, the nature of the gate dielectric is evolving – will the emergence of

high-k gate insulators reduce or increase the susceptibility to process-induced damage? Of the various candidates are there some that are more resistant to damage? The continuing requirement for legacy power supply compatibility requires that new technologies also have thicker gate dielectrics available – the compatibility of advanced processes with these "older" dielectrics is an interesting question. One trend in advanced technology that has become more important is that some process controls are no longer practical to keep the same tight specification as in older technology. Such limitation can either come from the extraordinary level of difficulties involved or from fundamental physics. Either way, the reduced control inevitably impact circuit performance, yield and reliability. These issues are the very core of process induced "damage" and P2ID is the perfect forum for it.

MESSAGE FROM THE EDS PRESIDENT

(continued from page 2)

this position is to quickly tie the new technical activities in the Society to the other areas of our business, mainly our technical meetings and publications, to ensure the Society maintains its value to our members. We are hoping with this organizational change that the Society will again be primarily driven by its vital technical component.

I believe that the future will be determined by how well we can attract the best researchers and developers to par-

ticipate in the Society's plans. We have created several new technical committees over the last several years and have given the technical committees a greater influence in the direction of the Society activities. I would like to see more Society members become active in these committees along with the organizing and editorial committees for the meetings and journals. We have also made considerable progress over the last two years in positioning the

EDS Executive Office to better serve the membership and to create a more efficient operation for the Society business. This has made it easier for the volunteers to use their time more effectively.

I hope that all of these changes have created a foundation for the Society to grow and thrive in the future.

*Steven J. Hillenius
Agere Systems
Allentown, PA USA*

2004 INTERNATIONAL CONFERENCE ON MICROELECTRONICS (MIEL)

The 24th International Conference on Microelectronics (MIEL 2004) will be held May 16-19, 2004, at the Faculty of Electronic Engineering, University of Nis, Serbia & Montenegro. The MIEL 2004 Conference will be organized by the IEEE Yugoslavia Section - ED/SSC Chapter, in cooperation with the Faculty of Electronic Engineering, University of Nis, Ei-Holding Co.-Nis, and Society for ETRAN, under the co-sponsorship of the IEEE EDS, with the cooperation of IEEE SSCS, and under the auspices of Serbian Ministry of Science, Technology and Development, Yugoslav Academy of Engineering, and City Assembly of Nis.

MIEL is an outstanding European conference providing an international forum for the presentation and discussion of the recent developments and future trends in the field of microelectronics. Since 1984, there is an aura of internationalization around the MIEL conferences, providing an opportunity for specialists from both academic and industrial environments from the West and East, as well as from the countries of the Third World, to meet in an informal and friendly atmosphere and exchange experiences in the theory and practice of microelectronics. From 1995, MIEL has been organized under the technical co-sponsorship of IEEE EDS, while the conference received IEEE EDS co-sponsorship for the first time in 2000.

The topics to be covered by the technical program of the MIEL 2004 Conference include all important aspects of microelectronic devices, circuits and systems, ranging from materials and processes, technologies and devices, device physics and modeling, process and device simulation, circuit design and testing, system design and packaging, and characterization and reliability. Based on the past decade history, the technical program is expected to consist of about 150 contributed papers by the authors from more



than 30 countries all around the world, which will be structured into oral and poster sessions. These papers, together with 21 invited papers, which are to be presented by the world leading authorities in the field of microelectronics, will form the solid foundation of the Conference MIEL 2004. Two related scientific events, namely the workshops "Power Devices and ICs" and "Microsystem Technologies", containing 5 invited papers each, will round off the technical program.

The invited lectures are: "GaN Electronics: Promises and Prospects" (I. Adesida, University of Illinois, USA); "Concurrent Engineering - A Tool for Improving MEMS Research & Manufacturing" (M. Bazu, National Institute of Microtechnologies, Romania); "Add-On Process Modules - An Economic Enhancement of Silicon Technology" (J. Burghartz, Delft University of Technology, The Netherlands); "Advanced Power Devices for DC/DC Conversion" (M. Darwish, Vishay Siliconix, Santa Clara, USA); "Concept of Virtual MST-Factory" (H. Deter, Technical University of Vienna, Austria); "Instrumentation and Methodology for MEMS Testing, Reliability Assessment and Failure Analysis" (I. De Wolf, IMEC, Belgium); "Characterization and Modelling Issues in MOS Structures with Ultra Thin Oxides" (G. Ghibaudo, ENSERG, France); "Memory Technology Including Emerging New Memory" (K. Kim, Samsung, Korea);

"MICROS: An Experimental Coin-Sized, Low Cost, Low Power CMOS ZigBee Radio at 2.4 GHz as a Ubiquitous Network Node" (K. Lee, KAIST, Korea); "CMOS Analog Design for Wireless Communication" (V. Liberali, University of Milan, Italy); "CMOS Reliability: Empirical Modeling and SPICE Simulation" (J. Liou, University of Central Florida, Orlando, USA); "Fast Recovery Diodes - Reverse Recovery Behaviour and Dynamic Avalanche" (J. Lutz, Chemnitz University, Germany); "Advanced Isolation Structures for Power ICs" (P. Mawby, University of Wales, UK); "Recent Developments in SiC Power Devices and Related Technology" (J. Millan, CNM-CSIC, Spain); "Reliability Overview of MEMS Technology" (R. Plana, LAAS, France); "MEMS Tunable Capacitors and Switches for RF Applications (RF MEMS)" (T. Rijks, Philips, The Netherlands); "Analysis of High Speed Heterostructures Devices" (S. Selberherr, Technical University of Vienna, Austria); "Forward and Reverse Recovery Behaviour of Diodes in Power Conversion Applications" (N. Shamma, Staffordshire University, UK); "Power Management in Wireless OEM Devices" (K. Shenai, University of Illinois at Chicago, USA); "Predictive Simulation of Microdevices and Microsystems: The Basis of Virtual Fabrication, Experimentation and Test" (G. Wachutka, Munich University of Technology, Germany); and "Microwave Photonics Links in Modern Communication Network: Component Technology" (P. Yu, University of California, San Diego, USA).

The city of Nis is the administrative, cultural and economic center of southeastern Serbia. Among many and various industries located in Nis, it is the electronic industry that is to take credit for its occasionally used nickname "City of Electronics". It is no wonder when the largest company in Nis is Ei-Holding Company founded in 1948,

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IEEE INTERNATIONAL RELIABILITY PHYSICS SYMPOSIUM (IRPS)

The 42nd Annual International Reliability Physics Symposium will be held at the Hyatt Regency Phoenix Civic Plaza in Phoenix, Arizona from April 25 to April 30, 2004. IRPS is the principal symposium dealing with the physical mechanisms that influence the performance or affect the reliability of integrated circuits and micro-electronic devices in the users' environment.

The Symposium has its roots in the early 1960's when a forum for interchange of information on the physical processes, which caused electronic components to fail, was established. Sponsorship was largely from the military, most notably from the U. S. Air Force Rome Air Development Center. In 1967 sponsorship moved to the Institute of Electrical and Electronic Engineers, with the Reliability Society and the Electron Devices Society agreeing to jointly sponsor the Symposium.

The conference aims to stimulate progress in these broad areas:

- Reliability Implications of Transistor Scaling
- Modeling, Simulation, and Understanding of Failure Mechanisms and Circuit Reliability
- Correlation of Reliability to the Physical and Electrical Properties of Microelectronic Materials
- Reliability-Driven Circuit Design and Wafer Processing

IRPS affords attendees the opportunity to hear technical presentations on the latest developments in the rapidly changing field of semiconductor/microelectronic reliability in a relaxed professional environment. Scheduled activities also allow time for social contact so that attendees can network with other participants who share common interests.

Technical Program

The conference is a forum for presenting original work that identifies new microelectronic failure or degradation mechanisms; describes how fabrication processes influence the susceptibility of products to particular failure mechanisms; demonstrates new,



improved, or innovative analytical techniques; or demonstrates techniques to build-in or extend reliability while meeting performance goals, especially as technologies are scaled.

On the product side, specific areas addressed at the symposium are Product Reliability and Burn-In, which covers chip-level reliability issues, burn-in elimination strategies, and correlation between yield, infant mortality, and burn-in fallout; Non-Volatile Memory, which addresses unique reliability phenomena and failure mechanisms in non-volatile memories; Qualification Strategies, which describes new techniques/test structures/vehicles for product qualification along with best practices to reduce cost and time to market.

The product sessions will also cover Assembly and Packaging (Cu and low-K issues, chip scale integration, stress modeling) Failure Analysis (evidence of new mechanisms, new techniques, case histories), MEMS (reliability of new structures sensors, and actuators) and Circuits (soft error upsets, analog circuit reliability issues).

Process issues scheduled to be discussed are Device Dielectrics, which addresses oxide breakdown mechanisms and models and the effects of processing on MOS gate reliability; Transistor Reliability, which covers new hot carrier phenomena, NBTI, material degradation mechanisms, and impact of alterna-

tive gate dielectrics; Interconnects will include defect and wear out phenomena in Cu and Al systems, low-K/oxide inter/intra-level reliability, mechanical stress issues, and joule heating effects. Electrostatic Discharge and Latch-up will cover novel structures including SOI and bipolar, damage interpretation, scaling issues, and RF CMOS.

Sessions on Device and Process, which addresses reliability-driven process interactions, new process related reliability issues, and Process-Induced Damage, which will describe reliability degradation associated with damage and early non-destructive in-line detection of process-induced damage complete the program.

Tutorials/Workshops

IRPS's two day Tutorial Program features two sets of bound notes from all of the tutorials presented at the symposium. Seasoned attendees have the opportunity to learn new, challenging areas of interest during the Advanced Reliability session on Monday, while new participants can gain familiarity in classic reliability methodologies during the Reliability Fundamentals session on Sunday. Past tutorial sessions have covered a wide variety of topics such as Electro migration, Insulators, Defects, Testing, Noise, Electrostatic Discharge Damage, Reliability Tools and Modeling, Hot Carriers, and Surface Mount Technology.

The IRPS Workshops enhance the synergy of the Symposium by affording the attendees an opportunity to meet in informal groups to discuss key reliability physics topics with the guidance of experienced moderators. Some of the workshop topics are directly coupled to the Tutorial Program. This allows each attendee to learn more about a particular topic or field of interest in a Tutorial session during the day on Monday and then exchange ideas with other attendees having similar interests in an open moderated forum on Wednesday evening. Workshop topics will deal with electro migration, dielectrics, hot

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2004 IEEE INTERNATIONAL VACUUM ELECTRONICS CONFERENCE (IVEC)

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The 2004 conference will open with three plenary talks reviewing government supported educational research programs in the US, Europe and Asia. The plenary session will continue with four invited talks on the theme of "High-Frequency Technology". The conference will then transition into presentations of contributed papers on a variety of topics related to vacuum electron devices for the next two and a half days in three parallel oral sessions and two poster sessions. Papers will include presentations on a wide range of classic vacuum devices, including traveling wave tubes, crossed field devices, klystrons, inductive output tubes, fast wave devices, free electron lasers, pulse compression devices, high pulsed power devices, plasma filled amplifiers, triodes, tetrodes, pentodes and switches. In the area of vacuum microelectronics, IVEC is seeking papers on microwave and millimeter wave devices, displays, sensors, field emitter arrays and microwave devices.

Dr. Dan M. Goebel, JPL
Dr. Carol L. Kory Calabazas Creek Research
Dr. Monica Blank, CPI
Dr. John H. Booske, University of Wisconsin
Dr. James A. Dayton, Jr., Genvac
Dr. Yehuda Goren, Teledyne
Dr. Vern Heinen, Northrop Grumman
Dr. Baruch Levush, Naval Research Laboratory
Dr. William L. Menninger Boeing EDD
Dr. Richard True, L-3 Communications
Dr. David R. Whaley, L-3 Communications
Mr. Ralph Nadell, Palisades Conventions

General Chairman
Program Chairperson
Local Arrangements
Education
Awards Chair
Publicity
Finance
Plenary Sessions
Special Issue Editor
Finance
Publicity
Meeting Arrangements

Under systems and subsystems, IVEC is including component parts (guns, collectors etc.), microwave power modules, electronic power conditioners, power supplies, linearizers, amplifier/antenna coupling, device and subsystem integration, reliability and life. Under the heading of theory and technologies, IVEC is seeking papers on computer analysis and modeling, novel materials, electron emission, RF and high voltage breakdown, linearity, intermodula-

tion, noise, measurement techniques, miniaturization and thermal control.

The IVEC 2004 conference is organized by a Program Committee made up of representatives of government, industry and university researchers. Members of the 2004 program committee are listed above.

Dan M. Goebel
General Chairman
NASA Jet Propulsion Laboratory
Pasadena, CA, USA

IEEE INTERNATIONAL RELIABILITY PHYSICS SYMPOSIUM (IRPS)

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carriers, and several specialized sessions covering wafer-level reliability, ESD/Latch-up, and micro-electromechanical systems.

Equipment Demonstrations

A unique aspect of the Symposium is the Equipment Demonstration program held throughout the week. Manufacturers of state-of-the-art analytical and test equipment are on hand to demonstrate their products and systems to individuals and small groups. Some demonstrators will analyze attendees' samples by appointment. Equipment to be demonstrated includes acoustic imaging, burn-in/device stressing, computer-aided navigation, confocal laser scanning microscopy, emission microscopy, and ESD testing. Demonstrations of

focused ion beam and SEM systems, functional/parametric test equipment, IR imaging/thermal analysis, probing systems (including laser cutters) reliability simulation tools, and wafer-level reliability assessment systems are also planned.

Reliability Year In Review

The Reliability Year in Review is a new session added in 2003 that will be offered again in 2004 due to its popularity and innovative format. Reliability experts in selected fields will offer their assessment of current and recent publications in their areas of expertise in a forum that allows for maximum interaction. The session is slated for Friday morning, April 30, and should again attract a strong turnout.

Further Information

The 2004 IRPS will be held at the Hyatt Regency Phoenix Civic Plaza in Phoenix, Arizona from April 25 to April 30, 2004. The hotel is located adjacent to the Phoenix Civic Plaza where the technical sessions will take place. Social events currently being planned are the Monday evening reception in the Equipment Demonstration area, and the Tuesday evening poster reception. For further 2004 IRPS information, contact: Bernie Pietrucha, IRPS General Chair, Rowan University, (856) 256-5338, fax (856) 256-5241, email:pietrucha@rowan.edu. Information is also available on the IRPS Web Page at: <http://www.irps.org/>

Bernie Pietrucha
General Chair
Rowan University
Glassboro, NJ, USA

CALL FOR NOMINATIONS

2004 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, Asia & Pacific.

Prize: US\$5,000 to the student; US\$1,000 grant to the student's department; US\$1,000 grant to the

student's faculty advisor in support of the student's project; 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
- 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

Timetable:

- Nomination packages will be due at the EDS Executive Office no later than May 15, 2004
- Recipients will be notified by July 15, 2004
- Monetary awards will be given by August 15, 2004
- Formal presentation of the awards will take place at the IEDM Awards Ceremony in December 2004.
- Nominations 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

<http://www.ieee.org/eds/fellowship>

For more information contact:
edsfellowship@ieee.org

2004 INTERNATIONAL CONFERENCE ON MICROELECTRONICS (MIEL)

(continued from page 4)

which is the leading Serbian manufacturer of wide range of electronic products. Situated in the Nisava valley, some 240 kilometers away from Belgrade, Nis is one of the busiest road and railway junctions in this part of Europe. Good road and railway connections put Nis within easy striking distance from Belgrade. Rich in ancient monuments that bear witness of turbulent periods of its history, Nis is now a burgeoning seat of learning. The University of Nis, although rel-

atively young, has come to be called "my alma mater" by many of the highly skilled professionals. The Faculty of Electronic Engineering, one of the organizers of the Conference MIEL 2004, has constantly been giving a significant contribution to the development of the University of Nis, as one of its most prosperous institutions.

For registration and other information, visit the MIEL 2004 Home Page at <http://europa.elfak.ni.ac.yu/miel/>, or contact the MIEL Confer-

ence Secretariat, Department of Microelectronics, Faculty of Electronic Engineering, University of Nis, Beogradska 14, 18000 Nis, Serbia & Montenegro; Tel.: +381 18 529 325; Fax: +381 18 524 931; E-mail: miel@elfak.ni.ac.yu

The MIEL organizers and committee members look forward to seeing you in May 2004.

*Ninoslav Stojadinovic
General Chairman
University of Nis
Serbia & Montenegro*

SOCIETY NEWS

2002 EDS GEORGE E SMITH AWARD

The George E. Smith Award was established in 2002 to recognize the best paper appearing in a fast turn-around archival publication of the IEEE Electron Devices Society, targeted to *IEEE Electron Device Letters*. This award has been named after the founding editor-in-chief of the publication, George E. Smith. Among other selection criteria, an equally important one, is comprehensive and fair referencing of prior art.

The first-ever paper winning the George E. Smith has been selected. The winning paper is entitled "Self-Aligned SiGe NPN Transistors with 285 GHz fMAX and 207 GHz fT in a Manufacturable Technology". The paper appeared in the May 2002 issue of *Electron Device Letters* and the authors are: D. Ahlgren, D. Angell, H. Chen, J. Florkey, G. Freeman, F. Golan, D.R. Greenberg, R. Groves, B. Jagannathan, S.J. Jeng, J. Johnson, M. Khater, E. Mengistu, F. Pagette, J.-S. Rieh, C.M. Schnabel, K.T. Schonenberg, P. Smith, K. Stein, A. Stricker, and S. Subbanna. The recipients are awarded a certificate and a check for \$2,500. The 2002 award will be presented at the IEDM on 8 December, 2003 in Washington, D.C. The following are brief biographies of the twenty-one winners.



David C. Ahlgren received his BA from DePauw University, Greencastle, IN, in 1973 and PhD in Chemical Physics from The University of Michigan, Ann Arbor, MI, in 1979. He joined IBM in Hopewell Junction, NY in 1979 conducting semiconductor process development. He is currently Senior Engineering Manager of SiGe Advanced BiCMOS Technology Development.

Dr. Ahlgren has published over 50 technical papers and holds 9 patents in semiconductor device and process technology.

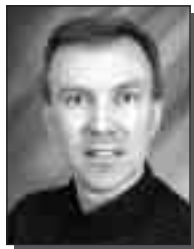
David Angell (photo not available) received a Doctorate in Physics from State University of New York at Albany, concentrating on defects in semiconductor materials. Worked for IBM in research, development and production of semiconductor chips.

Current assignment is in Real-time Process Monitoring and Control in IBM's 300mm chip manufacturing facility at East Fishkill, New York.



Huajie Chen received his B.S. and M.S. in physics from Fudan University, Shanghai in 1993 and 1996, respectively, and Ph. D. in physics from Carnegie Mellon University, Pittsburgh in 2000. He is currently a development engineer at IBM Semiconductor Research and Development Center, working on Si/SiGe materials, SiGe BiCMOS, and strained Si CMOS.

John Florkey (photo not available) received the B.S. and M.S. degrees in Materials Science at The Ohio State University, in 1997 and 2001, respectively. From 1997 to 1999, he worked at Seagate Technology Incorporated's Recording Head Operations in Bloomington, MN. In 2001, he joined the Silicon Germanium Passives Integration Group, IBM Microelectronics.



Greg Freeman received his PhD in EE from Stanford University in 1991, and has since worked at IBM Microelectronics in East Fishkill NY. He currently is a senior engineering manager, managing a department with responsibility for high performance SiGe and RFCMOS device design, RF characterization, and compact modeling.



Frank Golan, prior to working in silicon germanium microelectronics process integration, worked since 1998 in photolithography metrology and chemical mechanical planarization process development with IBM in Hopewell Junction, NY. He was previously employed with Philips Semiconductor (formerly Micrus) as an equipment engineer in CMP while working on his undergraduate degree in chemical engineering which he received in 1998 from Rensselaer Polytechnic Institute.



David R. Greenberg is a semiconductor device researcher working in advanced RF technology development and assessment. He earned a B.S. degree in electrical engineering at Columbia University under a Pulitzer scholarship in 1988 and completed both his M.S. and Ph.D. at M.I.T under Hertz and Intel Foundation fellowships in 1990 and 1994, respectively. Dr. Greenberg joined IBM in 1995. He is an author or coauthor of 4 patents and over 30 technical papers and is a member of Tau Beta Pi and the Institute of Electrical and Electronics Engineers.



Robert A. Groves received the B.S.E.E degree from the State University of New York in 1996. He joined IBM Corporation, Microelectronics Division in East Fishkill, NY in 1989 as a Development Lab Technician. Since 1994, he has worked on SiGe technology development, with an emphasis on high frequency modeling and characterization. His current interest is in microwave passive devices on

silicon (interconnect, capacitors, and inductors), particularly integrated spiral inductor optimization and modeling.



Basant Jagannathan obtained B.Tech. degree from IIT, Kharagpur, India and M.S and Ph.D from State University of New York at Buffalo. He is with IBM

Microelectronics where his current research interests lie in CMOS/BiCMOS technology development for rf and high speed communication systems.



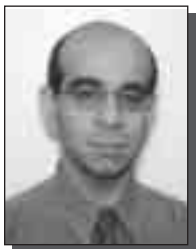
Shwu-Jen Jeng received the Ph.D. degree in Materials Science and Engineering from University of Illinois, Champaign-Urbana. She joined IBM in 1986 and

worked on reactive ion etching damage, in-situ oxide removal and silicidation of silicon as well as wide band gap emitter. In 1994, she joined IBM, SRDC and has been working on SiGe BiCMOS Device and Process Development.



Jeffery Johnson, after receiving a Ph.D. degree in electrical engineering from Carnegie-Mellon University in 1987, he joined IBM to work on technology CAD. He is currently a Senior

Technical Staff Member.



Marwan H. Khater received B.S. degree in Physics from Middle East Technical University, Turkey, M.S. degree in Physics, with Computer Science minor,

from Southwest Texas State University, and Ph.D. in Electrical Engineering from the University of Texas at Dallas. Currently he is working at IBM Microelectronics on development of Silicon-Germanium

bipolar transistor technology for high speed applications.



Endeshaw H. Mengistu was born in Addis Ababa, Ethiopia, in 1968. He received the B.S. and M.S degrees in Physics from Addis Ababa Uni-

versity, Addis Ababa, in 1989 and in 1995 respectively. He received an M.S degree in Physics from Clemson University, Clemson, South Carolina, USA, in 1997 and received an M.S degree in Electrical engineering from Brigham Young University (BYU), Provo, Utah, USA, in 1999.

In 1994, he was with KFA, Juelich, Germany. From 1999 to 2001, he worked with IBM.

Currently, he is with HaloLSI Device inc. working as a Test/Device engineer in MONOS flash memory.



François Pagette received the B.S. degree in Physics from Université de Sherbrooke, Québec (1992) and the MS degree in electrical engi-

neering from Carleton University, Ontario (1995). He occupied various BiCMOS process development positions at Nortel Networks, Ontario (1990-1994). He was a photolithography engineer at Texas Instruments, Dallas, (1995-2001). He since joined IBM's SiGe integration team.



Jae-Sung Rieh received B.S. and M.S. degrees in electronics engineering from Seoul National University, and Ph.D. degree in electrical engineer-

ing from the University of Michigan, Ann Arbor. Since 1999, he has been with IBM Semiconductor R&D Center, Hopewell Junction, NY, where he is involved in high-speed SiGe HBT device design and characterization.



Christopher Schnabel received the B.S. and M.S. degrees in electrical engineering from Case Western Reserve University, Cleveland, Ohio in 1999

and 2000, respectively. He joined IBM Corporation, Hopewell Junction, NY, in 2000, where he is working on analog and mixed signal technology development.



Kathryn Schonenberg received a B.S. in Chemical Engineering from Purdue University in 1985. She joined IBM as a process engineer in 1985, working

in photomask manufacturing, semiconductor manufacturing. She received a M.S. in Materials Science from Columbia University in 1996. She currently works for the IBM T.J. Watson Research Center in Yorktown Heights, NY as a SiGe process integration engineer.



Peter Smith received the B.S. and M.S. degrees in Electrical Engineering from the Pennsylvania State University in 1999 and 2001. He subsequently

joined the IBM Semiconductor Research and Development Center as a Staff Engineer. His work primarily involves development, design, and characterization of high performance SiGe heterojunction bipolar transistors.



Kenneth J. Stein is an Advisory Engineer in the Silicon Germanium BiCMOS Department, with responsibilities in the areas of FEOL, BEOL and Passives

process integration. He has held both management and process

integration positions in both Research and Microelectronics Divisions, and holds a number of patents in bipolar and passive devices.



Andreas D. Stricker was born in Bern, Switzerland, in February 1965. In January 1992, he received his M.S. degree in applied physics from the University of Bern where he worked in the field of LASER interactions with solid state materials. Andreas Stricker started his Ph.D. stud-

ies at the Integrated Systems Laboratory. He published his thesis, "TCAD of ESD Protection devices", in November 2000. Andreas Stricker is now with IBM Microelectronics, Burlington, Vermont where he joined the SiGe RF device and modeling group.



Seshadri Subbanna received the Ph.D. degree in electrical engineering and materials science from the University of California, Santa Barbara. Since

joining IBM Microelectronics, East Fishkill, NY, he has held positions in base technology development, 0.22mm CMOS and SRAM technology development from 1989 to 1996. Currently he is with the Microelectronics division, systems Group Business Unit, as program manager involved with advanced technology development & integration into systems.

*Renuka P. Jindal
University of Louisiana at Lafayette
Lafayette, LA, USA*

2002 EDS PAUL RAPPAPORT AWARD

Starting 2002, the IEEE Electron Devices Society has decided to confer the Paul Rappaport Award to the best paper published in the *IEEE Transactions on Electron Devices* exclusively. In prior years, papers from both *IEEE Transactions on Electron Devices* and *IEEE Electron Device Letters* were considered for this award. The recipients are awarded a certificate and a check for \$2,500, presented at the International Electron Devices Meeting (IEDM).

The winner of the 2002 award is a paper entitled, "Design and Fabrication of 50-nm Thin-Body p-MOSFETs with a Silicon-Germanium Heterostructure Channel", which appeared in the February, 2002 issue of *Transactions on Electron Devices*, and was authored by Jeffrey Bokor, Chenming Hu, Jakub Kedzierski, Tsu-Jae King, Vivek Subramanian, Peiqi Xuan and Yee Chia Yeo. The 2002 award will be presented at the IEDM on 8 December, 2003 in Washington, D.C. The following are brief biographies of the seven winners.



Jeffrey Bokor is Professor of Electrical Engineering and Computer Sciences at the University of California at Berkeley, with a joint appointment at the Lawrence Berkeley National Laboratory. His current research activities include novel techniques for nanofabrication, new devices for nanoelectronics, and extreme ultraviolet lithography.



Chenming Hu is the CTO of TSMC and the TSMC Distinguished Professor of Electrical Engineering and Computer Science at UC Berkeley. He received the 2002 IEEE Solid State Circuits Award for co-developing BSIM, the industry standard MOSFET model for IC simulation, and the 1997 IEEE Jack Morton Award for contribu-

tions to MOSFET reliability physics.



Jakub Kedzierski received his Ph.D. degree from the University of California at Berkeley in 2001. He is currently a research staff member at the IBM Watson Research Center. His research interests include the investigation of thin-body devices, and the integration of silicides as gate electrodes.



Tsu-Jae King received the Ph.D. degree in Electrical Engineering from Stanford University. From 1992 to 1996, she was a Member of Research Staff at the Xerox Palo Alto Research Center. Since 1996, she has been with

continued on page 14

ANNOUNCEMENT OF THE EDS GRADUATE STUDENT FELLOWSHIP WINNERS FOR 2003

In 2000, the IEEE approved the establishment of the Electron Devices Society Graduate Student Fellowship Program. It is designed 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.

EDS proudly announces the two 2003 EDS Graduate Student Fellowship winners. Brief biographies of the 2003 recipients follow.

Detailed articles about each Graduate Student Fellowship winners and his work will appear in forthcoming issues of the EDS Newsletter.



Yu-Long Jiang

was born in 1977 in Hebei Province, China. He received his B.S. degree in physics in 1999 and his M.S. degree in micro-

electronics and solid-state electronics in 2002 at Fudan University, Shanghai, China. Since September of 2002, he has been pursuing his Ph.D. degree in microelectronics & solid-state electronics at Fudan University. He was invited by Axcelis Technologies Inc. (Massachusetts) to co-develop Ni-salicide technology on ultra shallow junctions from February to August of 2003. He was the winner of 2002 GE Fund Edison Cup Technology Innovation Competition. His current research interests include VLSI technology, device physics and modeling. He has authored or co-authored nine papers.



Javier A. Salcedo

was born in Mérida, Venezuela, on August 16, 1977. He received his Professional degree in Electronics Engineering from the Universidad Simón Bolívar (USB), Caracas, Venezuela, in 1999, and his M.S. degree in Electrical Engineering from

the University of Central Florida, Orlando, Florida, in 2003.

From 1997 to 2001, he was a member of the technical staff at USB Solid-State Electronics Laboratory. While there, he conducted research on sub-micron MOS physics-based modeling and parameter extraction, embedded systems design, and transducers design for RF applications. He has published ten papers in referred technical journals and conference proceedings, and has worked on the design of innovative electrostatic discharge (ESD) protection cells for emerging MEMS applications at NIST and for commercial communication systems at Intersil Corporation. In 2003, he received the IEEE Outstanding Graduate Student Award from the IEEE Orlando Section.

He is currently a Ph.D student at the University of Central Florida, where his research work focuses on the development of CAD tools for the design and simulation of novel ESD protection cells for integrated circuits and MEMS-based embedded sensor system-on-chip technologies.

*Ilesanmi Adesida
EDS Educational Activities Chair
University of Illinois
Urbana, IL, USA*

*Stephen Parke
EDS Graduate Student Fellowship
Chair
Boise State University
Boise, ID, USA*

CALL FOR IEEE FELLOW NOMINATIONS

Nominations are being accepted for the 2005 class of IEEE Fellows. Earlier this year, the new Electronic Fellow Nomination Process (EFNP) was launched. This procedure will allow nominators, references, and endorsers the capability to submit IEEE Fellow Nomination forms electronically.

Any person, including non-members, are eligible to serve as a nominator with the following exceptions: members of the IEEE Board of

Directors, members of the IEEE Fellow Committee, IEEE Technical Society/Council Fellow Evaluating Committee Chairs, members of IEEE Technical Society/Council Evaluating Committees reviewing the nomination, or IEEE Staff.

A Candidate must be an IEEE Senior Member at the time the nomination is submitted, his/her IEEE membership dues must be current, and he/she must have completed five

years of service in any grade of IEEE Membership. NOTE: IEEE affiliate membership does not apply.

The deadline for receipt of complete IEEE Fellow Nominations is 15 March 2004.

To learn more about the new electronic nomination process or to request a hard copy of the Fellow Nomination Kit, please visit the IEEE Fellow Activities Web Site at www.ieee.org/fellows.

2002 IEEE TRANSACTIONS ON SEMICONDUCTOR MANUFACTURING BEST PAPER AWARD

The *IEEE Transactions on Semiconductor Manufacturing Best Paper Award* is presented to the authors of that paper considered by the Transactions' Editorial Staff and reviewers to be the outstanding paper published during the year. The Award is based on the accuracy, originality, and importance of the technical concepts, as well as the quality and readability of the manuscript. The Best Paper is also based on the immediate or potential impact that this work will have on the overall semiconductor manufacturing industry.

The Editorial Staff is pleased to announce that the paper entitled, "Real-time Predictive Control of Photoresist Film Thickness Uniformity," by Lay Lay Lee, Charles D. Schaper, and Weng Khuen Ho has been recognized as the best paper published in the 2002 Transactions. This paper, which appeared in the February issue, has been chosen because it demonstrates the gains possible through development and application of advanced process control methods in photoresist processing. By combining arrays of real-time thickness sensors, a multizone hotplate for actuation, and generalized predictive control algorithms, real-time control of resist thickness is achieved and tenfold improvements in thickness uniformity are shown. The work vividly shows the improvements possible with real-time sensing, actuation, and control in

advanced semiconductor processing.



Lay Lay Lee received the B.Eng. degree (with honors) in electrical engineering in 1998 and is currently pursuing the Ph.D. degree in electrical engineering from National University of Singapore (NUS), Singapore. She was a Visiting Researcher at Stanford University, CA, in 1999 and 2000. Her research interests include process control and applications of control and signal processing in semiconductor manufacturing.



Charles D. Schaper received the B.S. and M.S. degrees in chemical engineering from the University of Connecticut, Storrs, and the Ph.D. degree in chemical engineering from the University of California, Santa Barbara, in 1990.

He is a Senior Research Scientist in electrical engineering at Stanford University, Stanford, CA. His current research interests include molecular methods of pattern generation for nanofabrication applications and temperature control for

lithography. He has consulted with industry on numerous projects including RTP, RTCVD, MOCVD, and thermal cycling for semiconductor processing.

Dr. Schaper was a co-winner of the American Statistics in Chemistry Award.



Weng Khuen Ho received the B.S. degree (with honors) in electrical engineering from the National University of Singapore (NUS), Singapore, in 1987 and the Ph.D.

degree in control engineering from the Department of Electrical Engineering, NUS, in 1992. Currently, he is the director for Intelligent Control in the Faculty of Engineering and an Associate Professor at the Department of Electrical Engineering in NUS. His research interests include process control, knowledge-based adaptive control, and application of control and signal processing in the manufacturing of semiconductors. He was a Visiting Scholar in Stanford University, Stanford, CA, in 1998 and 1999. He has co-authored (with C. C. Huang and T. H. Lee) the book, *Adaptive Control* (Instrument Society of America, 1993).

*Duane S. Boning, T-SM Editor
Cambridge, MA, USA*

CONGRATULATIONS TO THE EDS MEMBERS RECENTLY ELECTED TO IEEE SENIOR MEMBER GRADE!

Angela Antoniu
Zaiki Awang
Sandra G. Biedron
Richard S. Burton
William Chen
Carlos A. Couto
Ranadeep Dutta

John S. Fairbanks
Lorenzo Faraone
Yuriy V. Gandel*
Craig A. Gaw
John R. Jones
Scotten W. Jones
Omar M. Manasreh*

Joseph Nahas
Andrzej Pradzynski
Erwin J. Prinz
Franklin Schellenberg*
Fernando Silveira
Ooi-Kiang Tan
Deepak Uttamchandani

Truc Q. Vu
Robert A. Weller
Steven E. Wetterling
Richard L. Woodin
Ken H. Wong
Viktor D. Yeryomka*

* = 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. In addition, 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/md/smelev.htm>.

EDS REGION 9 CHAPTERS MEETING SUMMARY

The EDS Region 9 (Latin America and the Caribbean) Chapters Meeting was held on Sunday, 7 September 2003, at the Blue Tree Conventions Center in Sao Paulo, Brazil, in conjunction with SBmicro2003 (18th Symposium on Microelectronics Technology and Devices). The meeting was attended by Cor L. Claeys, Chair of the Regions/Chapters Committee; Magali Estrada del Cueto, EDS Chair of the R9 Sub-committee for Regions/Chapters; Francisco J. García Sánchez, Vice-Chair of the R9 Sub-committee for Regions/Chapters, and CAS/ED/PEL Venezuela Chapter Chair; Rodolfo Quintero, ED Mexico Chapter Chair; Jacobus W. Swart, ED South Brazil Chapter Chair; Miguel Alemán Arce and Antonio Cerdeira, CINVESTAV-IPN Mexico Student Branch Chapter Chair and Faculty Advisor, respectively; as well as several special invited guests, i.e., Sergio E. Barbin, Chair of the IEEE South Brazil Section, Nilton Morimoto, of the Escola Politecnica da Universidade de Sao Paulo, who coordinated local arrangements for this meeting, and Oliver Bonnaud of the Université de Rennes.

The meeting was convened to bring together R9 Chapter leaders to discuss a variety of challenging issues confronting EDS activities in the Latin American and Caribbean Region, its chapters and especially their members.

After Cor L. Claeys, the EDS Regions/Chapters Chair, presented the welcome and opening remarks, the meeting started with a discussion of several general issues of interest, such as: chapters placement within IEEE's regional and societal structure, EDS' organizational structure, nature of its different activities, procedures, and relationships among chapters, committees, sections, societies, etc. Cor Claeys went on to describe EDS chapter growth history by region, and commented on the 2001 peak and the outstanding increase experienced by Regions 8 and 10, specifically the former.



EDS Region 9 Chapters Meeting on September 7, 2003, Sao Paulo, Brazil

Magali Estrada del Cueto presented, on behalf of Ilesanmi Adesida, a description of the Educational Committee's Activities, including the Distinguished Lecturer Program. Francisco García Sánchez, on behalf of Region 9 EDS Newsletter Editor Adelmo Ortiz, talked about the importance of sending timely reports of chapters' activities to this newsletter.

Following the general discussion, three active chapters (Mexico, South Brazil, and Venezuela) and one student branch chapter (CINVESTAV-IPN Mexico) reported their recent activities as well as their future plans. Additionally, Hugo Martín Fernandez and Carlos Vega, both of Cristóbal Colón University in Vera Cruz (Mexico), Edval J. P. Santos of Universidad Federal de Pernambuco, Recife (Brazil), and José Camargo da Costa of Universidad de Brasília (Brazil) presented their ongoing work towards the forthcoming establishment of three new EDS Chapters at Vera Cruz, Recife and Brasília, respectively. The Venezuela's Chapter Chair advised that the Fifth IEEE International Caracas Conference on Devices, Circuits and Systems (ICDCS2004), biannually held with EDS technical co-sponsorship, will take place in November 2004 in the Dominican Republic.

One of the critical issues discussed at the meeting was the effect on R9 EDS membership of the relatively onerous IEEE membership fees, which many members in Region 9 find very difficult to afford. In the view of the participants, this poses a serious problem for the Region that is not being effectively addressed by the

present IEEE "minimum income" policy.

The meeting participants unanimously agreed to submit for immediate approval to EDS and IEEE for the creation of an annual "Region 9 EDS Outstanding Student Paper Award" to encourage student ED related activities and to promote much needed EDS membership growth in Region 9. If approved, the award is expected to be conferred for the

first time in 2004 at one of the EDS sponsored international technical meetings regularly held in Region 9.

As part of their goals for the coming year, the members of the R9 Sub-committee for Regions and Chapters (Chair, Vice-Chair, and all R9 Chapter Chairs) will undertake actions to identify and promote the formation of new regular and student chapters in strategic regional areas, starting with Argentina, Chile, Colombia, Peru and Puerto Rico. They will also continue to assist some chapters to become more active, and to promote the more organized chapters to further their activities.

It was decided to create a Region 9 EDS web site, to be maintained by the R9 Sub-committee for Regions and Chapters. It will contain up-to-date information about ED related activities, including announcements, bulletins, meetings, awards, etc, as well as direct links to all R9 Chapters and other EDS and IEEE sites of interest. It was also agreed that each Chapter would continue and strengthen the efforts to increase the number of Senior Members in the Region, as well as the number of Distinguished Lecturers.

The formal meeting was adjourned late in the afternoon, after having covered all the agenda's items. Later the meeting continued very informally at a local "currascaria" during a good part of the evening.

*Francisco J. Garcia Sanchez
University Simon Bolivar
Caracas, Venezuela*

EDS DISTINGUISHED LECTURERS PARTICIPATE IN THE 2ND WIMNACT- KOREA

The 2nd Workshop and IEEE EDS Mini-colloquia on NANometer CMOS Technology (WIMNACT 2003) was held on September 19, 2003 in Daejeon, Korea. The speakers were composed of three EDS Distinguished Lecturers. After the welcoming address by Kwyro Lee, EDS Chair of the Asia & Pacific subcommittee for Regions/Chapters (SRC-AP), Professor Marcel Profirescu, from the Technical University of Bucharest, Bucharest, Romania, presented a lecture, entitled, "Recent Developments in Deep Submicron Devices-Theory and Experiment". J. J. Liou from the University of Central Florida, Orlando, Florida, USA, followed with a talk entitled "ESD protection design and modeling". After lunch at the KAIST faculty club, Professor Mitiko Miura-Mattausch from Hiroshima University, Japan, gave the last lecture entitled, "Circuit Simulation Models for Coming MOSFET Generations".

There were more than 50 attendees; about half of them were from



From Left to Right: J.J. Liou, University of Central Florida, Kwyro Lee, KAIST, Professor Mitiko Miura, Hiroshima University and Marcel Profirescu, Technical University of Bucharest

local semiconductor manufacturers such as Samsung, Hynix, and Anam, including some from the national research institute such as the Electronics and Telecommunication Research Institute. They showed deep interest in all of the lectures.

After the workshop, we had a tour of the IDEC (Integrated-circuit Design Education Center in KAIST), and met with Professor In Cheol Park, deputy-director.

tor. IDEC is our national organization arranging foundry interface, distributing ECAD, and technical education. Then we visited the Korean National Nano Fab Building, a 25 million USD project sponsored by our government and industries that was hosted by KAIST recently, and met with Professor Kye. H. Oh, Director. Then we moved to MICROS (Micro Information and Communication Remote Object-oriented Research Center), an Engineering Center of Excellence supported by the Korea Science and Engineering Foundation, and met with my, Director.

In summary, the second WIMNACT was very successful, following the first one in China in 2002. The audiences especially liked the EDS mini-colloquium format, because they can listen to several lecturers together in one place.

Kwyro Lee
KAIST
Taejon, Korea

2002 PAUL RAPPAPORT AWARD

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the University of California at Berkeley, where she is currently Professor of Electrical Engineering and Computer Sciences, and Director of the UC Berkeley Microfabrication Laboratory. Her research activities are in advanced materials, devices, and technology for integrated circuits and micro-electromechanical devices.



Vivek Subramanian received his PhD from Stanford University in 1998. He co-founded Matrix Semiconductor. He is currently an Assistant Professor in the EECS Department, Uni-

versity of California, Berkeley. He was nominated to Technology Review's TR100 list (2002), to the NAE's "Frontiers of Engineering" (2003), and received an NSF CAREER award.



Peiqi Xuan was born in Shaoxing, China, in 1973. He received a Bachelor's degree in physics from Peking University in 1996, and received a Master's degree in EECS from University of California at Berkeley in 2000. His Ph.D. research at UC Berkeley involves the fabrication and modeling of sub 50nm UTB and DG MOSFETs.



Yee-Chia Yeo received the M.S. and Ph.D degrees from the University of California, Berkeley. For the period 2001-2003, he worked on exploratory devices at TSMC. He is currently an Assistant Professor at the National University of Singapore. His research interest relates to nano-transistor technology, including strained-channel devices, metal-gates, and advanced dielectrics.

Renuka P. Jindal
University of Louisiana
at Lafayette
Lafayette, LA

REGIONAL AND CHAPTER NEWS

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

ED Washington/ Northern Virginia

- by Michael Hurt

The Washington/Northern Virginia Chapter of the Electron Devices Society held the first two meetings of its Fall Lecture Series on the topic "Nanotechnology and its Applications." On September 4, Dr. Cliff Lau, from the Office of Secretary of Defense and President-Elect of the IEEE Nanotechnology Council, gave a presentation entitled "Nanotechnology — An Overview." Dr. Lau defined nanotechnology as the research and technical development of structures, devices, materials, etc., in the 1 - 100 nm range. He provided a glimpse of the various nanotechnology developments taking place at research centers, government agencies, and multidisciplinary university research initiatives. Dr. Lau predicted that microelectronics and nanotechnology will continue to follow concurrent paths of revolution (molecular electronics, spintronics, quantum dots) and evolution (manufacturing, characterization techniques). He concluded with the statements that nanotechnology is here to stay, investment in nanotechnology continues to increase, the investment and research is leading to commercial products, and that nanotechnology is the frontier for the next industrial revolution.

Dr. Kwan Kwok gave a presentation on the topic of "Nanodevices and Nanoelectronics" on October 2. He pointed out the rapid breakthroughs by referencing quotes from 1992-1997 stating the molecular electronics were "impossible," while just a few years later in 2001 nanotechnology was deemed the "breakthrough of the year." Dr. Kwok, from the MTO at DARPA, reviewed DARPA programs on Moleapps and Moletronics. A goal of the Moleapps program is to produce an Intel 4004 grade chip on an area 10 um x 10 um. The chip will have 1011

devices, be low power, and be integratable with molecular memory. Another goal is to create a molecular sensor that is as good as "nature's best nose." The roadmap for Moleapps starts with moletronics nanomemory and branches into processors and sensors, before recombining in moleprocessors and systems before evolving into 2-D and eventually 3-D integration. Dr. Kwok predicted that by 2023, there would be massively parallel nanoprocessing at 1018-bit ops/sec. This may allow for a cerebromorphic system encompassing a nanotechnology brain, nose, tongue, and ears.

For more information, please see www.ewh.ieee.org/r2/no_virginia/eds/.

AP/CPMT/MTT/ED Eastern North Carolina

- by Dev Palmer

The communications industry in eastern North Carolina has seen dramatic growth in the technology and manufacturing areas that feed electronic and radio communications. In response, the ACME (AP/CPMT/MTT/ED) Chapter was formed in May 2003 to disseminate technical information and advance the professional interests of North Carolina scientists and engineers involved in research, development, design, and manufacture of electromagnetic and optical components and systems. The chapter comprises four IEEE societies chosen for their relevance to electronic and radio communications systems: EDS for the development of transistors and other electron devices, MTT for microwave theory, circuits, and applications, CPMT for reliable, high-performance packaging systems, and AP for antennas and wave propagation between systems.

The ACME Chapter kickoff meeting was held on August 27th at the MCNC Research and Development Institute in Research Triangle Park NC. There were over 20 attendees representing six

area companies, the US Army Research Office, Duke University, and North Carolina State University. At the meeting, Dr. Dev Palmer was elected Chair and Dr. Brett Guenther was elected Vice-Chair. The ACME winter meeting will be in late November, with technical talks on high-speed and high-density electronic packaging by chapter members from DuPont and Unitive Electronics. We welcome the participation of all interested IEEE members from government, industry, and academia.

- Murty S. Polavarapu, Editor

ED Santa Clara Valley

- by Prasad Chaparala

The ED Santa Clara Valley chapter held a technical seminar on September 9, 2003 on the National Semiconductor's campus in Sunnyvale, CA, with Professor Yuan Taur (University of California, San Diego) as the guest speaker. In his talk "Challenges Near the Limit of CMOS Scaling", Professor Taur addressed the issues, challenges and limits of CMOS scaling technologies beyond 100 nm. He projected that CMOS is likely to extend to 20-nm channel lengths, with the gate oxide and power limiting further scaling.

Using robust first-order analytical modeling, Dr. Taur made a comprehensive review of MOSFET scaling that included the classical bulk structure as well as less conventional structures such as partially- and fully-depleted SOI MOSFETs and double-gate MOSFETs. Based on his original analytical design theory of double-gate MOSFET,



Dr. Kwan Kwok at the ED Washington/N. Virginia Chapter Meeting

Dr. Taur projected that this device architecture could in principle extend scaling to 10 nm, but with tremendous fabrication challenges.

The opportunities offered by new materials such as high-K gate dielectrics and high-mobility strained silicon were factored into the scaling projections.

At the end of his talk, the speaker mentioned on-going research on non-CMOS replacements such as single-electron transistors and carbon nanotubes, concluding that there is "no credible candidate at the horizon that shows the promise to replace CMOS ULSI".

The event was organized by the chapter's secretary Dr. Constantin Bulucea, who introduced the speaker as "the coauthor of the most convincing book on sub-micron devices" (Fundamentals of Modern VLSI Devices, by Yuan Taur and Tak H. Ning, Cambridge University Press, 1998). Having known the speaker from his distinguished contributions to the field as well as from a previous IEEE talk, the Santa Clara community filled the auditorium to its limits. After-seminar discussions extended well into the evening.

The ED Santa Clara Valley Chapter holds technical seminars on every second Tuesday of the month.

- Sunit Tyagi, Editor

ED South Brazil

-by Jacobus W. Swart

The chapter organized a meeting in conjunction with the 18th Symposium on Microelectronics Technology and Devices – SBMicro 2003, held in São Paulo, Brazil, September 8 to 11, 2004. This symposium was organized by two Brazilian scientific societies: SBMi-

cro (Sociedade Brasileira de Microeletrônica) and SBC (Sociedade Brasileira de Computação), and was technically co-sponsored by the IEEE Electron Devices Society. During this event, a chapter meeting was held and four tutorial and invited seminars were given by three distinguished lecturers from EDS: Antonio Cerdeira, from CINVESTAV, Mexico: "The Integral Function Method to Determine the Non-linear Harmonic Distortion"; Cor Claeys, from IMEC, Belgium: "Submicron Silicon Technologies", and "Low Temperature Electronics: From Fundamental Physics to Emerging Silicon Technologies" and Magali Estrada del Cueto, also from CINVESTAV, Mexico: "Dielectrics for Sub micrometric Devices". These seminars were attended by over 50 people, many of them members of the chapter, others from other regions of Brazil and other countries of Latin America and some from the USA and Europe. Besides giving the seminars, the distinguished lecturers attended a chapters meeting and had many discussions with the participants during the four days of the symposium. One of the topics during the chapters meeting was about starting an EDS student chapter at the University of Campinas. Students showed great interest about this idea and will work on it afterwards.

2004 Symposium on Microelectronics Technology and Devices & 2004 Symposium on Integrated Circuits and Systems Design

-by Jacobus W. Swart

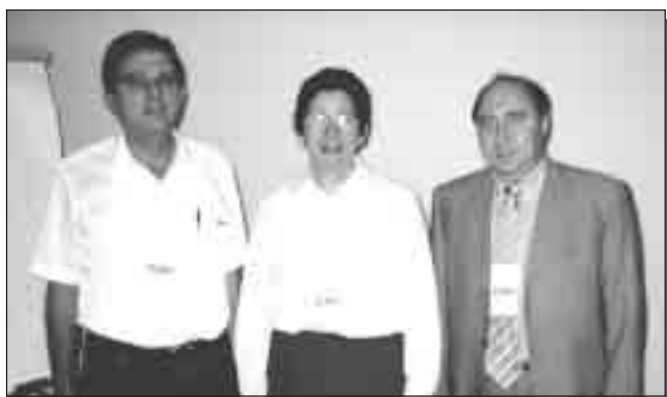
The 19th Symposium on Microelectronics Technology and Devices will

be held on September 7 to 11 in Porto de Galinhas, PE, Brazil. This symposium is organized by two Brazilian scientific societies: SBMicro (Sociedade Brasileira de Microeletrônica) and SBC (Sociedade Brasileira de Computação), and is technically co-sponsored by the IEEE Electron Devices Society. The SBMicro symposium is a forum dedicated to fabrication and modeling of microsystems, integrated circuits and devices, held annually in Brazil. The goal of the symposium is to bring together researchers in the areas of processing, materials, characterization, modeling and TCAD of integrated circuits and MEMS. In conjunction with the SBMicro 2004, an additional symposium is held at the same place and time, namely the 17th Symposium on Integrated Circuits and Systems Design. This symposium is also organized by the same two local societies. The two symposia have been held together since the year 2000, with a total attendance of about 300 participants with presentation of about 100 regular papers, in addition to invited and tutorial lectures. The two symposia together are named by a fantasy name that changes in accordance to its location. This year it has been named: Chip in Sampa (São Paulo, 2003). For next year it has received the name: "Chip on the Reefs". The events in the previous years were named as: Chip in the Pampa (Porto Alegre, 2002), Brasília 2001 (Pirenópolis, 2001) and Chip in the Jungle (Manaus, 2000). Since the year 2002, The Electrochemical Society publishes the proceedings of the SBMicro Symposia.

The symposia location is Porto de Galinhas, a wonderful beach just 60 km south of Recife, the capital of Per-



Professor Yuan Taur addressing the ED Santa Clara Valley Chapter.



From left to right: Antonio Cerdeira, Magali Estrada del Cueto and Cor Claeys

nambuco state, Brazil. This tropical paradise contains some of the most beautiful beaches of Brazil, with warm green clean waters. When the low tide comes, natural pools, protected by reefs, are formed.

This international conference offers a unique blend of microelectronics and serves as a major conference for the discussion of interdisciplinary research around the world.

Topics of interest include, but are not limited to: IC and MEMS processing; novel materials and devices; reliability; technology CAD; displays; thermal effects and models; nanoelectronics; device characterization and modeling; sensors and actuators; package and technology roadmaps; packaging; engineering education.

Important deadlines are as follows: Submission: April 19th, 2004; Notification of Acceptance: June 1st, 2004; Camera-ready: June 21st, 2004. For more information, see <http://www.sbmicro.org.br/sbmicro> and <http://www.sbc.org.br/sbcc>, and or contact the program chair, Prof. Edval Santos: edval@ee.ufpe.br

ED Venezuela

-by *Adelmo Ortiz-Conde*

The next "IEEE International Caracas Conference on Devices, Circuits and Systems" (ICCDCS) will be held in the Dominican Republic during the first week of November 2004. ICCDCS 2004 is the fifth in the series of ICCDCS biannual international conferences intended to provide a forum for exchanging recent information, knowledge and experience, and for establishing personal and professional contacts among engineers, scientists and academicians working in the areas of its coverage. The conference will cover several fields of Electronics Engineering, from basic scientific theory to industrial applications, dealing with research, development, design, technology and applications of electron devices, the theory, analysis, design, and practical implementation of circuits, and the application to systems and to signal processing. The program will include a plenary session, invited talks on selected topics and contributed oral presentations.

ICCDCS has been held periodically since 1995 at different locations in the Caribbean basin. The previous occurrence of the Conference (ICCDCS

2002) took place in Aruba. The word "Caracas" appears in its title in remembrance of the first of this series of conferences (ICCDCS'95), which was held in Caracas, Venezuela, on December 12-14, 1995.

For more information, please contact: Prof. Francisco J. Garcia Sanchez, E-mail: fgarcia@ieee.org, <http://pancho.labc.usb.ve/ICCD-CS2004>.

- *Adelmo Ortiz-Conde, Editor*

EUROPE, MIDDLE EAST & AFRICA (REGION 8)

EDS Distinguished Lecturer/Chapter Partner Visits Minsk

-by *Albert Wang*

I visited the ED Minsk chapter on July 7 and 8, as the Chapter partner and Distinguished Lecturer. The local ED Chapter Chair, Prof. Sergei Malyshev of the National Academy of Sciences of Belarus, hosted me. On July 7th, I delivered a lecture for the local ED/SSC members at the Integral, a major regional microelectronics company, on Advanced ESD Protection for ICs. The seminar was well accepted by the audience of 40. Further discussion followed after the lecture, including reviewing some of their recent designs related to the technical topics. There were mutual interests in future collaboration on related IC designs. On July 8th, I visited the Institute of Electronics of the National Academy of Sciences and held an in-depth discussion with Prof. Malyshev on various issues regarding local chapter activities. In particular, Prof. Malyshev pointed out that the EDS Membership Fee Subsidy Program has been vital for the local chapter to keep the member volume and organize various activities. However, concern was raised as to whether such society support would continue in the future, which is really critical to the chapters in the relatively lower income areas. For

example, other IEEE society chapters in Minsk actually stopped functioning due to a loss of membership because the fee is too high for local members. Regardless, the Minsk Chapter has been very active the past year in organizing various technical activities, such as, hosting the annual Inter-University PhD Research forum in Europe.

EDS Distinguished Lecturer/Chapter Partner Visits Czech Republic

-by *James B. Kuo*

I visited the MTT/AP/ED Czechoslovakia Chapter September 10-12, 2003. The IEEE Czechoslovakia Section Chair, Prof. Jan Vobecky gave me a very nice reception to the Czech Technical University in Prague, where I also gave an EDS DL talk on Challenges of SOI CMOS VLSI. The Czech Republic has a high potential for recruiting EDS student members, since its EE student body is over 2000.

I am quite impressed with the semiconductor research activities there. In addition, the Chapter Vice Chair, Prof. Pavel Hazdra, also explained to me the status of the Czech's semiconductor industry and its academia. I also visited a local IC design company in Prague, which is reflecting the booming high-tech industry in the Czech Republic. I was told that after the Czech Republic joins EU next year; the semiconductor industry will be even more promising.

- *Andrzej Napieralski, Editor*

MTT/ED/AP/CPMT/SSC West Ukraine

-by *Mykhailo I. Andriychuk*

Mr. Richard L. Doyle, IEEE Division VI Director and past President of the IEEE Reliability Society, visited the Chapter



Professor Albert Wang (center) visits the ED MINSK Chapter



James Kuo visits the MTT/AP/ED Czechoslovakia Chapter



Mr. Richard L. Doyle (in center) and the West Ukraine Chapter Officers at the business luncheon

on September 5-6, 2003. The questions of cooperation between the IEEE Reliability Society and the West Ukraine Chapter, as well as the Chapter activity and perspectives were discussed.

MTT/ED/AP/CPMT Saratov-Penza

-by Michael V. Davidovich

The Chapter's activity within the period from August 2002 to August 2003 is presented here.

Due to our efforts, the total number of IEEE members was increased in 2003. Today we have 29 members (including 3 Student Members and 2 SM) in Saratov and Penza cities. We can note the good potential for new growth of IEEE membership in the Saratov State University (SSU) and Saratov State Technical University (SSTU).

This year our chapter successfully held 5 scientific events. These events are:

1. International Conference Actual Problems of Electron Devices Engineering (APEDE'2002), SSTU, Saratov, September 21-23, 2002 (The Chairman was Dr. A. Zakharov, and there were approximately 200 participants including 16 IEEE Members).
2. 'Nonlinear Days in Saratov for Young Scientists' (NDSYS'2002), October 2-6, 2002 (The Chairman was Prof. D. Trubetskov, Rector of SSU, Member, IEEE). It's an annual event for attracting young scientists and scholars in nonlinear dynamics and electronics. Twelve distinguished Russian lecturers, approximately 20 postgraduate students and young scientists, and 80 students and scholars participated in this event.
3. Saratov Fall Meeting (SFM'02), October 4-8, 2002, SSU (The Chair-

man was Prof. V. Tuchin, and there were over 100 participants, Internet session). It's an annual conference in optics and electromagnetics.

4. Seventh Chapter Workshop 'CAD and Numerical Methods in Applied Electrodynamics and Electronics', November 27, 2002, SSU (The Chairman was Prof. M. Davidovich, and there were over 60 participants including 16 IEEE Members).
5. International School on Microwave Electronics and Radio Physics (ISMER'2003), January 27 - February 3, 2003 (The Chairman was Prof. D. Trubetskov, and there were almost 150 participants from the Microwave centers in Russia and Ukraine).

The Chapter organized several lectures and seminars on microwave electronics and antennas and three ExCom meetings.

ED Novosibirsk State Technical University (NSTU) Student Branch

-by Vladimir A. Kolchuzhin

The 4th Siberian Russian Workshop and Tutorial EDM'2003 was organized and successfully held July 1-5, 2003 in NSTU Recreation Department 'Erlagol'. The total number of accepted papers was 72; the total number of authors was 165.

The first EDM was held in 2000 due to the great support from the Radio Engineering, Electronics and Physics Faculty and Professor Victor Gridchin. Taking into attention his great investment in the matter of organizing EDM, Professor Gridchin was appointed the General Chair of EDM'2003.

One of the results of integration

between higher education and fundamental science, EDM'2003 received financial support from the Institute of Semiconductor Physics of SB RAS (Siberian Branch of Russian Academy of Sciences). The Vice-director of this Institute, Professor Igor Neizvesny, visited EDM'2003 as an invited lecturer.

The volume of the Proceedings of 270 pages was prepared for publication in the Technical University, Chemnitz, Germany and printed with a hard-illustrated colorful cover.

The scientific directions covered by EDM'2003 were: simulation of microsystems and semiconductor electron devices, modern technologies in control and information transmission, industrial electronics and instruments for medicine and biology. The EDM'2003 Organizing Committee notes the high scientific level of presented reports.

EDM'2003 collected papers from 14 cities and 6 countries. Thus, we can upgrade the status of EDM to International. We invite all interested young specialists to submit original and unpublished papers until March 1, 2004 to the EDM Publishing Chair Mr. Vladimir Kolchuzhin (edm@hotmail.ru and ieeensk@yandex.ru).

ED Tomsk Student Branch

-by Oleg V. Stoukach

The traditional meeting of the Novosibirsk (NSTU) and Tomsk (TPU) ED Student branch chapters was held in Novosibirsk on July 15, 2003. The internship students from the IEEE Student Branch Twente, The Netherlands were invited. The first part of the meeting was coincided with a



Organizing Committee General Chair, Prof. Victor Gridchin, makes a presentation for participants of EDM'2003

meeting of the IEEE Siberia Section.

The meeting was continued by a business luncheon, where problems of membership and activities of the IEEE Siberian units were productively discussed. A positive EDS role in the formation of our Section is especially noted. The Netherlands guests told about their branch activity. It was decided to continue contacts between our chapters.

– Alexander V. Gridchin, Editor

EDS Distinguished Lecturer/ Chapter Partner Visits Bulgaria

–by Albert Wang

I visited the ED/SSC Sofia & Varna chapters on August 1st and 4th, as the Chapter partner and Distinguished Lecturer. My visit was a joint mission for both the ED and SSC societies. On August 1st, I visited the Sofia Chapter and was hosted by the local IEEE Section Chair, Prof. Marin Hristov of the Technical University -Sofia. The visit included general discussions on various IEEE activities and issues. In the afternoon, I delivered a DL lecture on "Advanced ESD protection for ICs" at the Melexis, a major micro-

electronics company in Bulgaria. The lecture, followed by general technical discussions, was well received by an audience of around 40.

On August 4th, I visited the ED/SSC Varna Chapter where the Chapter Chair, Prof. Jordan Kolev of the Technical University - Varna, hosted me. A

general meeting was held with the officers of the Varna chapter to discuss various issues, followed by visits to research labs and the local IEEE chapter facility. Particularly, the IEEE library of the Varna Chapter was very impressive, which has been serving the local IEEE members well.

MTT/ED/AP/LEO UK&RI

–by Terry Oxley

The 8th IEEE High Frequency Postgraduate Student Colloquium (HFPSC) was held at the Queen's University Belfast (QUB) 8-9 September 2003. The 2003 Colloquium, hosted by the High Frequency Electronics Group, returned to QUB where it originated in 1995, thus continuing a very successful series of events. For many postgraduate students studying in the fields of RF, microwave, mm-wave and optical technologies, this Colloquium has become the traditional forum for presenting their initial research results, and for informal exchange with peers and senior experienced colleagues. Jointly sponsored by the IEEE Chapter, the 2003 event was also technically co-

sponsored by the IEEE ED and MTT societies; and supported by the Engineering and Physical Science Research Council (EPSRC) and industry including RF Integration Ltd and TDK.

University representation was wide-ranging, including the University of Bath, Dublin Institute of Technology, University of York, UMIST, University College Dublin, University of Limerick, University College Cork, Imperial College, Queen Mary and Westfield College, University of Leeds, Dublin City University, University of Birmingham, Ulster University and Queen's University Belfast.

The meeting was opened by a welcoming address by the chairman, Professor V F Vusco from QUB, followed by an invited talk by Michael. J. McCullagh of RF Integration Inc., who presented a talk, entitled "Optimum Radio Solutions for UWB Systems". In his presentation, Mr McCullagh gave an overview of the latest trends in the development of ultra wideband (UWB) radio systems and discussed the impact of the emerging UWB standard on future radio system requirements. The invited presentation was followed by the evening Colloquium dinner.

Thirty-two papers were presented by postgraduate students within the technical programme which included one poster and six oral sessions on "Wave propagation", "Dielectric Characterisation", "Nonlinear Devices", "Guided Propagation", "Passive Devices" and "Antennas". Important issues of high frequency wireless/microwave/optical research were addressed including for example the topics of electromagnetic wave interaction with the human body, non-linear device model



Officers of ED Student branch chapters of Novosibirsk, Tomsk and Twente at the business luncheon



The IEEE library. From Left to Right are: Prof. Kolev, Prof. Dimova and Prof. Wang. Prof. Wang delivered a DL lecture to the local members.



Prof Ali A Rezazadeh, MTT/ED/AP/LEOS Chapter Chairman (left) and Prof Vince Vusco, Chair of HFPSC 2003, at the HFPSC 2003 held in Queen's University of Belfast during 8-9 September 2003.



Prof. V. Ramgopal Rao addressing the audience in the 4 day course "Elements of Microelectronics".

enhancement, practical aspects of antenna design, guided waves propagation, and application of novel micro-machining techniques.

The Best Paper Prize was awarded for the paper titled "Measurements to 320 GHz of Millimetre-Wave Waveguide Components Made by High Precision and Economic Micro-Machining Techniques" by W.H. Chow, A. Champion and D.P. Steenson from the University of Leeds. The paper discussed novel micro-machining techniques and its application to fabrication of active and passive millimetre wave components, highlighting a range of terahertz waveguide components that demonstrated high dimensional accuracy and superior performance.

In conclusion, with over fifty attendees, the meeting was considered most successful, again providing a unique forum for research students to engage with each other in a friendly open environment at a formative time in their careers.

The 9th IEEE HFPSC will be held at UMIST in Manchester, Monday the 6th and Tuesday the 7th of September 2004. Contributions are sought from postgraduate students who are working in fields relating to electromagnetism, RF, microwave, mm-wave and optical technologies. For further details please contact the 9th HFPSC Chairman Dr Rob Sloan, E-Mail: sloan@umist.ac.uk, or the website www.ee.umist.ac.uk/mw/.

For further information on the 2004 Chapter technical programme, please contact the Chapter Chairman: Ali A Rezazadeh, Professor of Microwave Engineering, Dept. of Electrical Engineering and Electronics,

University of Manchester Institute of Science and Technology (UMIST), P.O. Box 88, Manchester M60 1QD, UK. Tel: +44 (0) 161 200 4708 (Sec.4801).

E-Mail: a.rezazadeh@umist.ac.uk.

– Gady Golan, Editor

ASIA & PACIFIC

(REGION 10)

AP/ED Bombay Chapter

–by Prof. M.B. Patil

Kartik Raol of Intel Corp. (Oregon) conducted a lecture series on "MOS transistor modeling" from 28th June to 4th July, 2003 at the Indian Institute of Technology, Bombay. The lectures were attended by graduate students working on MOS devices. The participants benefited by developing a good understanding of compact models for MOS transistors.

Kartik Raol also delivered a seminar on "Performance Metrics and Issues for Interconnections in VLSI" on July 25, 2003. He discussed a methodology to design a multilevel interconnect architecture.

The AP/ED Bombay Chapter co-organized a one-day workshop on "Advances in Microelectronics" at Vidyavardhini College of Engineering and Technology, Mumbai on Aug 23. The workshop created great curiosity and interest among engineering students who attended the course. Various aspects of Microelectronics from technology to design were covered in the workshop.

The AP/ED Bombay Chapter co-sponsored a 4 day course on "Elements of Microelectronics" conducted at IIT Bombay on Sept 20, 21, 27, 28.

The course was oriented towards teachers from engineering colleges around Bombay. About forty six teachers attended the course along with 19 students from engineering colleges. The course was found highly useful by the participants, and there were many enthusiastic interaction sessions.

For more information, please contact Prof. MB Patil, Electrical Engineering Department, IIT Bombay, Powai, Mumbai 400076, India, Email: mbpatil@ee.iitb.ac.in.

ED Malaysia

–by Burhanuddin Yeop Majlis

ED Malaysia has successfully organized the 2003 IEEE National Symposium on Microelectronics (NSM2003) September 9 - 10, 2003 at Kangar, Perlis, located north of Malaysia near the border of Thailand. This is the fourth NSM organized by the Chapter in collaboration with the Institute of Microengineering and Nanoelectronics (IMEN), UKM and Northern Malaysia University College of Engineering (KUKUM). This Symposium is sponsored by Silterra Malaysia and was opened by the Chief Minister of Perlis Datuk Seri Shahidan Kasim. The scope of the conference covers all aspects of the semiconductor technology, from materials issues and device fabrication, photonics technology, IC design (RF and VLSI) and testing, manufacturing, and system applications. A total of 72 papers were presented in two concurrent sessions. All papers were published in the Proceedings of NSM2003. The participants are mainly academics, research students from local universities and engineers from semiconductor industries in Malaysia such as Silterra, On Semiconductor,

Intel, and also Chartered Semiconductor Singapore.

For more information, please contact Prof. Majlis, Department of Electrical, Electronics and System Engineering, Universiti Kebangsaan Malaysia, Tel: 603 89265861, Fax: 603 89259080, Email: burhan@eng.ukm.my.

REL/CPMT/ED Singapore

-by Dr. SH Ong

The Chapter canceled the 10th IPFA, which was scheduled 7-11 July 2003 due to the SARS epidemic, which hit the region during that period. However, the papers selected through peer review, as well as the invited papers and the exchange papers from ESREF and ISTFA were published as the IPFA 03 proceedings per the IEEE Book Broker programme (IEEE catalog number: 03TH8662C). Looking forward, The Chapter has made all the arrangements to organize the IPFA 04 in July 2004. This will be organized at Hsinchu, Taiwan along with the EDS Taipei Chapter.

Arrangements for EPTC 2003 in December 2003 are in progress. A total of 148 papers were selected for oral presentation.

The EDS AP-SRC approved the proposal for the Chapter to organize an EDS DL Mini- Colloquium in Singapore. The title is the "3rd Workshop and IEEE Mini-Colloquium on Nanometer CMOS Technology" (WIMNACT) which was held on 15 October 2003.

Apart from all these conferences, the Chapter has organized the following technical talks:

(1) A talk entitled "What is Different about the Circuit-level Reliability of

copper Based Interconnects?" was given by Dr. Gan Chee Lip of the Singapore -MIT Alliance on the 21 May 2003 at the Nanyang Technological University, Singapore.

- (2) A talk entitled "Packaging Materials, Processes & Structures for Future Devices & Systems" was delivered by Dr Charles Baeur of TechLead Corporation on the 9 June 2003 at the National University of Singapore.
- (3) Dr. Mahesh Patil of the Indian Institute of Technology, Bombay presented a talk on "The Super junction Power MOS Transistor" on the 16 July 2003 at the Nanyang Technological University.
- (4) Dr. John H. Lau of Agilent Technologies Inc. presented a talk entitled "Impacts of Lead-Free Solder on Wafer-Level Chip Scale Package (WLCSP)" on the 12 August 2003 at the National University of Singapore.
- (5) A talk entitled "RF passive devices on Si with excellent performance close to ideal devices designed by Electro-Magnetic simulation up to 100 GHz" was given by Professor Albert Chin of the Dept. of Electronics Engineering, National Chiao Tung University (Taiwan) on the 17 September 2003 at the National University of Singapore.

For more information, please contact Dr. SH Ong, Email: Soon.Huat.Ong@nsc.com.

ED Kansai

-by Hiroyuki Sakai

The 2003 International Meeting for Future of Electron Devices, Kansai (2003 IMFEDK) was held at Osaka Uni-

versity Convention Center July 16-18, 2003. The IEEE Electron Devices Society & ED Kansai Chapter sponsored the first international conference on semiconductor devices held in Kansai, Japan. Three distinguished researchers, Prof. Leo Esaki from Shibaura Institute of Technology, Prof. Shuji Nakamura from the University of California, Santa Barbara, USA and Dr. Stefan Lai from Intel, made keynote speeches. They demonstrated their visions for future electron devices, solid-state lighting devices and non-volatile memory technologies, respectively. The presented papers, 50 in total and 14 invited, covered nearly the entire field of the semiconductor devices, ranging from Silicon integration to III-V or III-N device technologies, further extending to the leading edge of carbon or organic semiconductor devices. Universities made half of the contributions and the other half was from industries. The number of the audience was more than 220. It was a great opportunity for discussions and exchanges of various viewpoints of the participants with different backgrounds, which was the main purpose of holding the meeting in Kansai. The committee of IMFEDK selected Dr. Judai (Matsushita Electric) and Dr. Dang (Renesas Technology) for Best Paper Awards, Mr. Shibuya (Osaka University) and Mr. Nishiguchi (Kyoto Institute of Technology) for the Student Paper Awards. Dr. Daisuke Ueda, Chair of EDS Kansai Chapter and chief editor of IMFEDK, honored them with an award of merit at the end of the meeting.

ED/Japan

-by Naoki Yokoyama

The Japan Chapter held the Distinguished Lecturers Meeting on July 2nd at Tokyo Institute of Technology in Yokohama, Japan. The meeting focused on the recent activities and prospects on electron devices technology. Six prestigious speakers from EDS and SSC DLs gave presentations on: "Information Technology Revolution by Nanotechnology Breakthrough" by Dr. Naoki Yokoyama (Fujitsu Lab.); "The Future of LSIs Driven by Post-Scaling Technology" by Dr. Masao Fukuma (NEC); "AlGaN/GaN FET Technology for Microwave Power Applications" by Dr. Masaaki Kuzuhara (FED and NEC); "Design of Transmission Line Interconnect in Si CMOS ULSI" by Prof. Kazuya



Participants for NSM 2003



Prof. Leo Esaki, Prof. Shuji Nakamura and Dr. Stefan Lai at the 2003 IMFEDK



The ED/SSC Seoul Chapter distinguished lecture meeting on Aug. 27, 2003.

Masu (Tokyo Institute of Technology); "Intense Soft and Hard X-ray Excited Photoelectron Spectroscopy Study on Gate Insulators for ULSI" by Prof. Takeo Hattori, (Musashi Institute of Technology); "Current status and future prospect on mixed signal SoC Technology" by Prof. Akira Matsuzawa (Tokyo Institute of Technology). The meeting was successful, as there were active discussions on each topic with about 80 attendees. In the social hours following the DL meeting, most of the attendees enjoyed continued discussions.

ED/SSC Seoul

- by Taegeun Park

The IEEE Seoul Chapter is a joint chapter of SSCS and EDS. The chapter has actively worked to promote the research activities and to build a strong relationship between the members by organizing and sponsoring conferences, inviting distinguished lecturers, and having regular chapter meetings. In the year 2003, the IEEE Seoul Chapter hosted two lectures by distinguished lecturers. Prof. Steve Kang, University of California, Santa Cruz, who was invited as an IEEE Distinguished Lecturer, presented a very interesting paper entitled, "Three High-Tech Tenors for the 21st Century," at Korea University, Aug. 27, 2003. In this talk, important aspects of information technology, nanotechnology, and biotechnology were discussed with emphasis on their synergistic engineering applications. A chapter meeting followed the distinguished lecture at the dinner table to give the chapter members chances to get together with distinguished lecturers and to have close conversations on selected topics. Prof. Vojin G. Oklobdzija, University of Cali-

fornia, Irvine, presented another talk entitled, "Microprocessor Development Perspective," at Korea University, Sep. 17, 2003. He addressed advances in enabling technology and a perspective for the future development. The features, which enabled development of modern microprocessors and the guiding principles of modern microprocessor architecture, were discussed. As a part of annual support of the conferences, the Seoul Chapter will sponsor SOC Design conference, formerly IEEK Circuits and Systems Conference, being held at Coex, Asem Hall, Seoul, Korea, Nov. 5-6, 2003. The Seoul Chapter sponsored \$300 for the best paper awards. The IEEE Seoul Chapter has held a chapter meeting on bimonthly basis. We also make an effort on membership promotion by opening the membership development desk at local meetings.

-Hisayo S. Momose, Editor

2004 International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA 2004)

- by Steve Chung

After more than one-year of discussions and mutual exchanges of ideas, the ED Taipei Chapter and R/CPMT/ED Singapore Chapter have reached an agreement to have the International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA) moved to Taiwan for 2004.

IPFA is an international conference, which has been one of the major conferences in reliability and failure analysis of devices and integrated circuits, running for 10 years and sponsored by the Reliability/CPMT/ED Singapore Chapter, the IEEE EDS, and the IEEE Reliability Society. To extend

the scope and to meet the needs for the fast growing semiconductor industry in the Asia-Pacific region, IPFA now calls for international participations. A preparation meeting for IPFA'04 had been held in early July via teleconferencing because of the concerns of SARS at that time. Officers from both chapters as well as key members of the steering committee joined the meeting.

The IPFA'04 will be organized by IEEE ED Taipei Chapter, IEEE Taipei Section, National Chiao Tung University, and in cooperation with IEEE Reliability/CPMT/ED Singapore Chapter. It will be held from 5 to 8 July 2004 in Hsinchu-Science Based-Industrial Park, where the two world leading foundries: TSMC and UMC, as well as many highly developed semiconductor manufacturing and IC design companies are located. This meeting has traditionally featured a paper exchange arrangement with the best paper presentations from the other European reliability conferences, ESREF and ISTFA. Researchers, engineers and scientist in the area of device and integrated circuit reliability are encouraged to submit papers and attend this wonderful event. The format of the conference includes a one-day workshop, 3 days technical paper presentation, and concurrently with a worldwide exhibition. The deadline for paper submission is 10 February 2004.

For further information, please contact Prof. Steve S. Chung, Department of Electronics Engineering, National Chiao Tung University, 1001 University Road, Hsinchu 300, Taiwan. Tel: +886-3-5731830, Fax: +886-3-5734608, E-mail: schung@cc.nctu.edu.tw; or visit conference web site: <http://www.ieee.org/ipfa>

- Hei Wong, Editor

EDS MEETINGS CALENDAR

(AS OF 21 OCTOBER 2003)

THE COMPLETE EDS CALENDAR CAN BE FOUND AT OUR WEB SITE:

[HTTP://WWW.IEEE.ORG/ORGANIZATIONS/SOCIETY/EDS/MEETINGS_CALENDAR.HTML](http://www.ieee.org/organizations/society/eds/meetings_calendar.html) PLEASE VISIT!

January 1 - 3, 2004, T **International Conference on Computers and Devices for Communication** Location: Hyatt Regency Kolkata, Calcutta (Kolkata), West Bengal, India Contact: Nikhil Das, Institute of Radio Physics and Electronics, 92 Acharya P.C. Road, Kolkata, West Bengal, India 700 009 Tel: +91 33 2350 9115 ext 54 Fax: +91 33 2351 5828 E-Mail: codec2004@yahoo.com Deadline: 8/15/03 www: <http://www.irpel.org/codec/codec04.html>

January 5 - 9, 2004, T **International Conference on VLSI Design** Location: Renaissance Hotel, Mumbai, Bombay, India Contact: Juzer Vasi, Indian Institute of Technology, Bombay, Dept of Electrical Engineering, Powai, Mumbai, India 4000076 Tel: +91 22 722545 Fax: +91 22 5723707 E-Mail: vasi@ee.iitb.ac.in Deadline: Not Available www: <http://vlsi.nj.nec.com>

January 10 - 12, 2004, T **International Symposium on Nanoelectronic Circuits and Gigascale Systems** Location: National Lien-Ho Institute of Technology, Miaoli, Taiwan Contact: Jui-Lin Lai, National Lien-Ho Institute of Technology, Lien Kung 1, Kung-Ching Li,, Miaoli, Taiwan 360 Tel: +886 37 381510 Fax: +886 37 362809 E-Mail: jllai@mail.nlhu.edu.tw Deadline: Not Available www: <http://www.isncgs.nlhu.edu.tw>

January 26 - 30, 2004, T **International Photo-voltaic Science & Engineering Conference** Location: Chulalongkorn University, Bangkok, Thailand Contact: Krissanapong Kirtikara, King Mongkut's University of Technology Thonburi, P.O. Box 51, Ratburana,, Bangkok, Thailand 10140 Tel: +66 2 428 4014 Fax: +66 2 428 4014 E-Mail: PVSEC14@kmutt.ac.th Deadline: 11/30/03 www: <http://www.chula.ac.th/pvsec-14>

February 14 - 19, 2004, T **IEEE International Solid-State Circuits Conference** Location: San Francisco Marriott Hotel, San Francisco, CA, USA Contact: Akira Kanuma, Toshiba Corporation, 580-1 Hirikawa-cho, Saiwai-ku, Kawasaki, Kanagawa, Japan 212-8520 Tel: +81 44 548 2514 Fax: +81 44 548 8324 E-Mail: akira.kanuma@toshiba.co.jp Deadline: 9/8/03 www: <http://www.isscc.org/isscc>

February 25 - 27, 2004, T **Euroregional Workshop on Thin Silicon Devices** Location: Con-

gress Center of Ministry of Foreign Affairs, Bratislava, Slovak Republic Contact: Vojtech Nadazdy, Dubravska Cesta 9, Bratislava 45, Slovak Republic 845 11 Tel: +421 2 59410542 Fax: +421 2 54776085 E-Mail: fyzinavo@savba.sk Deadline: Not Available www: <http://www.asi-net.net>

March 7 - 11, 2004, T Nanotechnology Conference and Trade Show Location: Sheraton Boston Hotel & Hynes Convention Center, Boston, MA, USA Contact: Sarah Wenning, Applied Computational Research Society, 4847 Hopyard Road, Suite 4-381, Pleasanton, CA, USA 94588 Tel: +1 925 743 9466 Fax: +1 925 696 6416 E-Mail: wenning@dnai.com Deadline: 9/26/03 www: <http://www.nanotech2004.com>

March 11 - 12, 2004, T **Workshop on Ultimate Integration of Silicon Devices** Location: IMEC, Leuven, Belgium Contact: Kristin De Meyer, Kapeldreef 75, Leuven, Belgium 3001 Tel: +32 16 281322 Fax: +32 16 281844 E-Mail: demeyer@imec.be Deadline: Not Available www: <http://www.imec.be/ulis2004>

March 15 - 16, 2004, T **International Workshop on Junction Technology** Location: Hotel Equatorial, Shanghai, China Contact: Guo-Ping Ru, Fudan University, Dept of Microelectronics, Shanghai, China 200433 Tel: +86 21 6564 3561 Fax: +86 21-6564 3768 E-Mail: gpru@fudan.edu.cn Deadline: Not Available www: <http://www.cie-china.org>

March 22 - 25, 2004, @ **IEEE International Conference on Microelectronic Test Structures** Location: Awaji Yumebutai International Conference Center, Hyogo, Japan Contact: Tomoko Hamada, ICMTS 2004 Secretariat, Center for Academic Societies Japan, Osaka, 14th Fl. Senri IC Bldg, 1-4-2 Shinseni Higashi-machi, Toyonaka, Japan 560-0082 Tel: +81 6 6873 2301 Fax: +81 6 6873 2300 E-Mail: icmts2004@bcasj.or.jp Deadline: 9/12/03 www: <http://www.ee.ed.ac.uk/ICMTS>

March 22 - 24, 2004, T **IEEE International Symposium on Quality Electronic Design** Location: Doubletree Hotel, San Jose, CA, USA Contact: Ali Iranmanesh, 26744 Arastradero Road, Los Altos Hills, CA, USA 94022 Tel: +1 650 868 8844 Fax:

+1 408 573 0200 E-Mail: alii@isqed.org Deadline: 9/25/03 www: <http://www.isqed.org>

March 29 - April 2, 2004, T **International Scientific & Practical Conference of Students, Post Graduates & Young Scientists "Modern Technique & Technology"** Location: Tomsk Polytechnic University, Tomsk, Russia Contact: Lyudmila Zolnikova, Tomsk Polytechnic University, 30a Lenin Ave, Bldg 4, Office 35, Tomsk, Russia 634050 Tel: +7 3822 563 825 Fax: +7 3822 415 658 E-Mail: mtt_eng@tpu.ru Deadline: 2/15/04 www: <http://mtt.tpu.ru>

April 14 - 15, 2004, T **Siberian Conference on Electron Devices and Materials** Location: TUSCR, 40 Lenin Avenue, Tomsk, 634050, Russia Contact: Oleg Stoukatch, Tomsk State Univ. of Control Systems & Radioelec., 40 Lenin Avenue, Tomsk, Russia 634050 Tel: +7 3822 233077 Fax: +7 3822 223262 E-Mail: ird@tusur.ru Deadline: 12/10/03 www: <http://www.me.tusur.ru/~fieee>

April 25 - 29, 2004, T **Science & Technology of Semiconductor-on-Insulator Structures & Devices in a Harsh Environment** Location: Sanatorium "Pushcha Ozerna", Kyiv, Ukraine Contact: Yuri Houk, Institute of Semiconductor Physics, NAS of Ukraine, Prospect Nauky 45, Kyiv, Ukraine 03028 Tel: +380 44 265 7022 Fax: +380 44 265 6177 E-Mail: houk@lab15.kiev.ua Deadline: 1/15/04 www: <http://www.lab15.kiev.ua>

April 25 - 29, 2004, * **IEEE International Reliability Physics Symposium** Location: Hyatt Regency Phoenix at Civic Plaza, Phoenix, AZ, USA Contact: Bernie Pietrucha, Rowan University, 201 Mullica Hill Road, Glassboro, NJ, USA 08028 Tel: +1 856 256 5338 Fax: +1 856 256 5241 E-Mail: pietrucha@rowan.edu Deadline: 10/24/03 www: <http://www.irps.org>

April 26 - 27, 2004, T **IEEE/Sarnoff Symposium on Advances in Wired and Wireless Communications** Location: Nassau Inn, Princeton, NJ, USA Contact: Henry Owen, Sarnoff Corporation, CN4300 201 Washington Road, Princeton, NJ, USA 08540 Tel: +1 609 734 2751 Fax: +1 609 734 2043 E-Mail: howen@sarnoff.com Deadline: 10/30/03 www: <http://www.sarnoffsymposium.org/>

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= Cooperation Support

EDS DISTINGUISHED LECTURERS PARTICIPATE IN THE 3RD WIMNACT-SINGAPORE

The 3rd Workshop and IEEE EDS Mini-colloquia on NANometer CMOS Technology (WIMNACT-Singapore) was held on Oct. 15, 2003 in Singapore, organized and sponsored by the IEEE Rel/CPMT/ED Singapore Chapter, the EDS Asia-Pacific Subcommittee of Regions/Chapters and the EDS Distinguished Lecturer Program. The Microelectronics Division of the School of Electrical & Electronic Engineering (EEE) at Nanyang Technological University (NTU) hosted this one-day event, composed of 3 DL's from Taiwan, Japan, and Hong Kong sent by the EDS and 2 local DL's and one Chapter committee member. After the welcome address by the Guest-of-Honor and Head of Microelectronics Division, Dr. Ooi Kiang Tan, Chapter Vice Chair, Y. C. Ng, delivered an opening address on behalf of the Chapter Chair, Dr. Soon Huat Ong, in which he also reviewed Chapter activities in the past years. This was followed by brief introductions of the Silicon Technology and Computational Nano-Electronics groups in the Microelectronics Division by the respective Program Directors, Dr. Kin Leong Pey and Dr. Xing Zhou.

The first talk was given by Dr. Steve Chung from National Chiao Tung University entitled, "Low Voltage/Power and High Speed Flash Memory Technology for High Performance and Reliability," followed by the talk on "ESD in Sub-micron Devices: Issues and Challenges" given by Dr. M. K. Radhakrishnan. The morning session ended with a talk by Dr. Kin Leong Pey on "Ultra shallow Junction Formation for Sub-100nm Technologies Using Pulsed Excimer Laser." After lunch, at the

NTU staff club with the invited guests and Chapter committee members, Dr. Mitiko Miura-Matsumura from Hiroshima University gave a talk on "Circuit Simulation Models for Coming MOS-FET Generations," following by a talk on "Nano-CMOS Technology Options: From Traditional to Futuristic Device Structures" given by Dr. Mansun Chan of Hong Kong University of Science & Technology. The Workshop ended with a talk by Dr. Xing Zhou on "The Missing Link to Seamless Simulation." The Chapter presented all the speakers with a token of appreciation. After an interactive session with the speakers, the invited guests were given a tour of the Micro Fabrication Lab (MFL) in the School of EEE, an SGD\$25m 6" CMOS teaching/research facility, briefed by the Program Manager, Prof Man Siu Tse. The full-day event was ended with the dinner for the invited DLs hosted by the Chapter.

In summary, the 3rd WIMNACT-Singapore was a very successful event. The Workshop received an enthusiastic response with 130 pre-registrations and more than 110 attendees, with more than half of them from the local indus-



From left to right: Xing Zhou (Speaker & Chapter Committee Member), M. K. Radhakrishnan (Speaker & Chapter Committee Member), Mitiko Miura-Matsumura (Speaker, Hiroshima University, Japan), Mansun Chan (Speaker, Hong Kong University of Science & Technology), Steve Chung (Speaker, National Chiao Tung University, Taiwan), Kin Leong Pey (Speaker & Chapter Committee Member), Y. C. Ng (Chapter Vice Chair), Chih Hang Tung (IPFA'04 Committee Member)

tries, and neighboring countries. They showed deep interests in the invited talks and many followed up on inquiries for the speakers' presentation slides. The complete information on the 3rd WIMNACT-Singapore, including all the slides and snapshots, has been made available from the following website: <http://www.ntu.edu.sg/eee/eee6/conf/WIMNACT.htm>

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