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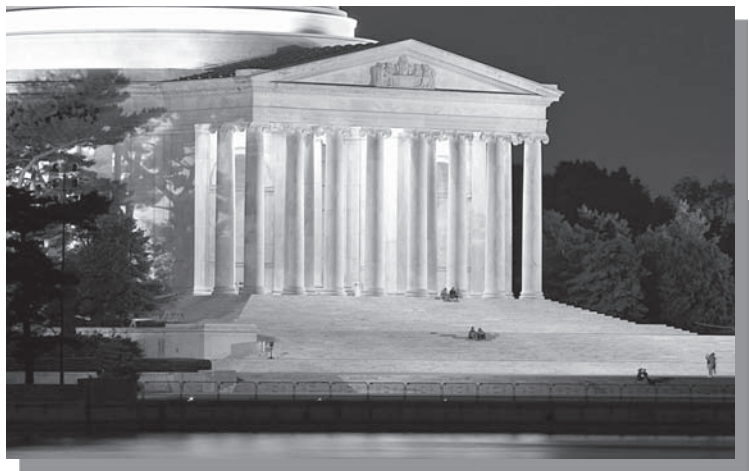
SAVE THE DATES! DON'T MISS THESE IMPORTANT IEEE EDS EVENTS AT THE IEDM

December 2011

Sunday, 4th	GOLD Mixer (Graduates of the Last Decade)
Tuesday, 6th	Grant Writing Proposal Workshop (EDS Members Only)
Wednesday, 7th	IEEE Women in Engineering (WIE) Luncheon

For more details, visit the News & Announcements section of the EDS website, www.ieee.org/eds

2011 IEEE INTERNATIONAL ELECTRON DEVICES MEETING (IEDM)



Jefferson Memorial at Night

Destination DC

The IEDM returns to Washington D.C. for 2011. Slated for December 5–7, 2011, the 57th annual IEDM offers new tutorials, new sessions, and increased emphasis on circuit interactions, energy & power, and biomedical devices.

The Electron Devices Society's largest annual technical conference, the IEEE International Electron Devices Meeting (IEDM), returns to Washington, D.C. this December with several new features designed to enhance the IEDM experience for attendees. In addition to the strong slate of technical presentations that has been a hallmark of IEDM, this year the conference also features a new tutorial session, two new technical subcommittees, and an increased emphasis on circuit-device interaction, energy-harvesting and power devices, and biomedical devices.

IEDM 2011 will take place at the newly renovated Hilton Washington Hotel, December 5–7, 2011, preceded by a day of Short

(continued on page 3)

YOUR COMMENTS SOLICITED

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

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

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CONTRIBUTIONS WELCOME

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

NEWSLETTER DEADLINES

ISSUE	DUE DATE
January	October 1st
April	January 1st
July	April 1st
October	July 1st

The EDS Newsletter archive can be found on the Society web site at <https://www.ieee.org/portal/pages/society/eds/pubs/newsletters/newsletter.html>. The archive contains issues from July 1994 to the present.

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UPCOMING TECHNICAL MEETINGS

2011 IEEE INTERNATIONAL ELECTRON DEVICES MEETING (IEDM)

(continued from page 1)

Courses on Sunday, December 4th and two tutorials on Saturday afternoon, December 3rd.

The IEDM draws presentations and attendees from industry, academia and governmental agencies worldwide. No other conference presents as much leading work encompassing both silicon and non-silicon device and process technology, molecular electronics, nanotechnology, optoelectronics, MEMS (microelectromechanical system) and bioelectronics.

Saturday Tutorials

New for 2011 are two 90-minute tutorial sessions on emerging topics, to be held on Saturday afternoon, December 3rd. Today's research and industrial environments feature an increased emphasis on cross-disciplinary work and technological integration, and these tutorials are intended to help attendees bridge the gap between textbook knowledge and the leading-edge research presented during the IEDM conference. Specific topics offered include strain effects, nanotube and nanowire devices, bio-device simulation, MEMS resonators, and post-processing for More-than-Moore integration.

Short Courses

There will be two day-long Short Courses on Sunday, December 4th, with one course focusing on the future of scaling beyond the 14 nm node, and the other on universal memory and advanced non-volatile memory.

Evening Panel Sessions

There will be two evening panel sessions on Tuesday, December 6th, designed to foster discussion and debate

on important technical and industry issues. One topic is whether SiC or GaN will replace Si as the semiconductor for power devices, while the other will explore whether 3D integration is an alternate scaling pathway.

Emerging Technology Focus

IEDM 2011 will feature an Emerging Technology Session on Energy Harvesting Materials, Devices and Systems. The session will feature invited speakers from academia and industry, who will discuss the challenges and prospects of energy-harvesting devices that collect energy from ambient sources (e.g. solar power, thermal energy, salinity gradients, and kinetic energy), convert them into electrical energy, and store that energy to power a range of autonomous devices (e.g. wearable electronics, sensor networks, implantable medical electronics).

New Technical Subcommittees

The two new technical subcommittees for 2011 are Circuit & Device Interaction and Nano Device Technology, both of which have been established to align with emerging trends in device research and in the industry.

Circuit & Device Interaction (CDI)

The newly formed CDI subcommittee focuses on papers addressing the many circuit-device interactions that have become increasingly important as devices have scaled down and as systems have scaled up. These include technology-circuit co-optimization, power-performance-area analysis, design for manufacturing and process control, and forward-

looking areas such as potential interactions between emerging device concepts and circuits. CMOS platform technology and papers on device and design interactions in issues such as technology variability, power constraints, and design complexity in memory, logic, and mixed-signal circuits round out this subcommittee's scope.

Nano Device Technology (NDT)

The NDT subcommittee is intended as a focal point for emerging devices and concepts, including carbon-based devices, nanotubes, nanowires, quantum dots, and other novel solid-state and nanoelectronic devices, nanodevices for energy harvesting and storage, spintronic and other non-charge-based devices, nanoelectro-mechanical (NEMS) devices intended for logic, and molecular devices. Fundamental silicon device topics including device physics, novel MOS device structures, CMOS scaling issues, high performance, low power, and analog/RF devices, as well as SOI, high-mobility channel devices such as strained silicon and SiGe MOS devices, and non-planar devices are also of interest.

Technical Program

Rounding out the technical program for IEDM 2011 is topical coverage of:

- Characterization, Reliability and Yield
- Displays, Sensors and MEMS
- Memory Technology
- Modeling and Simulation
- Process Technology
- Quantum, Power and Compound Semiconductor Devices



Lighting of the US Capitol Christmas Tree

Characterization, Reliability and Yield (CRY)

All areas of characterization, yield and reliability, both front-end and back-end of the process. Topics include but are not limited to hot carriers, gate dielectric wearout and breakdown, process charging damage, latch-up, ESD, soft errors, noise and mismatch behavior, bias temperature instabilities, and reliability of high-k and low-k materials, circuits, and packaging. Other topics include interconnect reliability, electromigration, the impact of back-end processing on devices, chip packaging interaction, manufacturing technologies for reliability, physics of failure analysis, as well as reliability issues for memory, logic, and 3D technologies and novel characterization techniques.

Displays, Sensors, and Mems (DSM):

Devices, structures, and integration for imaging, displays, detectors, sensors, and micro electromechanical systems

(MEMS). A subset of key topics includes CMOS imagers, CCD's, TFT's, organic, amorphous, and polycrystalline devices, vacuum microelectronics, emissive displays and sensors for chemical, molecular and biological detection. Topics of interest in the MEMS area include resonators, switches, and passives for RF applications, integrated sensors, micro-optical devices, micro-fluidic and biomedical devices, micro-power generators and energy harvesting devices, with particular emphasis on integrated implementations. Other relevant subjects include design, fabrication, reliability, theory, and modeling.

Memory Technology (MT):

All memory-related technology topics, from novel memory cell concepts and integration schemes to fully integrated memories and manufacturing issues. Areas of interest include volatile as well as nonvolatile memories, processes for advanced memories, novel memory cells including

NEMS-based devices, reliability; modeling; memory array optimization, 3D memory architectures, novel reading/program/erase schemes and solid state drive (SSD) applications.

Modeling and Simulation (MS):

Analytical, numerical, and statistical approaches to modeling electronic, optical and multi-physical devices, their isolation and interconnection. Topics include: physical and compact models for devices and interconnects, modeling fabrication processes and equipment, simulation algorithms, process characterization, parameter extraction, early compact models for advanced technologies, performance evaluation, design for manufacturing, reliability and technology benchmarking methodology. Other topics of interest include the modeling of interactions between process, device, and circuit technology.

Process Technology (PT):

Front-end, back-end, and packaging process modules for fabrication of logic, memory, and 3D integrated circuits on silicon and non-silicon technologies. Topics related to front-end processing include substrate technologies, new transistor materials and integration of heterogeneous channel materials, lithography, etching, self-assembly techniques, isolation technologies, dielectric materials and metal electrodes for transistor gate stacks and MIM capacitors, shallow junctions, and silicides. Topics related to back-end processing include conductor systems, low dielectric constant materials, contact and via processes, barrier materials, planarization, design considerations for multilevel interconnects, and advanced packaging.

Quantum, Power, and Compound Semiconductor Devices (QPC):

Compound semiconductors (GaAs, InP, GaN, SiC, SiGe, Antimonides and their related alloys) with

electronic and optoelectronic device applications, as well as discrete and integrated high-power/current/voltage devices including those on silicon. Topics include FETs, HBTs, LEDs, lasers, external modulators, high power, RF, and microwave and millimeter wave devices. Also of special interest are ballistic and quantum effects, and optoelectronic integrated circuits, optical interconnects, photovoltaics, photonic bandgap structures and crystals, and integrated RF components including inductors, capacitors, and switches.

For registration and other information, visit the IEDM 2011 home page at www.ieee-iedm.org or contact the Conference Office at 19803 Laurel Valley Place, Montgomery Village, Maryland 20886, USA; telephone (301) 527-0900, ext. 2; fax (301) 527-0994; or e-mail: iedm@his.com.

Follow the IEDM on Twitter and Facebook at the following links to receive updates:

- Twitter: http://twitter.com/ieee_iedm
 - Facebook: <http://www.facebook.com/pages/IEDM/131119756449>
- The Washington, D.C. area pro-

vides many attractions for visitors and we encourage attendees to explore them in the off hours of the conference. The IEDM committee members look forward to seeing you in December.

Patrick Fay
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2011 IEEE SEMICONDUCTOR INTERFACE SPECIALISTS CONFERENCE (SISC)

The 42nd IEEE Semiconductor Interface Specialists Conference (SISC) will be held, December 1–3, 2011, at the Key Bridge Marriott Hotel in Arlington, Virginia, immediately before the IEEE International Electron Devices Meeting (IEDM). An evening Tutorial session, free to all registered SISC attendees, will be held on November 30th. The SISC is sponsored by the IEEE Electron Devices Society.

The SISC is a workshop-style conference that provides a forum for device engineers, materials scientists, and solid-state physicists, to openly discuss issues of common interest. Principal topics are semiconductor/insulator interfaces, the physics of insulating thin films, and the interaction among materials science, device physics, and state-of-the-art technology. At this year's SISC, novel topics such as dielectrics on high mobility substrates and carbon-based channels, oxide electronics and resistive non-volatile memory are expected to gain in importance.

At SISC, oral sessions of invited and contributed talks, as well as a

lively poster session, are designed to encourage discussion. Conference participants have numerous opportunities for social gatherings with renowned scientists and engineers. They can also enjoy Washington D.C.'s attractions such as the National Mall with the Lincoln Memorial, the National Air and Space Museum, the National Gallery of Art, the White House, the US Capitol, and the Library of Congress.

Conference Focus

The program includes roughly 60 presentations from all areas of MOS science and technology, including but not limited to:

- SiO₂ and high-k gate dielectrics on Si and their interfaces
- Insulators on high-mobility and alternative substrates (III-V, Ge, SiGe, GaN, etc.)
- MOS gate stacks with metal gate electrodes
- Dielectric layers for non-volatile memory
- Oxide and interface structure, chemistry, defects, and passivation: Theory and experiment

- Electrical characterization, performance and reliability of MOS-based devices
- Surface cleaning technology and impact on dielectrics and interfaces

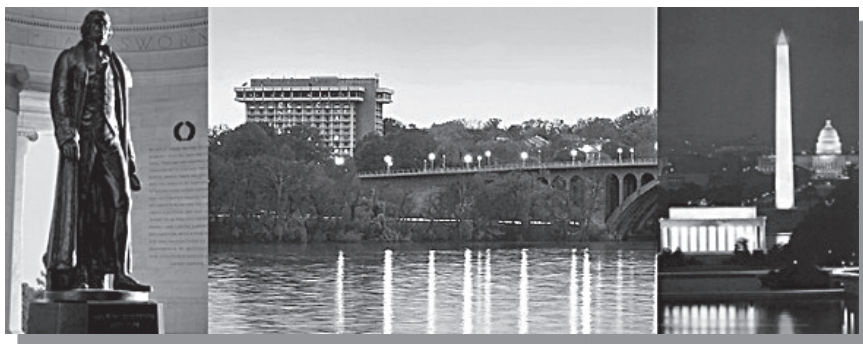
SISC 2011 will further explore novel topics such as:

- Dielectrics on nanowires/tubes and graphene
- Oxide electronics and multiferroics

Invited Presentations

This year's invited presentations will include:

- Dr. Supratik Guha, IBM Research Laboratories, USA – *Oxides for nano-electronics*
- Prof. Minghwei Hong, National Tsing Hua University, Taiwan – *III-V/high-k gate stacks*
- Prof. Cheol Seong Hwang, Seoul National University, Korea – *Resistive RA*
- Dr. Lars-Ake Ragnarsson, IMEC, Belgium – *Ultrathin EOT scaling of high-k/metal gate stacks*
- Prof. Darrell Schlom, Cornell University, USA – *Oxide-based heterostructures*



Washington, D.C., attractions are within easy reach from the Key Bridge Marriott Hotel in Arlington, Virginia

- Prof. Shinichi Takagi, Tokyo University, Japan – *Ge gate stacks and devices*
- Prof. Iain Thayne, University of Glasgow, UK – *III-V MOSFETs*
- Prof. Peide Ye, Purdue University, USA – *InGaAs/high-k gate stacks and devices*

Wednesday Evening Tutorial – free to all registered SISC Attendees

- Prof. Mark Lundstrom, Purdue University, USA – *Simple theory of the nanoscale MOSFET*

Unique Poster Session

A unique feature of SISC is the attention paid to the poster presentations. Each author of a poster presentation has the opportunity to

introduce their work orally, using two visuals, to the entire SISC audience during special poster introduction sessions. The posters are then presented during a separate poster reception on Thursday evening.

Best Student Presentation Award

SISC is a popular conference with students, who can get immediate and candid feedback on their latest results from the experts in the field. In addition to a strongly reduced registration fee for students, a Best Student Presentation award is conferred every year in memory of E.H. Nicollian, a pioneer in the exploration of the metal-oxide-semiconductor system who had a strong presence with-

in the SISC. The winner will receive a plaque and a cash prize.

Accompanying Program

The scientific content of the conference is complemented by informal events designed to encourage lively discussion and debate. A hospitality suite with complimentary drinks is available to attendees to continue their discussions on every evening of the conference. Friday afternoon has no scheduled talks, to allow time to meet informally, relax, or visit local attractions. On Friday evening the conference hosts a banquet and awards ceremony, complete with the famous limerick contest. The limericks never fail to give the conference presentations, people and events an entirely new perspective!

SISC is always a rewarding experience for specialists, students, as well as newcomers to the field. For more information about the conference, to consult its program and to register, please visit <http://www.ieeesisc.org>. We hope to see you at SISC!

John Robertson
2011 SISC General Chair
University of Cambridge
Cambridge, UK

2012 IEEE INTERNATIONAL CONFERENCE ON MICROELECTRONIC TEST STRUCTURES (ICMTS)

The 2012 IEEE International Conference on Microelectronic Test Structures (ICMTS) will be held at the Catamaran Hotel on Mission Bay in San Diego, California, March 20–22, 2012. This meeting is the 25th anniversary of the ICMTS and marks the first time that the conference has been held in San Diego since 1994. The first ICMTS was held in Long Beach in 1988, and since then has cycled between Europe, North America and Asia. ICMTS is sponsored by the

IEEE Electron Devices Society and brings together designers and users of test structures to discuss recent developments and future directions as relates to fields such as:

- Micro- and Nano-Electronics
- Bio-Electronics
- 3D Stacked Integrated Circuits, including Through-Silicon Vias (TSVs)
- MEMS and NEMS
- Micro- and Nano-fluidics, and
- Nanotechnology

A hallmark of ICMTS is that all lecture sessions are held sequentially as one track, and ICMTS provides ample time for fruitful discussion among delegates to the conference. At the conclusion of the program, the Technical Program Committee will announce the 2012 Best Paper award.

ICMTS will be preceded by a one-day Tutorial Short Course on Microelectronic Test Structures on March 19th. The Tutorial will cover hot topics in test structures for electron

device and process characterization and reliability as well as providing instruction in the basics of test structure metrology.

There will also be an equipment exhibition by leading companies in semiconductor device characterization, where conference attendees may take the opportunity to discuss innovative solutions in characterization and testing with technical and marketing experts.

Test structures have played a critical role in the rapid advancement of semiconductor manufacturing technology. Test structures uniquely designed to isolate and emphasize individual artifacts of the manufacturing process continue to play a key role in meeting the many challenges of advancing semiconductor technology as highlighted by The International Technology Roadmap for Semiconductors.

At the Catamaran Hotel on Mission Bay where you enter by a waterfall, visit hidden gardens of over 1,000 types of eclectic plants and flowers, exotic birds, 100 varieties of palm trees, and 30 types of hibiscus. Surround yourself with striking sunsets, the splendor of secluded sandy beaches, and the sights and sounds of nature all in one place. We will enjoy cruising on Mission Bay as the ICMTS banquet will be held on the Bahai Belle paddle wheel steamboat. The city of San Diego is famous for its weather, beaches and attractions, including the San Diego Zoo and Sea World.

Our full program is available on the ICMTS web page: <http://icmts2012.pdf.com>. We look forward to seeing you in San Diego!

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Resort aerial view of the Catamaran Hotel on Mission Bay in San Diego

Photos Courtesy of Catamaran Hotel, San Diego



Catamaran Hotel Reception Lobby Waterfall Entrance

SOCIETY NEWS

JUNE 2011 EDS AdCom MEETING SUMMARY

Opening Remarks. On the weekend of May 27th, the 2011 Mid-year EDS AdCom Meeting was held in Taipei, Taiwan. EDS Taipei Chapter Chair, Steve Chung, played host to over 50 EDS volunteers and proved outstanding in this role. From making all the local arrangements, including securing first rate accommodations at the fabulous Grand Hotel, to coordinating logistics between the hotel and the EDS Executive Office, Steve made this a most successful Mid-year meeting. On behalf of all of EDS, but especially the staff, we thank Steve for his dedication, resourcefulness, and generosity to the Society. THANK YOU STEVE and your wonderful team of volunteers:

- Prof. Chih-Fang Huang (National Tsing Hua University)
- Prof. Tuo-Hung Hou (National Chiao Tung University)
- Mr. E. R. Hsieh
- Mr. Andrew Chou
- Mr. Chuck Tsai
- Finance secretary: Miss S. F. Lo

The weekend began with an extremely well-attended MQ at the National Chiao Tung University in Hsinchu. Billed as WIMNACT-29, the 200+ attendees were treated to talks by EDS Distinguished Lecturers

Renuka Jindal, Cor Claey's, Hiroshi Iwai, Paul Yu, Meyya Meyyappan, Mansun Chan, Juin Liou, and Xing Zhou.



The ExCom meeting was held at the Grand Hotel Taipei on Saturday. The focus of the meeting was defining EDS's long-term strategy to ensure that all the Society's efforts, whether in publications, conferences, member and chapter affairs, technical activities, awards, or education, addresses the fundamental question, "are we adding value to membership in EDS?" The presentations made by EDS's leadership team answered that question with a resounding "Yes."

The meeting began with a detailed review of the Society's budgets for 2011 and 2012 led by President Renuka Jindal. The group debated how best to be fiscally prudent while at the same time ensuring the necessary resources are available to fund the Society's myriad programs, products, and services.

Following the budget discussion several of EDS's VPs gave overviews of the key activities and plans in their respective areas, including:

- Bin Zhao, VP of Meetings and Conferences

- Meyya Meyyappan, VP of Education
- Albert Wang, VP of Membership
- Juin Liou, VP of Regions and Chapters
- Samar Saha, VP of Publications
- Marvin White, VP of Awards

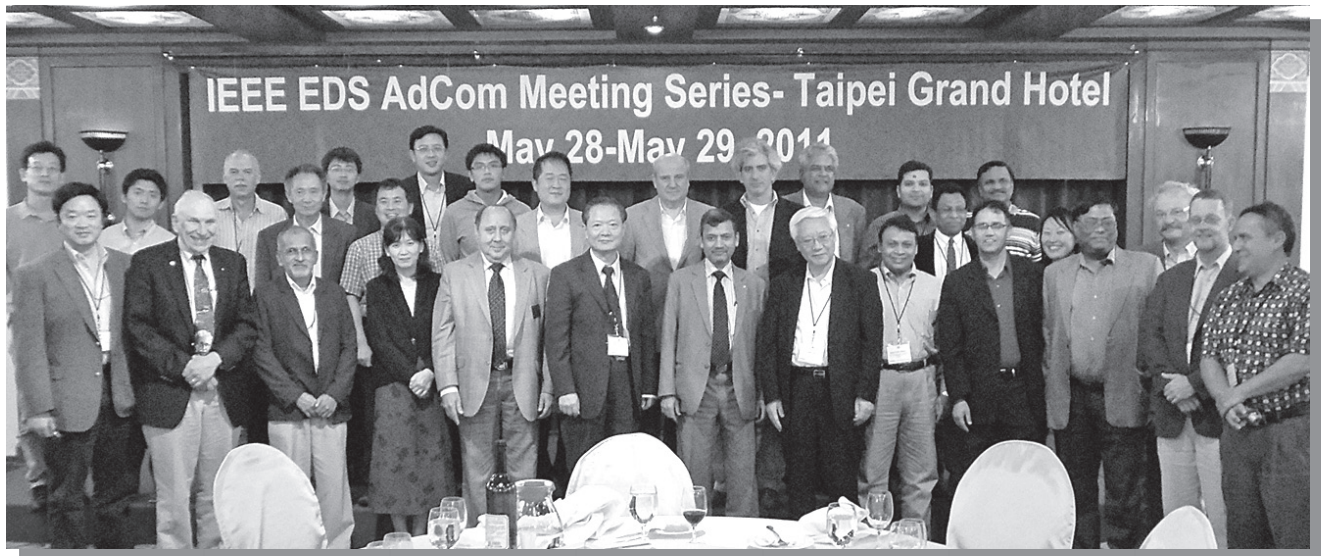
In addition, EDS President-Elect Paul Yu reviewed possible locations for the 2012 Mid-year AdCom Meeting, more on this later in the article, and Junior Past President Cor Claey's led an important discussion on changes to the EDS Bylaws. More on both of these presentations later in the article, so read on!

Following the very productive ExCom meeting, EDS leaders gathered together with chairs from over a dozen R10 chapters for the 2011 Region 10 Chapters Meeting. Region 10 SRC-AP Chair, Xing Zhou opened the meeting after which a very productive group discussion took place. Led by Renuka, the group dealt with key issues facing EDS chapters today, such as, "How can we leverage chapters to attract more members and engage current ones?" Many strategies and programs were discussed, chief among them, ensuring that chapter chairs and the regional leadership work together to better facilitate chapter programs and activities.

Next, the attendees were treated to presentations by many Region 10 Chapter Chairs. Among the speakers were:

- MK Radhakrishnan, South Asia Chapters
- Wen-Kuan Yeh, Tainan Chapter
- Hoi Wai Choi, Hong Kong Chapter
- Yimen Zhang, Xi'an Chapter
- Bhadra Pokharel, Nepal Chapter





- Chandan Sarkar, Calcutta Chapter
- R.S. Gupta, Delhi Chapter
- M. Madheswaran, India Chapter
- N. Mohankumar, Madras Chapter
- K.S. Sankara Reddy, Bangalore Chapter
- Ajit Kumar Panda, NIST Student Branch Chapter
- Ibrahim Ahmad, Malaysia Chapter
- Quazi D.M. Khosru, Bangladesh Chapter

Although the weekend was packed end-to-end with society business, there was some time for more relaxing endeavors. On Saturday, Steve Chung arranged for a spectacular ExCom dinner atop the fabu-

lous Taipei 101 building, the second tallest in the world. Coupling world-class Italian fusion cuisine with breathtaking views of the city, and impeccable service, the event was one that will not be soon forgotten.

The main event of the weekend was of course the AdCom Meeting on Sunday. With over 50 EDS volunteers present, including 15 of our 22 elected members, this was one of the best attended Mid-year meetings yet held.

The full agenda for the meeting, including links to presentations can be found under "Recent AdCom Meeting" link in the AdCom section of the EDS web site (www.ieee.org/eds).

In addition to nearly 20 presentations from key EDS volunteers, several important motions were passed at the meeting, including two referenced earlier, regarding site selection for 2012's meeting and critical changes to the EDS Bylaws.

For 2012, the EDS Mid-year meeting will be held in Belgium, tentatively slated for June 2-3. The final venue is not determined, but it will likely be in one of two beautiful cities: Brussels or Leuven, so we can't lose either way.

The other important motion related to required changes to the EDS Bylaws with respect to structure of the Executive Office. This motion engendered much discussion that continued among the EDS officers long after the end of the Mid-year. The net effect of these discussions is that the leadership of EDS, TAB, and the IEEE developed language that is in compliance with IEEE guidelines and accurately reflects the wonderful working relationship between EDS volunteers and professionals. For more on this, please see the article entitled, Dear EDS Members, immediately following this report.

The Mid-year meeting closed with the AdCom Dinner at the Grand Hotel. Attendees were treated to several courses showcasing Taipei's finest



cuisine and thankfully, no business was conducted at the dinner. By Sunday night, the group had more than earned its keep in terms of furthering the mission and vision of EDS.

Secretarial Reflections

This was, I believe, only the second EDS meeting that I have been forced to miss, and it ranks as one of the best, both in terms of the content of the discussion, and the quality of the meeting location and social events. I had been looking forward to a meeting in Taiwan for years, but events beyond my control forced me to forego the wonderful experience of this gathering. This



time it was not a grandson's confirmation, but an urgent, unexpected visit by my surgeon, who, scalpel in hand, installed a new aortic valve in my heart. (To this day I do not know if it was the valve of a cow or a pig, but lately I have suffered just the slightest revulsion to both beef and pork!)

Not following my example, I continue to urge all AdCom members to faithfully attend all of these meetings, both domestic and overseas, as your input to the vision of the EDS is essential to its success. I expect to see you all in D.C.!

A joyous time checking out of Memorial Hospital in South Bend, with my wife, Rose-Marie, and with Ryanne, one of a fabulous team of nurses and caregivers who made this "an experience" rather than "an ordeal"! (June 13, 2011)

Jim Merz

EDS Secretary

University of Notre Dame

Notre Dame, IN, USA

DEAR EDS MEMBERS



Renuka Jindal
EDS President

In response to the requirements imposed by the IEEE legal department while at the same time continuing to assign operating responsibility to the EDS leadership, EDS's Ad-

Com has voted to make the following amendments to the Society Bylaws:

- Section 6.1. We have added the following text:

The President is responsible for the fiscal health of the society and in consultation with the EDS AdCom is responsible for taking steps necessary to ensure the same.

- Section 8. This section, originally called "Executive Office," has been removed and all subsequent sections re-numbered.

These changes are being publicized to all EDS members for their perusal. You can view the revised

Bylaws at http://eds.ieee.org/images/files/About/bylaws_provisional.pdf. As always, I personally encourage you to take ownership and participate actively in the affairs of the Electron Devices Society. We are here to serve and empower our members.

Sincerely,

Renuka Jindal

EDS President

University of Louisiana

at Lafayette

Lafayette, LA, USA

REPORT ON THE EDS REGION 10 CHAPTERS MEETING

The EDS Region 10 Chapters Meeting was successfully held on May 28, 2011, in conjunction with the AdCom Meeting at the Grand Hotel, Taipei. The meeting was well attended by around 35 participants, including 13 chapter chairs (one student chapter

chair), EDS officers, staff, and local chapter representatives. The half-day meeting began with a welcome address by Vice-President of Regions/Chapters, Prof. Juin Liou, who also thanked Prof. Steve Chung of National Chiao Tung University for

all of his hard work in helping to arrange the EDS Spring AdCom Meeting Series, including the Region 10 Chapters Meeting and the EDS Mini-Colloquium in Hsinchu. EDS President Renuka Jindal gave an opening address and started a discussion



Attendees of the 2011 EDS Region 10 Chapters Meeting

with the attendees as well as conference call-ins on the topic of serving EDS members and empowering volunteers through our Sub-committee for Regions/Chapters (SRC). He mentioned to the meeting that between MQs and DLs, regional meetings, and subsidies, we invest roughly \$200K, in chapter activities, more than EDS's operational surplus for the past several years. Consequently, we need to make sure that the financial resources we have committed are providing the return they should. A new initiative in establishing direct SRC oversight of key chapter activities, provides each chapter with a dedicated SRC committee member who will oversee activities. This is an important step forward to empower our key volunteers to take meaningful action and improve our chapters, especially in connection with member recruitment.

Following the general discussion, the SRC-AP Chair, Prof. Xing Zhou, directed the meeting. The SRC-AP Vice-Chairs, Prof. Steve Chung, Dr. M.K. Radhakrishnan, Prof. Ru Huang, and Prof. Ramgopal Rao (who called in from Mumbai), were also in attendance. Prof. Zhou gave

a summary report of Region 10 chapters and major activities in the past year, including the EDS President's visits to various chapters, South-Asia Chapter Meetings, WIMNACT series, as well as proposed SRC outreach assignments for Region 10. He also gave a report on behalf of the Rel/CPMT/ED Singapore Chapter. Dr. Radhakrishnan, who has been coordinating chapter activities in India, reported on the past and recent South-Asia Chapter Meetings. The meeting was then followed by individual chapter reports, including: Tainan (Wen-Kuan Yeh), Hong Kong (Hoi Wai Choi), Xi'an (Yimen Zhang), Nepal (Bhadra Pokharel), Calcutta (Chandan Sarkar), Delhi (R.S. Gupta), India (M. Madheswaran), Madras (N. Mohankumar), Bangalore (K.S. Sankara Reddy), NIST Student Branch (Ajit Kumar Panda), and Malaysia (Ibrahim Ahmad). The Bangladesh Chapter Chair (Quazi Khosru) arrived at the last minute due to issues with his entry visa for Taiwan, and as a consequence, his chapter report was postponed to the AdCom Meeting the next day.

During the meeting, several chapter chairs from India raised the dis-

cussion on the membership fee being a barrier for potential members in emerging countries. Albert Wang, Vice-President of Membership, commented on this as a general issue of IEEE and also extended the discussion on ways to promote EDS membership and activities worldwide. Although no consensus and conclusion was reached during intensive discussion, this important topic clearly attracted enthusiasm of the attendants from different countries, which is exactly the aim of the Chapters Meeting.

The Region 10 Chapters Meeting was a very fruitful one, and Region 10 remains to be one of the most active and high-growth regions. Regular chapter chair meetings give those grass-root volunteer leaders an opportunity to share their experience and information exchange. The meeting was adjourned at approximately 5 p.m. After the group photo, most of the attendees enjoyed a short tour of a famous night market near the meeting venue.

*Xing Zhou
Chair EDS SRC-AP
Nanyang Technological University
Singapore*

EDS-ETC

Engineers Demonstrating Science: an Engineer Teacher Connection

REPORT FROM THE ED COLOMBIA CHAPTER

In order to present different schools and educational institutions with science and technology training tools for their students, a meeting was held on July 21, 2011, at the Pizano Conference Room of the Pontificia Universidad Javeriana. A

demonstration of teaching with the Snap Circuits™ kits was made by EDS student members. The meeting was coordinated by German Yamhure in his capacity as chair of the IEEE ED Colombia Chapter. The participants were presented

with some of the kits available and their educational benefits and given a demonstration of some of the experiments conducted by students of Electrical Engineering. The teachers and principals of schools and educational institutions then had the opportunity to inspect and manipulate the kits

Afterwards, a forum was held where the participants shared their views not only from the perspective of the technical education but the psychological impact on children and their relationships with their community, families and peers. A very important aspect for the Javeriana University is its social program of the Faculty of Engineering, PROSOFI.

The general opinion was that these tools would be very useful for students and even more so with the assistance of the Department of Electrical Engineering from the Pontificia Universidad Javeriana and the IEEE EDS who provided resources to train teachers in schools and institutions.

Prof. Yamhure also made available the documentation from the "Teacher's Guide," the "Student Guide" and "Projects" which were augmented with translated versions for some of the documents as authorized by the manufacturer, given that the original versions of these documents are in English. The Pontificia Universidad Javeriana provided the translations through their translation services.



Student members of the ED Colombia Chapter demonstrating to faculty, some of the experiments possible with the Snap Circuits™ kits

*Germán Yamhure
ED Colombia Chapter Chair
Pontificia Universidad Javeriana
Bogota, Colombia*



Interested in knowing why it's not possible to measure the built-in voltage of a PN junction using a voltmeter? Do you need to understand the best way to derive an expression for the average thermal velocity of an electron? Or are you curious about what quantum dots and wires are? The answers to these questions and more are available through the QuestEDS Question and Answer page.

To ask a question not already addressed on the Q&A page, visit www.ieee.org/go/questioneds. Technical experts answering the questions posed represent academic, government and industry sectors.

Questions are grouped into five technical categories and two general ones. Technical categories cover subject areas like semiconductor and device physics, process technology, device characterization and quantum electronics. Subject areas addressed are anticipated to expand in the future. Two other categories address questions pertaining to educational activities and general inquiries about society membership. Within a two week time frame from when the question is asked, an answer is posted online. Incoming questions are handled by an editor-in-chief who ensures that they fall within the technical scope of EDS and that they are adequately answered.

For the answers to these recent submissions, visit <http://eds.ieee.org/questioneds/question-and-answer-page.html> and select the appropriate topic links.

COMPACT MODELING

Question 047-11

How can we estimate the amount of electron concentration (or the inversion layer carrier concentration) in channel when the gate voltage is varied from subthreshold to inversion region in an nMOSFET? Can we make this electron concentration value dependent on V_{ds} too?

Question 049-11

According to the answer to question 046-11 "The velocity saturation is a hot carrier effect, dependent on carrier kinetic energy, which can be significant only under the application of a QFP gradient, or voltage." However, If we look at the base region of a graded base bipolar junction transistor, under low or zero bias the electrons are travelling at saturation velocity due to the built in electric field of 6 KV/cm [Fundamentals of semiconductor devices, Anderson: P-580 Example 9.4]. Since a P-N junction in BJT is same as a P-N junction in diode, why there is no mobility degradation in the later case under zero or low bias.

Question 050-11

What is the simplest but at the same time reasonably accurate method to model leakage current (like gate leakage current in MOSFET) and band-to-band tunneling current (like tunnel diode or tunnel FET)? Given that Poisson and Schrodinger equations are solved for the above mentioned devices to get the energy band profiles, now a method is required to calculate gate leakage and band-to-band tunneling current.

My second question is, is Tsu-Easki model applicable for the above mentioned cases?

Question 051-11

The answer to the Question QE050-11 gives two references on the modeling of direct tunneling gate leakage current. Is there any similar work that describes the simple methods of modeling interband tunneling phenomena? I am, especially, interested in modeling an interband tunnel nanowire FET where transition of electrons occur from valence band to conduction band. Is Tsu-Esaki and/or Kenji Natori's approaches applicable for such cases?

VLSI INTERCONNECTS

Question 048-11

Can anyone give me the idea of capacitor mismatching in analog switched capacitor circuits? What is the normal capacitor mismatch value for these circuits? Also how it affects the pipelined ADC circuits?

2010 EDS PAUL RAPPAPORT AWARD



Samar Saha
EDS Vice-President
of Publications

A high priority of the Electron Devices Society is to recognize and enhance the quality of papers published in EDS archival literature. Every year, the Society confers its prestigious Paul Rappaport Award

to the best paper published in the *IEEE Transactions on Electron Devices*. Among other criteria including technical excellence, an important metric for selection for the award is comprehensive and impartial referencing of prior art. The winning paper was selected from among 350 manuscripts that were published in 2010. The article is entitled, "Large-Area Flexible Ultrasonic Imaging System With an Organic-Transistor Active Matrix." This paper was published in the May, 2010 issue of the *IEEE Transactions on Electron Devices*, and was authored by Yusaku Kato, Takayasu Sekitani, Yoshiaki Noguchi, Tomoyuki Yokota, Makoto Takamiya, Takayasu Sakurai, and Takao Someya. The award will be presented at the EDS Administrative Committee Meeting to be held in early December 2011, in Washington, DC. In addition to the award certificate, the authors will receive a check for \$2,500. On behalf of the Electron Devices Society, I would like to congratulate the authors for this achievement. Brief biographies of the authors are given below.



Yusaku Kato was born in Tokyo, Japan, in 1981. He received the B.S. and Ph.D. degrees in applied physics from the University of Tokyo, in 2004 and 2009, respectively. Currently he is at Sony Corporation.



Yoshiaki Noguchi received the Ph.D. degree in applied physics from the University of Tokyo in 2010. From 2008 to 2010, he was a member of the Japanese Society for the Promotion of Science (JSPS) Research Fellowships. His research interests included organic transistors, large area electronics, and printed electrical devices. Since 2010 he has been working for FANUC LTD.



Tsuyoshi Sekitani received the B.S. degree from Osaka University, Japan, and the Ph.D. degree in applied physics from the University of Tokyo, Japan, in 1999 and 2003, respectively. From 1999 to 2003, he was with the Institute for Solid State Physics (ISSP), University of Tokyo. From 2003 to 2010, he was a Research Associate at the Quantum-Phase Electronics Center and the Department of Electrical and Electronic Engineering, University of Tokyo. Since 2011, he has been an Associate Professor of the Department of Electrical and Electronic Engineering, University of Tokyo.



Takao Someya received the Ph.D. degree in electrical engineering from the University of Tokyo in 1997. Since 2009, he has been a Professor of Electrical and Electronic Engineering, University of Tokyo. His current research interests include organic transistors, flexible electronics, plastic integrated circuits, large-area sensors, and plastic

actuators. Prof. Someya has been a Board of Directors of Material Research Society (MRS) since 2009, a Distinguished Lecturer of the IEEE Electron Devices Society since 2004, and Global Scholar of Princeton University since 2009. He has received numerous awards, including IEEE/ISSCC Sugano Award (2005), JSPS Award (2008), and Japan IBM Science Award (2009).



Makoto Takamiya received the B.S., M.S. and Ph.D. degrees in electronic engineering from the University of Tokyo, Japan, in 1995, 1997, and 2000, respectively. In 2000, he joined NEC Corporation, Japan, where he was engaged in the circuit design of high speed digital LSIs. In 2005, he joined the University of Tokyo, Japan, where he is currently an associate professor at the VLSI Design and Education Center. His research interests include the design of the low-power RF circuits, ultra low-voltage digital circuits, and the large area electronics with organic transistors. He is a member of the technical program committee for IEEE Symposium on VLSI Circuits and IEEE Custom Integrated Circuits Conference (CICC).



Tomoyuki Yokota was born in Tokyo, Japan, in 1985. He received the M.S. degree in applied physics from the University of Tokyo, in 2009, where he is currently pursuing the Ph.D. degree in applied physics. His research interests include printed electrical devices, large-area electronics, organic memories, and organic transistors. He is a student research fellow of the Japanese

Society for the Promotion of Science (JSPS) and the student member of the Material Research Society (MRS) and the Japanese Society of Applied Physics (JSAP).

Takayasu Sakurai received the Ph.D. degree in EE from the University of Tokyo in 1981. In 1981 he joined Toshiba, where he designed DRAM, SRAM, RISCs, DSPs and SoCs. From



1988 to 1990, he was a visiting researcher at UC Berkeley. From 1996, he has been a professor at the University of Tokyo, working on low-power VLSI, memories, interconnects, and wireless systems. He is an executive committee chair for

VLSI Symposium and A-SSCC. He is a recipient of many technical awards including IEEE Donald O. Pederson Award in Solid-State Circuits, IEICE achievement awards. He is an IEICE and IEEE Fellow.

Samar Saha
EDS Vice-President of Publications
SuVolta, Inc.
Los Gatos, CA, USA

2010 GEORGE E. SMITH AWARD

A high priority of the Electron Devices Society (EDS) is to recognize and enhance the quality of papers published in EDS archival literature. The George E. Smith Award was established in 2002 to recognize the best paper appearing in a fast turn-around archival publication of EDS, targeted to *IEEE Electron Device Letters*. Among other criteria including technical excellence, an important metric for selection for the award is comprehensive and impartial referencing of prior art.

The paper winning the 2010 George E. Smith Award was selected from among 400 articles that were published in 2010. The article is entitled "Dual-Gate Graphene FETs with f_T of 50 GHz." This paper appeared in the January 2010 issue of *Electron Device Letters* and was authored by Yu-Ming Lin, Hsin-Ying Chiu, Keith A. Jenkins, Damon B. Farmer, Phaeton Avouris, and Alberto Valdes-Garcia. The award will be presented at the EDS Administrative Committee Meeting to be held in early December 2011, in Washington, DC. In addition to the award certificate, the authors will receive a check for \$2,500. On behalf of the Electron Devices Society I would like to congratulate the authors for this

achievement. Brief biographies of the authors follow.



Phaeton Avouris is an IBM Fellow and manager of Nanoscience & Nanotechnology at the IBM Watson Research Center. His research focuses on the electrical properties of carbon nanostructures. He has published over 400 papers and received many awards including the Irving Langmuir Prize, Medard Welch Award, Richard Feynman Prize, and the IEEE Nanotechnology Pioneer Award.



Hsin-Ying Chiu is an assistant professor at the University of Kansas since July 2011. During her career at IBM, she studied device physics to optimize performance of graphene RF transistors. Her Ph.D. is in applied physics from the California Institute of Technology for studying thermal and electromechanical properties of carbon nanotubes.



Damon B. Farmer received the B.S. degree in physics from Vanderbilt University and the Ph.D. degree in applied physics from Harvard University. He joined the research staff at the IBM T.J. Watson Research Center in 2010 after a postdoctoral fellowship at the same institution, where he currently works on graphene electronics.



Keith A. Jenkins has been with IBM since 1983, where he has developed techniques to evaluate high frequency devices and circuits. He is currently studying the performance of non-silicon devices, and designing on-chip circuits to measure signal fidelity in VLSI circuits. He has a Ph.D. in physics from Columbia University.

Yu-Ming Lin received the B.S. degree in physics from National Taiwan University and the Ph.D. degree in EECS from Massachusetts Institute



of Technology in 1996 and 2003, respectively. He joined IBM in 2003, and is currently a research staff member. His recent research includes

the development of graphene and carbon nanotubes for RF electronics.



Alberto Valdes-Garcia received the Ph.D. degree in E.E. from Texas A&M University in 2006. He is currently a Research Staff Member with IBM

working on millimeter-wave ICs and carbon electronics and serves a Tech-

nical Advisory Board Member with SRC. He is the winner of the 2005 IEEE TTTC Best Doctoral Thesis Award.

*Samar Saha
EDS Vice-President of Publications
SuVolta, Inc.
Los Gatos, CA, USA*

GOLDEN MOMENTS OF THE 37TH PVSC

The 37th IEEE Photovoltaic Specialist Conference (PVSC) was held June 19–24, 2011, in Seattle, Washington. This conference marked the 50th anniversary of the first PVSC and set records for both total attendance (>1800) and contributed technical papers (>1100). Many past PVSC Chairs and luminaries were in attendance to celebrate the anniversary, which was a great treat for the attendees. In addition to being a special conference because of the anniversary, there were numerous technical highlights that made this conference particularly memorable.

- Dr. Jerry Olsen of NREL won the prestigious Cherry Award this year. Jerry sincerely thanked his team from NREL for their support and the community at large for its contributions. He gave an interesting speech on very high efficiency multijunction photovoltaics, which has been one of his primary contributions to the community.
- Dr. Dick Swanson of SunPower, presented the Keynote talk on the current status of PV, the economic drivers, and where the community stands in terms of cost of product. He argued strongly that past forecasts for future cost of devices had largely come true and that making similar fore-



casts for future cost reductions demonstrates that the crystalline Si community will reach cost targets that will leave them profitable when the investment tax credit expires in 2016.

- Prof. Atwater of CalTech, delivered a very interesting lecture on emerging paths to low cost high efficiency solar cells. It highlighted the strength of

combining innovative light trapping and epitaxial lift-off processes for low-cost manufacturing of GaAs based thin film solar cells and reported record efficiencies as high as 27.6% (cells) and 21% (modules) for thin film GaAs devices.

- Stuart Wenham of Suntech Power, described what allows PV production in China to grow faster than in other countries – not the low cost of labor but the low cost of capital and the adoption of the best technologies from around the world. He showed data that demonstrated how in the past seven years Si solar modules have grown from a very modest baseline to the point today where four of the top five manufacturers of photovoltaics are located in China. Finally, it was stated that silicon modules will achieve \$1/W prices by 2015 even allowing for manufacturer profit.
- Marika Edoff of Uppsala University, presented highlights on $\text{Cu}(\text{In,Ga})\text{Se}_2$ (CIGS) and $\text{CuZnSn}(\text{S,Se})_4$ (CZTS) research. She noted that a very high efficiency device has been achieved on a polymer substrate by Tiwari and collaborators (18.7%), that a 15.7%-efficient large area module



Jerry Olsen, (middle) accepting the Cherry Award



Past chairs of the IEEE PVSC attending the 37th PVSC



a >82% remaining power percentage at end of life following radiation testing. A triple junction IMM cell result of 43.5% (AM1.5D) under 300x concentration was described (in-house measurement).

has been demonstrated by Misolé, and that a 14.6% efficient module from a production line has been shown by Solibro.

- Ulrich Kroll of Oerlikon Solar presented the history and current status of the company's thin film silicon PV technology, from R&D to large-area production equipment. Record efficiencies on the laboratory level for single junction amorphous cells of 10.09% and for micromorph (amorphous-microcrystalline multijunction) cells on specialty glasses from Corning of 11.91% have been achieved. These results were obtained using VHF thin film Si and LPCVD ZnO processing technologies. Successful scale up to 1.4 m² modules has been demonstrated, yielding a stable 143 W micromorph module (stable active area efficiency of 10.7%). Impressive production yields of > 97% were demonstrated.
- Dr. David King from DK Solar Work discussed more efficient methods for specifying and monitoring PV system performance. The motivation for this topic is to match the accuracy of technical expectations of PV performance with the demands set by the financial sector.
- Antonio Luque from Universidad Politécnica de Madrid, focused on concentrators driven by high efficiency devices. It was argued that concentrators will eventually achieve a practical efficiency of 50% through the application of very high performance devices.
- Yang Yang of UCLA, mentioned two verified organic photovoltaics results above 8% and a 9.3% efficient result, not yet verified. The results continue the remarkable recent successes in champion device performances in OPV. The rate of increase in efficiency is spectacular. In addition, roll to roll processing has been demonstrated for high throughput. Because the absorption bands are relatively narrow in organics, solution processed tandems are being explored.
- Pravin Patel of Emcore Corporation presented data showing that the inverted metamorphic (IMM) based devices are taking the performance lead for both space and terrestrial technologies / applications. They have achieved a material quality enabling Voc's similar to lattice matched approaches. Four-junction inverted metamorphic cells demonstrated efficiencies of 36.2% (135.3mW/cm² AM0 spectrum) at 28°C and

- Yanfa Yan of NREL, described characterization using electron microscopy and modeling of extended defects in semiconductors used in solar cells. They showed that the general trend of defect formation mainly depends on the covalent/ionic character of the compound (Si, GaAs, CdTe, CIGS, CZTS). Covalent materials produce deep levels, while ionic materials produce shallow levels (a useful design rule for PV absorbers). Similar tendencies apply to grain boundaries. As a result, in contrast to thin film Si and III-V's, II-VI-based polycrystalline materials have relatively good PV performance.

In addition to the great technical program, attendees benefited from a vibrant PV Velocity Forum, tutorial program, social program and numerous social events.

Next year's PVSC will be in Austin, Texas, June 3–8, 2012. We hope to see you there!

David Wilt
2011 PVSC Conference Chair
U.S. Air Force Research Laboratory
New Mexico, USA

Angus Rocket
2011 PVSC Deputy Program Chair
University of Illinois
Illinois, USA

PVSC WILLIAM R. CHERRY AWARD WINNER

William R. Cherry Award

This award is named in honor of William R. Cherry, a founder of the photovoltaic community. In the 1950's, he was instrumental in establishing solar cells as the ideal power source for space satellites and for recognizing, advocating, and nurturing the use of photovoltaic systems for terrestrial applications. The William R. Cherry Award was instituted in 1980, shortly after his death. The purpose of the award is to recognize engineers and scientists who devote a part of their professional life to the advancement of the technology of photovoltaic energy conversion.

This award is presented at each IEEE/EDS Photovoltaic Specialists Conference. The recipient is selected by the William R. Cherry Committee composed of past PVSC chairpersons and past recipients of the award.

Dr. Jerry Olson is currently a Principal Scientist in the III-V Materials and Devices Group of the National Renewable Energy Laboratory (NREL). He has contributed to the invention



Jerry M. Olson

of several GaInP/GaAs single and multi-junction photovoltaic devices. These devices are now being produced by numerous companies for space power and terrestrial photovoltaic systems. He has also invented several novel processes for purifying silicon.

Jerry Olson received his Ph.D. in physics from the University of Utah in 1977 and spent a year as a post doc at the Materials Research Center, Northwestern University. He then moved to the Solar Energy Research Institute (now NREL) in Golden, Colorado, in 1978. From 1978 to 1983 he was the leader of the Silicon Materials Group where he invented several efficient, low-cost processes for purifying metallurgical-grade Si, one of which has recently been implemented on a large scale by a silicon solar cell company. In 1983 he became the leader of the

III-V Materials and Devices Group and in 1984 invented the GaInP/GaAs tandem solar cell. The further development and refinement of this solar cell was the main project for the NREL III-V team for the next 20 years. During that time, the team patented several other single and multi-junction solar cells, transferred the technology to industry, set several world record efficiencies and garnered numerous awards, including two R&D 100 Awards in 1990 and 2001, a Federal Laboratory Consortium Award for Technology Transfer in 1997, the IEEE Electrotechnology Transfer Award in 1998 and the Dan David Prize in 2007. Devices based on the original GaInP/GaAs solar cell are now being produced by companies around the world for space power and concentrator photovoltaic systems.

*John D. Meakin
IEEE/EDS Representative
University of Delaware
Weybridge, VT, USA*

EDS MEMBERS NAMED RECIPIENTS OF THE 2011 IEEE MEDALS & RECOGNITIONS



*Marvin White
EDS Vice-President
of Awards*



Tze-Chiang Chen of IBM Research has been named the recipient of the 2011 IEEE ERNST Weber Engineering Leadership Recognition. His citation

states, "*For engineering and managerial leadership in driving the world's most advanced silicon chip technologies from research to development to manufacturing.*"

For over 25 years, Tze-Chiang Chen has driven major innovations in silicon microelectronics technology with contributions spanning across research, development and product manufacturing. His technical and managerial leadership in understanding and developing advanced bipolar, complimentary metal-oxide semiconductor (CMOS) and dynamic random access memory (DRAM) technology has played a critical role in placing IBM as one of the leaders of CMOS technology. Technology devel-

oped under Dr. Chen's guidance has impacted mainframe computing systems used worldwide for scientific, banking, and other business applications and has advanced the global semiconductor industry as a whole. During the 1980s, Dr. Chen conducted pioneering work on the polysilicon emitter/single-crystal silicon interface that led to the world's first double-poly bipolar technology. The successful commercialization of this technology formed the basis of semiconductor devices that were deployed in the IBM S/390 mainframe computers. Beginning in 1999, Dr. Chen helped lead an IBM team that demonstrated the first commercial microprocessor using silicon-on-insulator technology for

high-performance logic. He also personally led IBM's high-k/metal-gate CMOS development, which was one of the biggest changes to silicon microelectronics technology in decades.

Dr. Chen is a strong advocate of international collaboration in technology development. During the 1990s, he led a multinational alliance for advancing trench-capacitor DRAM technology, and his technical contributions led to the announcement of the world's fastest and smallest 256-Mb DRAM in 1995. His successful multinational development programs became the models for subsequent IBM joint-development projects with semiconductor companies worldwide. An IEEE Fellow, Dr. Chen is currently an IBM Fellow and vice president of science and technology with IBM Research, Yorktown Heights, New York.



Marcian E. Hoff of Teklicon, Inc. has been named the recipient of the 2011 IEEE/RSE Wolfson James Clerk Max-

well Award. His citation states, "For developments in programmable integrated circuitry for a wide range of applications."

As one of the inventors of the first microprocessor, Marcian E. Hoff revolutionized the computing and electronics industries, and other contributions have helped usher in the digital age of communications. Dr. Hoff is best known for his role in developing the first microprocessor (the Intel 4004) with Stanley Mazor and Federico Faggin in 1969. Dr. Hoff also applied the microprocessor concept to programmable digital devices that revolutionized telephony, opened the door to mobile communications and enabled digital delivery of music and photos as well. From 1975 to 1980, Dr. Hoff led a team at Intel that moved signal processing from the analog domain to the digital domain. Working with Matt Townsend, Stephen Dryer and John Huggins, the first commercially available monolithic CODEC (the Intel 2910) was released in 1978 for converting voice signals between analog and digital

formats. Today, this process is taken for granted, but this work helped launch the digital age of communications. In 1979, Dr. Hoff's team released the Intel 2920, which was an early digital signal processing chip. Dr. Hoff's impact began well before inventing the first microprocessor. As a doctoral student at Stanford University in 1960, he developed the least mean squares (LMS) adaptive algorithm with thesis advisor Bernard Widrow. The LMS algorithm became one of the enabling technologies of the Internet, and it is now used in some form in most modems and adaptive signal processors for echo cancellation, channel equalization and adaptive antennas. An IEEE Life Fellow, Dr. Hoff retired from Teklicon, Inc., San Jose, California, in 1997, where he served as chief technologist.

Marvin White
EDS Vice-President of Awards
Ohio State University
Columbus, OH, USA

CONGRATULATIONS TO THE 31 EDS MEMBERS RECENTLY ELECTED TO IEEE SENIOR MEMBER GRADE!

Seiichi Aritome
Adam Balkcum
Bulent Basol
Ishwara Bhat
James David Burnett
Kunal Girotra
Harald Gossner
Mool C. Gupta
Gilbert Herrera*
Alexander Hoefler
Paul Ingersoll

K.B. Jayanthi
Mojtaba Kahrizi
Sudhir Kamath
Joel Kessler
Chao Sung Lai*
Stuart Peter Lansley
Sean Lian
Sung-Ki Min
Branimir Pejcinovic
Jose Sergio Rocha Neto
Peter Rabkin*

Todd Roggenbauer
Thomas Rusch
Klaus Schrufer
Mahesh Sharma
Zhenan Tang*
Toru Tanzawa
Emanuel Tutuc
Jonathan J. Wierer
Addullah M. Yassine

* = Individual designated EDS as nominating entity

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

letter will be sent to employers, recognizing this new status. For more information on senior member status, visit <http://www.ieee.org/web/membership/senior-members/status.html>

To apply for senior member status, fill out an application at <http://www.ieee.org/organizations/rab/md/smelev.htm>



CALL FOR NOMINATIONS
2012 IEEE Electron Devices Society
Masters Student Fellowship

Description: One-year fellowships awarded to promote, recognize, and support graduate Masters level study and research within the Electron Devices Society's field of interest: all aspects of engineering, physics, theory, experiment and simulation of electron and ion devices involving insulators, metals, organic materials, plasmas, semiconductors, quantum-effect materials, vacuum, and emerging materials. Specific applications of these devices include bioelectronics, biomedical, computation, communications, displays, electro and micro mechanics, imaging, micro actuators, optical, photovoltaics, power, sensors and signal processing.

Three fellowships will be awarded, with the intention of at least one fellowship being given to eligible students in each of the following geographical regions every year: Americas, Europe/Mid-East/Africa, Asia & Pacific. Only one candidate can win per educational institution.

Prize: US\$2,000 and a plaque to the student, to be presented by the Dean or Department head of the student's enrolled graduate program.

Eligibility: Candidate must: be an IEEE EDS student member at the time of nomination; be accepted into a graduate program or within the first year of study in a graduate program in an EDS field of interest on a full-time basis; and continue his/her studies at a graduate education institution. Nominator must be an IEEE EDS member and preferably be serving as the candidate's mentor or faculty advisor. Previous award winners are ineligible.

Basis for Judging: Demonstration of his/her significant ability to perform research in the fields of electron devices and proven history of academic excellence in engineering and/or physics as well as involved in undergraduate research and/or supervised project.

Nomination Package:

- Nominating letter by an EDS member who served as candidate's mentor or faculty advisor.
- Two-page (maximum) statement by the student describing his or her education and research interests, accomplishments and graduation date. This can include undergraduate, graduate and summer internship research work.
- One-page biographical sketch of the student (including student's mailing address and e-mail address)
- One copy of the student's transcripts/grades
- A letter of recommendation from an individual familiar with the student's research and educational credentials. Letters of recommendation cannot be from the nominator.

Timetable:

- Nomination packages are due at the EDS Executive Office no later than **April 15, 2012**
- Recipients will be notified by June 15, 2012
- Monetary awards will be presented by the Dean or Department Chair of the recipient's graduate program at the beginning of the next academic term.
- Nomination packages can be submitted by mail, fax or e-mail, but a hard copy must be received at the EDS Office.

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

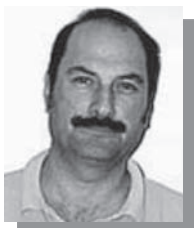
For more information contact: edsfellowship@ieee.org

Visit the EDS website: <http://eds.ieee.org/eds-masters-student-fellowship-program.html>

ANNOUNCEMENT OF THE 2011 EDS MASTERS STUDENT FELLOWSHIP WINNERS



Meyya Meyyappan
EDS Vice-President
of Educational
Activities



Agis Iliadis
EDS PhD &
Masters Student
Fellowship Chair

The Electron Devices Society Masters Student Fellowship Program was designed to promote, recognize, and support Masters level study and research within the Electron Devices Society's field of interest. The field of interest for EDS is all aspects of engineering, physics, theory, experiment and simulation of electron and ion devices involving insulators, metals, organic materials, plasmas, semiconductors, quantum-effect materials, vacuum, and emerging materials. Specific applications of these devices include bioelectronics, biomedical, computation, communications, displays, electro and micro mechanics, imaging, micro actuators, optical, photovoltaics, power, sensors and signal processing.

The Society is concerned with research, development, design and manufacture related to materials, processing, technology, and applications of such devices, and scientific,

technical, educational and other activities that contribute to the advancement of this field.

EDS proudly announces two 2011 EDS Masters Student Fellowship winners. Brief biographies of the recipients appear below. Detailed articles about each Masters Student Fellowship winner and their work, will appear in forthcoming issues of the EDS Newsletter.



the M.Phil. degree in the Department of Electrical and Electronic Engineering, University of Hong Kong. Qian Zhang has achieved outstanding academic results and received first-class scholarships for three consecutive years. She has performed independent research on the application of LEDs and won a best conference paper during her undergraduate study. Now her research interests focus on improving the optical performance of LED devices, including realizing polarized light emission from GaN LEDs and nano-scale patterning on LEDs.

Qian Zhang received the B.E. degree in Electrical Engineering and Automation from Fudan University, Shanghai, China, in 2010. She is currently pursuing



Haowei Zhang (S'11) was born in Henan, China, in 1988. He received B.S. degree in microelectronics from Peking University, Beijing, China, in 2010. He is now working on M.S. degree in the Department of Electrical Engineering, Stanford University, California, USA.

Haowei Zhang's research interest ranges from emerging semiconductor devices (e.g. RRAM, carbon nanotubes) simulation, modelling, fabrication, to energy-efficient circuits/architectures. While he was a research assistant in Novel Device Group, Institute of Microelectronics, Peking University, he and his colleagues developed methods to improve performance of HfO_2 and ZrO_2 RRAM devices.

Meyya Meyyappan
EDS Vice-President of Educational
Activities
NASA Ames Research Center
Moffett Field, CA, USA

Agis Iliadis
EDS PhD & Masters Student
Fellowship Chair
University of Maryland
College Park, MD, USA

REPORT ON EDS PRESIDENT'S VISIT TO CHAPTERS IN CHINA

Following the EDS AdCom Meeting in Taipei, President Renuka Jindal, accompanied by SRC-AP Chair, Xing Zhou, visited 3 chapters in China. On May 29th, Professors Jindal and Zhou arrived in Shanghai and joined the lunch hosted by the Shanghai

Chapter Chair, Prof. Yu-Long Jiang and its founding chair, Prof. Bing-Zhong Li at Fudan University, followed by a meeting with the chapter executives, members and students. Prof. Jindal briefed the attendees on the EDS mission and Society initia-

tives, as well as listened to reports and requests from chapter executives. The meeting gave first-hand information on the real needs of our local chapters and members, such as more publicity on EDS through online portals and networking, and



ED Shanghai Chapter visit: Prof. Renuka Jindal and Prof. Xing Zhou (in the middle) with Chapter Chair Prof. Yu-Long Jiang (4th left) and chapter founding chair Prof. Bing-Zhong Li (4th right) and students from Fudan University



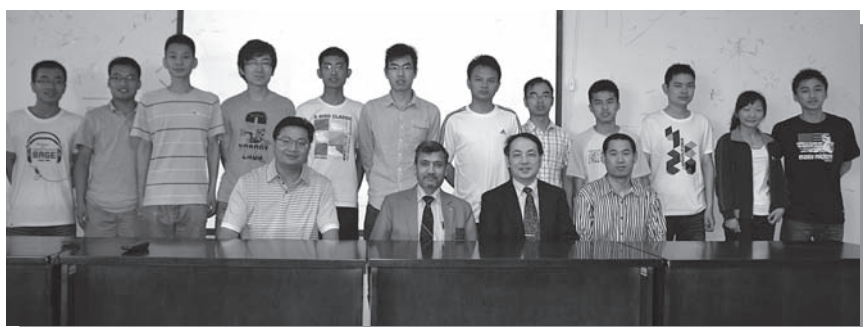
President Jindal with Shanghai Chapter Chair, Prof. Yu-Long Jiang (right), at Fudan University



Nanjing Chapter visit: (front, from 2nd left) Prof. Weifeng Sun, Prof. Xing Zhou, Prof. Renuka Jindal, and Prof. Hong Yu, with students from Southeast University



President Jindal and Prof. Zhou with Nanjing Chapter Chair, Prof. Qing-An Huang (2nd right) and Prof. Weifeng Sun (right)



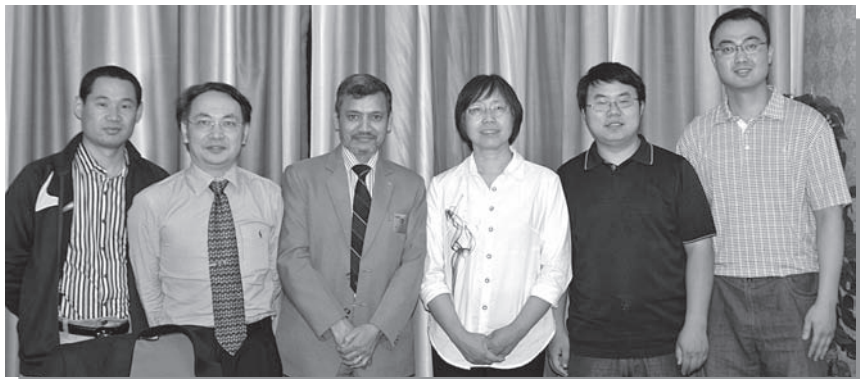
Hangzhou chapter visit: (front from left) Prof. Wenjun Li, Prof. Renuka Jindal, Prof. Xing Zhou, and Prof. Haipeng Zhang, with students from Hangzhou Dianzi University

more higher-visible events to promote awareness and interest in joining EDS activities.

After the Shanghai Chapter visit, Prof. Jindal and Prof. Zhou headed to Nanjing by high-speed train, to be greeted by Prof. Weifeng Sun and a warm welcome dinner by the Nanjing Chapter Chair, Prof. An-Qing Huang at Southeast University. The next day, Prof. Jindal gave a DL talk at Southeast University, entitled "From Millibits to Terabits per Second and Beyond – Over 60 Years of Innovation." It was attended by an enthusiastic audience with many heated questions. Prof. Hong Yu and Prof. Weifeng Sun also introduced the chapter activities and plans.

Upon finishing the Nanjing Chapter visit, Prof. Jindal and Prof. Zhou travelled to Hangzhou on the same day, where they received a warm welcome at a dinner hosted by the Hangzhou Chapter Chair and Vice President of Hangzhou Dianzi University, Prof. Ling-Ling Sun. Also attending the dinner were the Assistant Dean of Electronics & Information College, Prof. Zhidong Zhao, and Chapter Executive, Prof. Haipeng Zhang. On the morning of June 1st, Prof. Jindal gave his DL talk and spoke about the EDS to the attending students.

The short visits by the EDS President to 3 chapters in China, although very compact, were very fruitful in understanding the real needs from



President Jindal and Prof. Zhou with Hangzhou Chapter Chair, Prof. Ling-Ling Sun (3rd right), Prof. Zhidong Zhao (2nd right), and Prof. Haipeng Zhang (left)

the “ground.” Follow-up actions will be carried out, such as access to journals from home and more DVD based products due to limited or poor internet access. We will continue to keep our chapters informed of further developments in member benefits as they are released.

*Xing Zhou
Chair EDS SRC-AP
Nanyang Technological University
Singapore*

EDS DISTINGUISHED LECTURERS CONTINUE OUTREACH EFFORTS IN NORTHEAST INDIA

Various EDS Distinguished Lecturer symposium, workshops and seminars were organized in Northeast India and were co-sponsored by local universities. The events were planned by the IEEE Calcutta Section, EDS & Photonics societies and Tokyo Institute of Technology (TIT), Japan, with Professors. H. Iwai and C.K. Sarkar serving as DLs. Most of the events were held in remote border-states, like the mountain areas near China and Myanmar. Even though these areas required special entrance permission, many young students and faculties in the outreach regions attended. Details and photos of the very successful events follow and all provided the oppor-

tunity to communicate with those regions.

On April 7, 2011, the “One Day National Workshop on Electronic Devices” was held at Mizoram University (MU), Aizawl, Mizoram. Professors A. K. Agarwal, R. P. Tiwari, Thangchungnunga, and

L. Loit Kumar Singh of MU gave inauguration, welcome and closing speeches.

On April 9, 2011, the “One Day Seminar on Nanoelectronics/VLSI” was held at North Eastern Regional Institute of Science & Technology (NERIST), Nirjuli, Arunachal



Attendees of the “One day National Workshop on Electronic Devices” at Mizoram University, Mizoram



Attendees of the “One day Seminar on Nanoelectronics/VLSI” at NERIST in Arunachal Pradesh



ISDMISC 2011 held at Sikkim Manipal Institute of Technology in Sikkim



Attendees of the Seminar on Nano CMOS was given at Calcutta University, Kolkata, West Bengal

Pradesh. Professors M.D. Anwar Hussan, P. K. Das, and R. Subadal gave the inauguration, welcome and closing speeches.

On April 12–14, 2011, the “International Symposium on Device MEMS Intelligent Systems Communications” (ISDMISC) was held at Sikkim Manipal Institute of Technology, Majhitar, Sikkim. Professors P. C. Paradhan, B. C. Dandapat, C. T. Singh, and Prof. M. P. Lama of Sikkim University gave the inauguration, welcome and closing speeches.

On April 14th, the Seminar on Nano CMOS was given at Calcutta University, Kolkata, West Bengal. Professors D. Chattopadhyay, S. Sen, S. Dahar, D. Guha, and G. Ghosh attended the seminar with students and faculty.

*H. Iwai
IEEE Division I Director
Tokyo Institute of Technology
Yokohama, Japan*

*C. K. Sarkar
EDS Calcutta Chapter Chair
Jadavpur University
Kolkata, India*

IEEE EDS DISTINGUISHED LECTURER VISITS THE NATIONAL TSING-HUA UNIVERSITY STUDENT CHAPTER IN TAIWAN

On June 20, 2011, Prof. Juin J. Liou from the University of Central Florida visited the Department of Electrical Engineering at National Tsing Hua University (Hsinchu) and delivered an EDS Distinguished Lecture on “Outlook and Challenges in Electrostatic Discharge (ESD) Protection of Modern and Future Integrated Circuits.” Prof. Liu introduced an overview of the ESD sources, models, protection schemes, and testing method. As the technology changes rapidly, the size of the semiconductor devices has crossed into the deep-submicron regime. Shrinking device size improves the performance and complexity of Integrated Circuit (IC) and reduces the cost in



(Left of the EDS flag) Jui-Min Kuo (NTHU Student Chapter Chair), Prof. Chih-Fang Huang (Advisor to the NTHU Student Chapter), Prof. Juin J. Liou (Speaker), and Prof. S. H. Hsu (NTHU), with student members

manufacturing. But at the same time, the ESD robustness of the devices will also be degraded and the protection

is becoming more challenging. In this talk, Prof. Liu explained possible ESD events, equipments to stimulate and

measure ESD damages to the devices and ICs, approaches to design and realize protection solutions, and the future trends and challenges. This lecture was sponsored by the IEEE Elec-

tron Devices Society Student Chapter at NTHU. The talk was attended by more than 20 participants, including students and professors from local universities.

Jui-Min Kuo
EDS NTHU Student
Chapter Chair
National Tsing Hua University
Hsinchu, Taiwan

EDS DISTINGUISHED LECTURER VISITS THE ED XI'AN CHAPTER

Prof. Jian H. Zhao from Rutgers University, USA, visited the ED Xi'an Chapter, June 16–19, 2011. He delivered a Distinguished Lecture on June 17th, entitled “SiC Power Electronic Devices: The Second Electronics Revolution?” at Xidian University, Xi'an, China. There were more than 200 attendees of local professionals and graduate students from Xi'an University of Technology and Xidian University. It was an excellent lecture that introduced the unique property of SiC, the development history of SiC power devices, including the first 4H-SiC BJT, the first SiC normally-off VJFET, and the first SiC power IC reported by SiCLAB of Rutgers University, and the widespread potential applications. His talk received great interest and was highly appreciated. After the lecture, Prof. Zhao answered a lot



Prof. Jian H. Zhao, EDS Distinguished Lecturer at Xidian University

of valuable questions. During his visit, Prof. Zhao met with Prof. Yue Hao and Prof. Yintang Yang, vice presidents of Xidian University. He also visited the Laboratory of Wide Band Gap Semiconductor Technology of Xidian University and

discussed possibilities for further cooperation.

Yimen Zhang
ED Xi'an Chapter Chair
Xidian University
Xi'an, China

EDS DISTINGUISHED LECTURER VISITS THE ED/AP/MTT/SSC PENANG CHAPTER

The chapter was delighted to have Professor Juin J. Liou from the University of Central Florida visit and provide a Distinguished Lecture, titled “Outlook and Challenges in Electrostatic Discharge (ESD) Protection of Modern and Future In-

tegrated Circuits,” on June 27th. Professor Liou is an EDS Distinguished Lecturer and Fellow of IEEE. This lecture attracted 20 engineers and professionals from the semiconductor industry and local colleges in Penang.

Professor Liou provided a very systematic and well structured discussion through the introduction of fundamentals of ESD to practical aspect of ESD protection circuit in addressing the challenges of continuous scaling of technology. Among



Attendees of the DL with Dr. Juin Liou

the topics covered included basic ESD protection devices, ideal ESD protection circuit design principles, ESD circuit characterization and ESD standard test methodology.

Professor Liou highlighted ESD cost impact to the semiconductor industry and the possibility of ESD be-

ing the possible roadblock of emerging technology. It was also noted that ESD protection circuit design was unique due to a different requirement of the application of Integrated Circuit technology used and design functionality consideration. This fact was clearly appreciated by

the audience through the sharing of the Professor's work in the ESD circuit design of Data Communication Transceiver IC, which needed to address the challenges of IO pins with wide range of operating voltage from negative to positive, high trigger voltage of supply pin at the same time need to provide strong level of ESD protection with low leakage current. Another example of low voltage RF IC was also shared to provide a different flavor of diode and DTSCR application in low voltage design.

The lecture was well received with a high level of interactive questions and answers, which demonstrated the strong interest of the audience.

Boon Leng Lim
ED/AP/MTT/SSC Penang
Chapter Chair
Altera Corporation
Penang, Malaysia

REPORT ON THE IEEE EDS MINI-COLLOQUIUM HELD IN MONTREAL, CANADA

On April 29, 2011, the ED Montreal Chapter organized a mini-colloquium, an event co-sponsored by the IEEE Electron Devices Society, the Department of Electrical and Computer Engineering at Concordia University and the university's Mobilizing Knowledge Program. The theme of the conference was mainly related to nano/photonic devices. Nine speakers including five IEEE Distinguished Lecturers presented their talks. The session started at 8:30 a.m. in the faculty of Engineering and Computer Science at Concordia University, with Dr. Kahrizi (Chair of the ED Montreal Chapter) introducing the speakers and sharing the day's plan and agenda. Dr. W. Lynch, Chair of Concordia's ECE Department, welcomed the audience. The program included the following speakers and topics:

- Dr. M. Meyyappan (NASA), "*Nanotechnology: Development of Practical Systems and Applications*;"
- Dr. D. Misra (New Jersey Institute of Technology), "*High-k Dielectrics on High-Mobility Substrates*;"
- Dr. K. Karim (Waterloo University), "*Photon Counting with Amorphous Photoconductors*;"
- Dr. A.W. Skorek (University of Quebec in Trois-Rivieres), "*High Performance Computing in Nanoelectronics*;"





- Dr. J. J. Liou (University of Central Florida), "Outlook and Challenge in Electrostatic Discharge; Protection of Modern and Future Integrated Circuits;"
- Dr. A. R. Hajiaboli (McGill University), "Plasmonics Nanostructures Made of Nitzschia Palea Diatoms."

Three Ph.D. students from the ECE Department at Concordia also presented talks related to their theses projects.



About 50 people mostly IEEE members from various institutes and industries in the Montreal area, attended the MQ. Lunch and refreshments were provided for all the attendees, with the session adjourning at 4:30 p.m. Afterwards, the

delegates joined a mini banquet at a downtown Montreal restaurant.

*Mojtaba Kahrizi
ED Montreal Chapter Chair
Concordia University
Montreal, Quebec, Canada*

EDS DISTINGUISHED LECTURERS PARTICIPATE IN THE 29TH WIMNACT HELD IN HSINCHU, TAIWAN

The 29th WIMNACT was held in conjunction with the EDS Spring AdCom Meeting Series, located for the first time in Taipei. The mini-colloquium was held at the National Chiao Tung University in Hsinchu, May 27th, followed by the EDS AdCom Meetings at the Grand Hotel Taipei, May 28–29, 2011.

The MQ was sponsored by the EDS Distinguished Lecturer Program and organized by the ED Taipei Chapter, along with the assistance of two local student branch chapter advisors, and co-sponsored by National Chiao Tung University, Taiwan.

This event was the 29th WIMNACT in its series since its 2002 inaugura-

tion. It was conducted mainly by inviting EDS Distinguished Lecturers to deliver talks in their expertise area and also for the purpose of advertising EDS activities, to promote membership in the Society. This one-day workshop not only covered technical talks, but also provided social functions for our EDS members, non-members,



EDS DL speakers and attendees at the May 27th WIMNACT in Hsinchu



EDS President's forum with local academia and industry leaders from Taiwan

professors and graduate students. Key research engineers also attended, coming from the labs of NDL and ITRI, as well as the Science Park in Hsinchu. The workshop was well attended, with 170 registered participants from Taiwan and 8 EDS Chapter Chairs from the Asia-Pacific Region.

The colloquium began with a welcome by Steve Chung, organizer and Chair of the ED Taipei Chapter, who reported on some of the activities that are provided to the members in the EDS Asia-Pacific Region. Steve was followed by a discussion led by Renuka Jindal, EDS President. Renuka emphasized the importance of why people needed to join the Society, stating that most members regard joining IEEE and EDS as part of their career development. In becoming an EDS member, he (she) has the opportunity to serve the people in the EDS technical areas and to communicate with people in their common fields of interest.

More than 7 EDS Distinguished Lecturers were invited to the mini-

colloquium, which was divided into morning and afternoon sessions. The first three speakers in the program were: Cor Claeys (IMEC), "Potential and Research Challenges for Emerging CMOS Device Technologies;" Hiroshi Iwai (Tokyo Institute of Technology), "Future of Nano-CMOS Technology;" and Paul Yu (UCSD), "High Power Photodiode for Analog Optical Link." The afternoon session featured: Meyya Meyyappan (NASA Nanotechnology Center), "Nanotechnology in Electronics, Sensing and Instrumentation;" Mansun Chan (Hong Kong University of Science and Technology), "Vertically Stacked Nanowire CMOS Technology;" Juin J. Liou (Central University of Florida), "Outlook and Challenges in Electrostatic Discharge (ESD) Protection of Modern and Future Integrated Circuits;" and Xing Zhou (Nanyang Technological University), "Unification of MOS Compact Models with the Unified Regional Modeling Approach."

A special President's Forum luncheon was arranged to allow EDS President Renuka Jindal, President-Elect Paul Yu, and Jr. Past-President Cor Claeys, discuss possible ways EDS can better serve its members in the region, from both an academic as well as an industry perspective, especially for the corporate attendees. Renuka addressed that EDS is trying to provide more services to its members with online courses and by offering reduced registration fees to attend conferences, as a benefit of being an EDS member.

The MQ concluded with tokens of appreciation presented by Steve Chung to each of the invited speakers. One high note of this workshop, as a result of EDS membership promotion, was the addition of 15 new regular and student members!

*Steve Chung
ED Taipei Chapter Chair
National Chiao Tung University
Hsinchu, Taiwan*

EDS SENIOR MEMBER PROGRAM



*Albert Wang
EDS Vice-President
of Membership*

The Electron Devices Society established the EDS Senior Member Program to both complement and enhance the IEEE's Nominate-a-Senior-Member Initiative and make IEEE/

EDS members aware of the opportunity and encourage them to elevate their IEEE membership grade to Senior Member. This is the highest IEEE grade for which an individual can apply and is the first step to becoming a Fellow of IEEE. If you have been in professional practice for 10 years, you may be eligible for Senior Membership.

New Senior Members receive an engraved wood and bronze plaque and a credit certificate for US\$25 to be used towards a new IEEE society membership. Upon your request, the IEEE Admission & Advancement Department will send a letter to your employer recognizing this new status as well. The URL to request this letter is <http://www.ieee.org/web/>

membership/senior-members/notification.html.

As part of the IEEE's Nominate-a-Senior-Member Initiative, the nominating entity designated on the member's application form will receive US\$10 from IEEE for each application approved for Senior Member grade when there are at least five approved applications. As an EDS member, we would appreciate it if you could indicate on your Senior Member application form that EDS is your nominating entity.

Please be aware that even if you decide to list EDS as your nominating entity, you still need to have an

IEEE member nominate you along with two other references. Your nominator and your references all must be active IEEE members holding Senior Member, Fellow or Honorary Member grade.

For more information concerning Senior Membership, please visit http://www.ieee.org/membership_services/membership/senior/index.html. To apply for Senior Member grade, please complete an application form, which is available at http://www.ieee.org/membership_services/membership/senior/senior_application.html. You can also request a hard copy Senior Member packet via

mail or fax by contacting IEEE Admission and Advancement Department, 445 Hoes Lane, Piscataway, NJ 08854-1331, USA, Fax: +1 732 562 6528, E-mail: senior-member@ieee.org.

We strongly encourage you to apply for IEEE Senior Membership to enhance your career. At the same time, you'll be helping EDS.

Thank you for supporting IEEE and EDS.

Albert Wang
EDS Vice-President of Membership
University of California
Riverside, CA, USA

ON-LINE ACCESS TO IEEE JOURNALS AVAILABLE TO EDS MEMBERS

As an EDS member, you have FREE on-line access to the full articles of the following publications:

- **NEW, Journal of Photovoltaics**
- **Electron Device Letters** (All Issues From 1980 through current)
- **Transactions on Electron Devices** (All Issues From 1954 through current)
- **International Electron Devices Meeting** (All Digests From 1955 through current)
- **EDS Newsletter**
- **Journal of Lightwave Technology**

These publications can be viewed through the on-line delivery system, IEEE Xplore, which provides EDS members with the following benefits/capabilities:

- Online access to their IEEE personal subscriptions
- Full-text PDF image files for content, including all original charts, graphics, diagrams, photographs and illustrative material, from an

integrated-circuit schematic to a topographic map to a photograph of a new crystalline structure

- Full-text search allows you to search metadata fields and the associated full-text journal/transaction
- Links to references and cross linking between EDS publications and other IEEE publications is available in articles
- CrossRef search offers outbound links to publications by other leading publishers, employing the google search engine
- Online version available prior to the print equivalent
- Free and unlimited access to abstract/citation records
- Unlimited printing of bibliographic records and full-text documents
- Includes cover to cover material starting (starting in 2004) i.e., letters to editor, editorial boards, call for papers

To use the *Xplore* system, you must establish an IEEE Web Account. This account is also used for renewing your IEEE membership on-line. If you need to establish an IEEE Web Account, please visit www.ieee.org/web/accounts/. IEEE members can go to the *Xplore* site through the URL www.ieeeexplore.ieee.org. We encourage all members of the Society to use this dynamic system and leverage their membership benefits to the fullest extent.

Furthermore, an EDS member has on-line access to *QuestEDS* questions asked by EDS members and corresponding answers by experts in the field. Please visit www.ieee.org/go/questeds.

Samar K. Saha
EDS Vice-President of Publications
University of Colorado
Colorado Springs, CO, USA

REGIONAL AND CHAPTER NEWS

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

ED Mid-Hudson Valley

—by Fernando Guarín

On Friday June 17, 2011, the ED Mid-Hudson Valley, New York Chapter hosted Professor Dr. Souvik Mahapatra from the Department of Electrical Engineering, IIT Bombay. Dr. Mahapatra delivered a talk entitled “*Characterization and Modeling of NBTI Stress, Recovery, Material Dependence and AC Degradation Using R-D Framework*,” explaining how the empirical signatures of NBTI degradation are remarkably consistent across different industry and academic sources. It is the theoretical understanding of the degradation phenomena necessary for lifetime projection that remains a topic of active debate. The Reaction-Diffusion (R-D) model of interface trap generation (DNIT), originally proposed more than 30 years ago and later interpreted for modern contexts has been invoked to explain DC stress and AC frequency independence. However, it was suggested that R-D cannot explain NBTI recovery transient and the shape of AC duty cycle dependence. This apparent *failure* of R-D framework has inspired a plethora of new “well-based” models. However, none of the existing models have been used so far to consistently explain 3 practical features useful for qualification of NBTI: (a) long time degradation under DC stress, (b) AC degradation versus pulse frequency, and (c) AC degradation versus pulse duty cycle. In addition, any model should also

be able to successfully explain (d) strong gate insulator process dependence of NBTI and (e) NBTI recovery transients. The work Dr. Mahapatra presented re-evaluated the R-D framework in capturing (a)-(e), and compared key results from other models.

On Wednesday June 29, 2011, Professor Samuel Sia from the Bio-medical Engineering Department at Columbia University visited our EDS Chapter and delivered an engaging talk titled “*Microfluidics for global health diagnostics*.” He showed how Lab-on-a-chip (LOC) devices have a tremendous potential for improving the health of people in developing countries by providing immediate diagnosis in the field. The development of diagnostics for global health, however, presents unique and challenging design criteria. He presented his lab’s current efforts, in conjunction with partners in industry, public health, and local governments, to develop new rapid diagnostic tests. He showed how the tests they have developed span a variety of technologies, and target HIV, sexually transmitted diseases, and other infectious diseases.

2011 ISDRS

—by Zeynep Dilli

The International Semiconductor Device Research Symposium is a biennial conference on exploratory research in electronic and photonic materials and devices. This year’s symposium will be held in College Park, Maryland, December 7–9th. Bringing together diverse participants, the Symposium encourages multidisciplinary scientific and personal interaction for engineers, scientists and students in the fields of advanced electronic materials, and device and fabrication technologies. The subject areas include high and



Photo Credit: University of Maryland

low power electronics, SiGe and germanium devices, optoelectronics, organic materials and devices, photovoltaics, sensors, testing and characterization, high frequency devices, nanotubes and graphene, device modeling and simulation, and related fields. ISDRS 2009 was attended by over 350 participants from all across the world, with three plenary talks, 175 invited and contributed oral presentations, and 140 poster presentations.

The Symposium will feature plenary talks and an award ceremony. The Aldert van der Ziel Award is given at the ISDRS for distinguished educational and research contributions to the field of electronic devices and materials. Past winners include Arthur Milnes, Lester Eastman, Herbert Kroemer, Michael Shur, Marvin White, Jim Plummer, and Ben Streetman. Awards are also given to the best student poster and oral presentations. Selected full papers from those submitted at the conference are peer-reviewed and published in a special issue of Solid State Electronics.

The 2011 ISDRS will be held December 7–9, at the Stamp Student Union of the University of Maryland, College Park, at the heart of the 150-year old institution within the Washington DC Metropolitan Area. The Student Union

is easily accessible by the DC Metro System, with a short ride on one of the University's frequent shuttles to the College Park Metro Station. This provides a convenient opportunity for attendees of IEDM 2011, held December 5–7th, near Dupont Circle in Washington, DC, to subsequently attend ISDRS 2011.

More information can be found at <http://www.ece.umd.edu/isdrs2011>.

~**Fernando Guarín, Editor**

ED Boise

–by *Vishwanath Bhat*

WMED 2011 was held at the Boise State Student Union on April 22nd. This is the ninth workshop organized by the ED Boise Chapter. This year the workshop attracted more than 220 engineers, faculty and students from all over Idaho and neighboring states for a day of engaging discussions, professional networking and inspiration. Cutting-edge industry and academic research in areas ranging from LED and Nano technologies to Emerging Memories and Advanced Circuit Design were presented by leading researchers from across the country. Record participation in this year's workshop shows the growing interest of the scientific and engineering community.

This year the workshop had five invited speakers. Key note speaker

Prof. Michael N. Kozicki from Adesto Technologies addressed the challenges faced by traditional memory technologies and discussed in detail on new memory technology such as ionic memory. Prof. E. Fred Schubert from RPI presented promises and challenges in LED for lighting applications. An interesting talk on bisensing technology using silicon nanowires was presented by Prof. Mark A. Reed from Yale University. Two parallel tutorials were also held during the Workshop. Prof. Suman Data from Penn State talked on the topic of advanced CMOS transistor technology and Bryan Casper from Intel Circuit Research Labs discussed energy efficient circuit and system design techniques. In addition, engineers and university students from around the country presented their work during the two contributed paper sessions and the poster session. The workshop also offered a unique program to local high school students from around the Treasure Valley. About 40 high school students participated in this year's high school program.

Recipients of the WMED student Travel award, best paper and best poster awards were: Ahmed Abdelnaby of University of Idaho, who won the student travel award; Paolo Fantini of Micron Technology, winner of the best paper award for the

Process section; and Feng (Dan) Lin of Micron Technology, won best paper for the Circuits section. The Best poster award went to Peter Osheroff of Washington State University.

The workshop is receiving technical co-sponsorship support from the IEEE EDS and the Micron Foundation. Other sponsors of the workshop are the IEEE Boise Section and the Boise State University College of Engineering. The WMED-2012 will be held on April 20, 2012, at the Boise State Student Union. Please visit the website for further details: <http://www.ewh.ieee.org/r6/boise/wmed2012/WMED2012.html>.

2012 ISTDM

–by *Tsu-Jae King Liu*
and *Steve Koester*

We invite you to participate in the 6th International Silicon-Germanium Technology and Device Meeting (2012 ISTDM) to be held June 4–6, 2012, in Berkeley, California. Researchers and students all over the world are drawn to the University of California at Berkeley by its reputation as a pre-eminent research and teaching institution and its proximity to Silicon Valley, as well as the beautiful Bay Area weather. Your participation will add to the vibrant atmosphere of intellectual exchange at the frontier of knowledge, in a collegial environment.

Silicon-germanium (SiGe) has enabled key advancements in silicon-based microelectronics technology, including heterojunction bipolar transistors (HBTs) for RF communication and strained metal-oxide-semiconductor field-effect transistors (MOSFETs) for high-performance digital



The Workshop Management Committee (from left to right): Jaydeb Goswami (Publications Chair), Shyam Surthi (Advisor), Prashant Raghu (Technical Program Chair), Tim Hollis (Publicity and Program Chair), David Wells (Registration Chair), Vishwanath Bhat (General Chair), Steve Groothuis (Advisor), Professor Kozicki, Professor Schubert, Archana Nanjundarao (Webmaster), and Aparna Limaye (High School Program Chair). Not shown: Huy Le (Finance Chair)



computing, and will enable more energy-efficient electronic devices in the future. The ISTDM provides a forum for researchers to present their latest results on emerging/new SiGe technology, devices, circuits, and applications. The conference will comprise invited sessions, regular oral presentations in parallel sessions, and lively poster and panel sessions. For further information and Call for Papers, please see the ISTDM 2012 conference website: <http://nanolab.berkeley.edu/istdm2012>.

ED Phoenix

—by *Steve Rockwell*



*Stephen Goodnick
Arizona State
University*

The IEEE Waves and Devices Phoenix Chapter was pleased to host several meetings with Professor Stephen Goodnick, from Arizona State University, on May 2, 2011, to give a seminar entitled, “Modeling and Simulation of Submillimeter Wave Semiconductor Devices.” Professor Goodnick served ASU in many capacities including as Chair of the Electrical Engineering Department from 1996 to 2005, Deputy Dean for the Ira A. Fulton School of Engineering during 2005–2006, Associate Vice President for Research from 2006–2008, and currently is Deputy Director of the ASU Lightworks initiative. He is also currently President-Elect of the IEEE Nanotechnology Council and President of the IEEE-Eta Kappa Nu student honor society. Some of his main contributions include analysis of surface roughness at the Si/SiO₂ interface, Monte Carlo simulation of ultrafast carrier relaxation in quantum confined systems, global modeling of high frequency devices, full-band simulation of semiconductor devices, transport in nanostructures, and fabrication and characterization of nanoscale semiconductor devices. He has published over 200 refereed journal ar-

ticles, books and book chapters and is a Fellow of IEEE.

Professor Goodnick’s seminar focused on research and development in the exploitation sub-millimeter waves (300 GHz to 10 THz) which has undergone impressive growth during the last decade, due to the potential technological uses of the TeraHertz (THz) portion of the spectrum, with its unique location between the microwave (i.e. electronic) domain and the optical one. Important applications in the THz band include atmospheric science, bio-detection and imaging, THz spectroscopy, threat detection and broadband communications. He discussed microscopic modeling of high frequency III-V and nitride based HEMTs, in order to understand the fundamental physical barriers to THz operation, and how to improve present state of the art technology. The challenge to date has been the lack of solid state devices which operate effectively in this regime, which has historically been too high for electronic devices, and too long-wavelength for photonic devices. This ‘THz gap’ is being closed from both sides with long wavelength optical sources operating below 10 THz, and the advent of electronic devices capable of operation at frequencies above 1 THz. In particular, the frequency response of devices such as HEMTs (high electron mobility transistors) is ultimately limited by the carrier transit time across the active device region, which decreases with decreasing dimensions (along with parasitic capacitances), resulting in THz regime operation for nanoscale gate length devices.

UGIM 2012

—by *Katalin Voros*

The 19th Biennial UGIM University/Government/Industry, Micro/Nano Symposium (UGIM) will be held July 9–10, 2012, on the campus of the University of California at Berkeley. The goal of this symposium is to bring together educators and researchers involved in micro/



University of California, Berkeley

nanofabrication research laboratory development and management around the world and to provide a forum for exchanging information and presenting new research and educational concepts.

Representatives of university micro/nano fabrication facilities, ranging from small to large labs to nationally recognized facilities, present their know-how and participate in open discussions exchanging useful and workable ideas concerning all aspects of teaching and research laboratory management. Government agencies such as NSF, NIH, NIST, SEMATECH, SRC, DoD and ONR regularly participate with updates on research policy and funding opportunities. Industry interactions with universities, including technology transfer, collaborative research, and training efforts are frequently presented.

Panel topics of discussions will include: Facilities and Equipment Management; Financial Management; Command, Control, Communications, and Community; University and Public Relations; Expanding Laboratory Demands; Planning and Development. For further details, please see the Call for Papers at the UGIM 2012 website, <http://micro-lab2.eecs.berkeley.edu/UGIM2012/>.

During the 2-day event, participants will have the opportunity to tour Berkeley’s new Marvell Nanofabrication Laboratory, the Molecular Foundry of the Lawrence Berkeley National Laboratory, and have an optional visit to the Stanford Nanofabrication Facility. The date of the UGIM 2012 symposium, July 9–10, allows participants to attend Semicon West, July 10–12 in San Francisco.

—*Adam L. Conway, Editor*

2011 ICNF

The IEEE EDS sponsored 21st International Conference on Noise and Fluctuations (ICNF 2011) was held in Toronto, Canada July 12–16, 2011. This biennial conference has the lofty goal of bringing together specialists in noise and fluctuation phenomena from different fields in science and engineering who can address both fundamental and applied issues. It is the premier international conference on noise and fluctuations.

The conference's scientific program was carefully assembled, after a two-step rigorous peer-review of submitted abstracts and full-length manuscripts, to reflect the latest developments in this important field of noise and fluctuations. Two plenary talks and seventeen invited presentations, plus numerous oral and poster contributions, from distinguished researchers and talented students around the globe were presented. A workshop with tutorials on selected topics on noise in devices was also included on the first day.

For the first time, this conference was being held in Toronto, Canada - one of the diverse cities in the world and Canada's most cosmopolitan city with cultures and cuisines from around the globe. The conference attendees enjoyed the technical program as well as many of the cultural



IEEE Fellow and Chair of the Electronics and Photonics Division, Prof. Yue Kuo, who presented the award to Prof. Deen (middle) and Imran Deen

and touristic attractions of Toronto and its surroundings.

The Conference General Chair, Prof. Jamal Deen, an active EDS member and IEEE Fellow wrote, as co-editor with Prof. C.H. Chen of the Conference Proceedings that *"at present, noise and fluctuations are becoming increasingly important in science and technology. This is witnessed by the growing number of publications in this field that appear in leading journals in engineering and science. Also, many researchers now recognize the importance of fluctuations in new areas of human knowledge including business, finance and biological systems. Fluctuations and noise are also important in defining the ultimate miniaturization limits of devices for information storage and processing. The research results that were presented at ICNF 2011 clearly*

show how noise research can help in determining the fundamental properties of new materials, confirming theoretical conjectures, helping develop devices with improved performance, estimate material and device reliability, and making progress in the understanding of biological, social and financial systems."

Electrochemical Society's Award for Prof. Jamal Deen

Canadian IEEE Fellow Prof. Jamal Deen received the Electrochemical Society's 2011 Electronics and Photonics Award. The award citation recognizes Prof. Deen for his "pioneering contributions to noise and physics-based modeling of semiconductor devices and innovations in experiments."

Prof. Deen was presented with the award at the Electronics and Photonics Division Award Reception on Sunday, May 1st at the 219th Meeting of the Electrochemical Society in Montreal, Canada. The EPD Award was established in 1968 to encourage excellence and outstanding technical contributions in the fields of electronics and photonics research and science. Prof. Deen becomes the first Canadian to win both the Electronics and Photonics Division and the Dielectric Science and Technology Division award (2002) from the Electrochemical Society.

~Paymen Servati, Editor



Several of the conference organizers, volunteers and plenary speakers who all received plaques in appreciation of their professional contributions to ICNF 2011

EUROPE, MIDDLE EAST & AFRICA (REGION 8)

MIXDES 2011

*18th International Conference
"Mixed Design of Integrated Circuits
and Systems" - MIXDES 2011*

On June 16–18, 2011, Gliwice, Poland, the annual International Conference MIXDES 2011 took place. The event was organized by the Technical University of Lodz, together with the Silesian University of Technology. The conference was co-sponsored by the IEEE ED/CAS Poland Chapter and the Polish Academy of Sciences, Committee of Electronics and Telecommunication, Section of Microelectronics and Sections of Signals and Electronic Circuits and Systems.

In addition to the regular program, four special sessions were organized:

- *"Biomedical Engineering,"* organized by Prof. Ewa Piętko (Silesian University of Technology, Poland);
- *"Compact Modelling for Diagnostics and Design of Nanoscaled Analog ICs,"* organized by Dr. Władysław Grabinski (GMC Suisse, Switzerland) and Dr. Daniel Tomaszewski (Institute of Electron Technology, Poland);

- *"VESTIC: New VLSI Technology, Devices and Circuits,"* organized by Prof. Wiesław Kuźmich (Warsaw University of Technology, Poland);
- *"xTCA for Instrumentation,"* organized by Dr. Stefan Simrock (DESY, Germany) and Dr. Dariusz Makowski (Technical University of Łódź, Poland).

The conference was attended by over 150 scientists coming from 24 countries all over the world. During the conference four invited papers and 126 regular papers were presented at oral, poster, and special sessions.

The following invited keynote presentations included two EDS Distinguished Lecturers and were given by:

- *"Design and Technology of High-Power Silicon Devices,"* J. Vobecký (Czech Tech. Univ. Prague, Czech Republic)
- *"NeoSilicon Based Nanoelectromechanical Information Devices,"* S. Oda (Tokyo Inst. of Techn., Japan) – IEEE EDS Distinguished Lecturer
- *"Technology Challenges in Silicon Devices Beyond the 16 nm Node,"* M. Östling (Royal Inst. of Techn., Sweden) – IEEE EDS Distinguished Lecturer.

Based on evaluation of the quality of the papers and presentations, thirteen of the papers received the

Best Paper Award. Additionally, the paper entitled *"Hall Effect Sensors Performance Investigation Using Three-Dimensional Simulations"* (Maria-Alexandra Paun, Jean-Michel Sallese and Maher Kayal – EPFL, Switzerland) received the IEEE ED Poland Chapter Special Award from the Chapter Chairman.

The MIXDES 2012 Conference will take place in Warsaw. The Preliminary Call for Papers is available at <http://www.mixdes.org/downloads/call2012.pdf>. More information about the past and next MIXDES Conferences can be found at <http://www.mixdes.org>.

ED Poland

–by Mariusz Orlikowski

On June 16, 2011, Gliwice, Poland, a meeting was held, jointly organized by the ED Poland Chapter and the Polish Academy of Science, Section of Microelectronics, Committee on Electronics and Telecommunication.



Prof. E. Hryniewicz giving his presentation on June 16th



Participants of the 2011 MIXDES Conference

The meeting began with a presentation by Prof. Edward Hryniewicz, from the Silesian University of Technology, entitled "Logic Function Decomposition in Reed-Muller Spectral Domain." Taking the opportunity, the areas of interest and research of the Institute of Electronics (Silesian University of Technology) was also presented.

~Zygmunt Ciota, Editor

CAS/ED Switzerland

The CAS/ED Switzerland Chapter organized the Workshop on Imaging and Vision Sensors (<http://sivs2011.org/>), September 8, 2011.

Photonics devices, image sensors, and vision sensors are used in a host of applications in science and technology and are rapidly evolving. This one-day workshop brings together Swiss developers in industry and academia cover a broad range of cutting edge technologies ranging over single-photon sensors, 3d time-of-flight sensors, wide-dynamic range sensors, bio-inspired vision sensors, high speed sensors, advanced image processing, and application areas in machine vision. Live demonstrations showed how these worked and how they can be applied.

~Jan Vobecky, Editor

ASIA & PACIFIC (REGION 10)

ED Xi'an

~by Yimen Zhang

Prof. Sima Dimitrijevic, from Griffith University, Australia, visited the ED Xi'an Chapter, April. 27-29, 2011. He delivered a distinguished lecture on April 28th entitled, "3C-SiC on Silicon and its Applications," at Xidian University, Xi'an, China. The DL talk was attended by about 30 local professionals and students. This was an excellent lecture that included the progress in 3C-SiC on 150-mm and 200-mm Si wafers, the characteristics of



(first row, left to right), Prof. Yuming Zhang (Vice Dean of School of Microelectronics) Prof. Sima Dimitrijevic, and Yimen Zhang (Chair of ED Xi'an Chapter)

3C SiC/Si heterojunction, and the applications of 3C-SiC/Si in memories, LED, NEMS/MEMS and Power devices. The most significant contribution focused on the epitaxial growth of 3C-SiC on big diameter silicon wafers of 150 mm and 200 mm with very low interface states and without a buffer layer between 3C-SiC and Silicon. The I-V characteristics of 3C-SiC/Si heterojunction and C-V of MOS capacitor demonstrated the high quality of 3C-SiC/Si. This is an attractive progress. His talk received great interest and was highly appreciated. After the lecture, Prof. Sima answered a lot of valuable questions. Prof. Sima also visited the Wideband gap semiconductor

research Lab of Xidian University and discussed possibilities for further cooperation.

~Mansun Chan, Editor

ED Japan

~by Shin'ichiro Kimura

The 2011 Symposium on VLSI Technology was successfully held in Kyoto, June 14-16, as planned; gathering more than 1,000 attendees (combined number with Symposium on VLSI Circuits' attendees). In the wake of the great disaster in the Tohoku region, there was a serious concern that the number of participants from abroad would drastically decrease. The VLSI executive committee, chaired by Professor Sakurai of the University Tokyo, decided to ask



Dr. Simon Deleonibus, (first row, center) at Tokyo Institute of Technology



2011 IMFEDK Awards Winners

technical sponsors to send a strong support message to the Symposia on VLSI Technology and Circuits. EDS promptly responded to the request and its message was displayed on the front page of the Symposia's web site. This was a great help for us to inform potential attendees that the conference venue, Kyoto, was as usual.

As one of the executive committee members of the Symposia, I would like to extend our appreciation to EDS and Professor Jindal.

Dr. Simon Deleonibus, Chief Scientist & Director of Leti, Grenoble France, visited Tokyo Institute of Technology, Yokohama, Japan on June 17th and delivered an EDS Distinguished Lecture to the audience including those from industries. The title of the lecture was "CMOS Nanoelectronics scaling and Technology Diversifications," which prompted active discussions on the 'More than Moore' roadmap.

ED Kansai

—by Michinori Nishihara

The ED Kansai Chapter held the 9th International Meeting for Future of Electron Devices, Kansai (2011 IMFEDK) at Kansai University Centenary Memorial Hall, Osaka, Japan, May 19–20, 2011, with 135 attendees. The meeting's theme was on

"Nanotechnology and Its Impact on Electron Devices" and began with a tutorial seminar focusing on solar cell technology. The tutorials were given by distinguished lecturers from academia and industry, with the first lecture, "High Efficiency Quantum Dot Solar Cells," by Prof. Yoshitaka Okada, Tokyo University, followed by "Current Status of Solar Power Generation and Future Technology of Solar Cell," by Dr. Tatsuya Takamoto, Sharp Corporation. The formal program began after the tutorial session with opening remarks by Prof. Yoichi Akasaka, encouraging young students studying in the electron device field.

The two-day program featured five keynote speakers: 1) "Structure Analysis of Metal Nanoparticle Catalysts by Environmental Transmission Electron Microscopy," by Seiji

Takeda of Osaka University; 2) "Single Atom Calculation in Silicon," by Kohei M Itoh of Keio University; 3) "Small, Soft, Safe Micromachine For Minimally Invasive Surgery," by Satoshi Konishi of Ritsumeikan University; 4) "The Role of High-Doped Source and Drain on Device Performance in Nano-Scale Si-MOSFETs," by Nobuyuki Sano of the University of Tsukuba; and 5) "Single-Photon Detection by SOI MOSFET," by Hiroshi Inokawa of Shizuoka University.

These talks were well aligned with the meeting theme, covering basic nano process to device application. There was also a special invited session titled, "On-chip Robotics for Biomedical Innovations," by Prof. Fumihito Arai, Nagoya University. It was a fascinating topic to the audience. The two regular technical sessions this year were "Compound Semiconductor Devices and Emerging Devices" and "Silicon Devices and Related." We also held a poster session mainly by students, with 42 posters this year.

At the end of the meeting the following awards were presented to:

- IEEE EDS Kansai Chapter IMFEDK Best Paper Award, to Yoshiaki Yamamoto of Renesas
- IMFEDK Student Award, to Simpei Ogiwara (Osaka University), Tomohiro Higaki (Osaka Institute of Technology), Yasuhiro Kaki-hara (NAIST), Yumi Kawamura (NAIST), and Toshifumi Ota (Osaka University).

IMFEDK will continue to encourage and contribute to our student



IEEE members of the Delhi and Noida region with the EDS President (first row, 4th from left) at Amity University

members in the Kansai area by providing opportunities to present their ideas in English, hence extend their technical network to other Asian countries.

~Kazuo Tsutsui, Editor

ED New Delhi

–by M.K. Radhakrishnan

EDS President, Renuka Jindal, visited IEEE members in the Noida industrial belt near New Delhi, India, during his trip to the South Asia Chapters Meeting at Amity University, Noida on April, 21, 2011. The EDS President had an interactive session with Amity President, Dr. Ashok Chauhan. The DL talk by Dr. Jindal on “From millibits to terabits per second and beyond – over 60 years of innovation” was followed by a discussion on IEEE Division 1 activities. Dr. Shibani Koul, IEEE Delhi Section Chair, Dr. Mini Thomas, IEEE MGA Vice-Chair and several senior faculty members and managers from various institutions in the Delhi and Noida region attended the function. The event was organized locally by Dr. V.K. Jain, Director of Advanced Research at Amity University.

IPFA 2011

–by Chee Lip Gan and
M.K. Radhakrishnan

The IEEE International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA) is the annual flagship conference of the ED/Rel/CPMT Singapore Chapter and rated as one of the top device Failure Analysis and Reliability conferences. IPFA 2011 was held July 4–7, at the Songdo Convensia, Incheon, Korea. This was the first time that the IPFA was held in Korea, following the practice that the conference held outside Singapore every alternate year (in Hsinchu, Taiwan in 2004; Bangalore, India in 2007; Suzhou, China in 2009).

The week began with five tutorials on different aspects of IC reliability and failure analysis techniques on Monday. The symposium itself



IPFA 2011 Organizing Committee

began on July 5th with three excellent keynote papers by Dr Kinam Kim, President and CEO of Samsung Advanced Institute of Technology, Prof Mitsu Koyanagi, Tohoku University and Dr Jeong Il Kim, Singetics. Dr Kinam Kim highlighted a number of issues and challenges faced by semiconductor analysts on the latest device technology, such as 3D dopant profiling using Atomic Probe Technique, strain analysis using convergent beam electron diffraction or nano-beam diffraction, determining equivalent gate oxide thickness with 3D scanning transmission electron microscopy (STEM). Prof Koyanagi gave an overview of 3D integration technologies including a new 3D heterogeneous integration of super-chip. He then touched on reliability issues in these 3D LSIs such as mechanical stresses induced by through-silicon vias (TSVs) and metal microbumps, and then discussed on design and test methodologies to improve the reliability of 3D LSIs.

The symposium had 40 oral papers and 50 poster presentations. There were 7 invited papers and the best paper exchanges from 36th International Symposium for Testing and Failure Analysis (ISTFA 2010) and 21st European Symposium on Reliability of Electron Devices, Fail-

ure Physics Analysis (ESREF 2010). The invited papers included “Characterization and Modeling of NBTI Stress, Recovery, Material Dependence and AC Degradation Using R-D Framework,” by Prof. Souvik Mahapatra of IIT Bombay, India; “Investigation of Organic Thin-Film Transistors for Electrostatic Discharge Applications,” by Prof. Juin J. Liou of University of Central Florida, USA; “Interconnect Processes and Reliability for RF Technology,” by Dr Jeff Gambino of IBM, USA and “Advanced Failure Analysis of Memory Devices,” by Dr Susan Li of Spansion Inc., USA.

The best posters were selected and presented at the conference on short presentations. The winners were: Best Poster in Failure Analysis – “Multi Variation Mapping for Dynamic Laser Stimulation Analysis” by Sanchez Kevin and Philippe Perdu (CNES, France), Best Poster in Reliability – “Whitening Phenomena between Polyphthalamide Sidewall and Silicone Encapsulant in the Light Emitting Diode Package” by Kwang-Cheol Lee, et al. (Korea Photonics Technology Institute, Korea).

The best oral papers will be announced later, with the winners being invited to present their papers at ESREF 2011 (reliability) in October



Workshop at NIST EDS Student Chapter, Berhampur

and ISTFA 2011 (failure analysis) in November.

The Art of Failure Analysis photo contest was one of the key attractions and proved popular with many artistic, unusual and imaginative images being submitted. The top 3 winners determined through voting by the conference participants are displayed in IEEE Spectrum. IPFA will be celebrating its 25th anniversary in 2012 during the conference in Singapore, July 2–6, 2012.

ED NIST

—by Ajit Kumar Panda

The ED NIST Student Chapter conducted an IEEE EDS members only, two-day workshop on Analog IC Design by Professor (Dr.) S. C. Bose, Sr. Scientist, IC Design Group, CEERI, Pilani, Rajasthan, India, July 5–6, 2011, at NIST, Berhampur. The workshop focused mainly on latest trends in VLSI Design from Silicon wafer to MOS based Analog IC design incorporating the deep knowledge of MOS device physics. The program was inaugurated by Prof. Sangram Mudali, Director, NIST. A number of IEEE members and student counselors attended.

ED/REL/CPMT Singapore

—by Zhou Xing and Andrew Tay

The ED/Rel/CPMT Singapore Chapter organized several DL and technical talks. Information was distributed

to members and attended by people from the host institutions as well as from industries and research institutes across the city. The four most recent talks were:

- Prof. Simon Deleonibus of CEA-LETI, on “More Moore and More than Moore Meeting for 3D,” February 14, 2011, at Nanyang Technological University;
- Prof. Andrea Leonardo Lacita of Politecnico di Milano, March 2, 2011, entitled “Physical Modeling of Advanced Nanoscale Non Volatile Memories,” and organized by the Data Storage Institute under the Non-Volatile Memory Seminar Series;
- Prof. Raul Berger of Ohio State University, on “A Case Study of Poly (3-Hexylthiophene)-Fullerene Derivative Bulk Heterojunction Photovoltaics,” and hosted

by the National University of Singapore, June 15, 2011;

- The most recent talk by Dr. Genadi Bersuker of SEMITECH on “Reliability Modeling at the Atomic Structure Level,” July 7, 2011, was held at Nanyang Technological University.

At the EDS Region 10 Chapters Meeting held in Taipei, May 28th, Xing Zhou, EDS SRC Chair for Asia/Pacific, gave a report on behalf of the chapter chair, Prof. Andrew Tay. He shared with the meeting’s attendees the chapter’s activities and experiences in organizing two flagship conferences, the IPFA and EPTC.

ED VIT Student Chapter

—by Partha Mallick

The ED VIT University Student Chapter, Vellore, organized a student industry interaction program on May 4, 2011. This is a bi-monthly chapter program where experts from NxP Semiconductor Ltd., Bangalore, are invited to give talks and interact with EDS students and faculty members. Recently, more than 40 participants attended our program which was focused mainly on 32 bit “ARM Processors.” The industry experts explained the future challenges of the topic and demonstrated NxP products to the students, clarifying technical doubts and explaining the product versatilities.

~M.K. Radhakrishnan, Editor



ED VIT University Student Chapter bi-monthly, student industry interaction program.

EDS MEETINGS CALENDAR

(As of 1 September 2011)

THE COMPLETE EDS CALENDAR CAN BE FOUND AT OUR WEB SITE: [HTTP://EDS.IEEE.ORG/EDS-MEETINGS-CALENDARS.HTML](http://eds.ieee.org/eds-meetings-calendars.html)

October 3 - 6, 2011, * **IEEE International SOI Conference**, Location: Tempe Mission Palms Hotel & Conference Center, Tempe, AZ, USA, Contact: Joyce Hooper, E-mail: Joyce@imf.la, Deadline: 5/6/11, www: <http://www.soiconference.org>

October 9 - 11, 2011, * **IEEE Bipolar/BiCMOS Circuits and Technology Meeting**, Location: Global Learning Center, Atlanta, GA, USA, Contact: Janice Jopke, E-mail: ccsevents@comcast.net, Deadline: 5/2/11, www: <http://www.ieee-bctm.org/>

October 9 - 14, 2011, T **IEEE European Microwave Integrated Circuits Conference**, Location: Manchester Central, Manchester, United Kingdom, Contact: Ian Hunter, E-Mail: i.c.hunter@ee.leeds.ac.uk, Deadline: 2/14/11, www: <http://www.eumweek.com>

October 16 - 20, 2011, * **IEEE International Integrated Reliability Workshop**, Location: Stanford Sierra Conference Center, South Lake Tahoe, CA, USA, Contact: Rolf Geilenkeuser, E-mail: rolf.geilenkeuser@globalfoundries.com, Deadline: 6/16/11, www: <http://www.iirw.org>

October 16 - 19, 2011, * **IEEE Compound Semiconductor IC Symposium**, Location: Hilton Waikoloa Village, Waikoloa, HI, USA, Contact: Lisa Boyd, E-mail: l.boyd@ieee.org, Deadline: 5/8/11, www: <http://www.csics.org/>

October 17 - 19, 2011, * **International Semiconductor Conference**, Location: Hotel Sinaia, Sinaia, Romania, Contact: Cristina Buiiculescu, E-mail: cas@imt.ro, Deadline: 6/1/11, www: <http://www.imt.ro/cas>

October 26 - 28, 2011, T **International Conference on Electrical Engineering, Computing Science and Automatic Control**, Location: Instituto Tecnológico de Mérida (Campus North), Merida City, Mexico, Contact: Judith Esparza-Azcoitia, E-mail: cce@cinvestav.mx, Deadline: 6/20/11, www: <http://cce.cinvestav.mx/>

November 6 - 10, 2011, T **IEEE International Conference on Computer Aided Design**, Location: DoubleTree Hotel San Jose, San Jose, CA, USA, Contact: Kathy Embler, E-Mail: kathy@mpassociates.com, Deadline: 4/18/11, www: <http://iccad.com/>

November 7 - 9, 2011, T **Non-Volatile Memory Technology Symposium**, Location:

Shanghai Instit. of Microsystem & Info Technology, Shanghai, China, Contact: Shanghai Inst. of Microsystem and Information Tech, E-mail: NVMTS@mail.sim.ac.cn, Deadline: 7/31/11, www: <http://nvmts.org/>

November 7 - 9, 2011, T **IEEE International Conference on Microwaves, Communications, Antennas and Electronic Systems**, Location: David Intercontinental Hotel, Tel Aviv, Israel, Contact: Ortra Ltd. Manaf, E-mail: comcas@ortra.com, Deadline: 6/15/11, www: <http://www.comcas.org>

November 30 - December 3, 2011, * **IEEE Semiconductor Interface Specialists Conference**, Location: Key Bridget Marriott Hotel, Arlington, TX, USA, Contact: John Robertson, E-mail: jr@eng.cam.ac.uk, Deadline: 7/24/11, www: <http://www.ieeesisc.org/>

December 5 - 7, 2011, * **IEEE International Electron Devices Meeting**, Location: Hilton Washington and Towers, Washington, DC, USA, Contact: Phyllis Mahoney, E-mail: phyllism@widerkehr.com, Deadline: 6/24/11, www: <http://www.his.com/~iedm/general/future.html>

December 7 - 9, 2011, T **International Semiconductor Device Research Symposium**, Location: University of Maryland, Stamp Student Union, College Park, MD, USA, Contact: Lisa Press, E-mail: lpress@umd.edu, Deadline: 9/2/11, www: <http://www.ece.umd.edu/isdrs2011/>

December 12 - 14, 2011, T **International Conference on Field-Programmable Technology**, Location: India Habitat Center, New Delhi, India, Contact: Kolin Paul, E-mail: kolin@cse.iitd.ac.in, Deadline: 6/8/11, www: <http://www.cse.iitd.ernet.in/~icfpt11/index.html>

December 19 - 22, 2011, T **International Conference on Microelectronics**, Location: Yasmine Hammamet, Hammamet, Tunisia, Contact: Mourad Loulou, E-mail: mourad.loulou@ieee.org, Deadline: 7/18/11, www: <http://www.ieee-icm.com>

January 5 - 7, 2012, T **International Conference on Enabling Science and Nanotechnology (ESciNano)**, Location: Persada Johor International Convention Centre, Johor Bahru, Malaysia, Contact: Secretariat ESciNano 2012, E-mail: escinano@fke.utm.my, Deadline: 7/1/11, www: <http://www.fke.utm.my/mine/escinano2012/>

March 14 - 17, 2012, T **International Caribbean Conference on Devices, Circuits and Systems**, Location: Sandos Caracol Eco Resort & Spa, Playa del Carmen, Mexico, Contact: Rodrigo Picos, E-mail: rodrigo.picos@uib.es, Deadline: 10/3/11, www: <http://iccdcs.uib.es/>

March 19 - 21, 2012, T **IEEE International Symposium on Quality Electronic Design**, Location: Techmart Center/Hyatt Regency, Santa Clara, CA, USA, Contact: Ali Iranmanesh, E-mail: alii@svii.com, Deadline: 9/26/2011, www: <http://www.isqed.org>

March 19 - 22, 2012, @ **IEEE International Conference on Microelectronic Test Structures**, Location: Catamaran Hotel, San Diego, CA, USA, Contact: Wendy Walker, E-Mail: wendyw@widerkehr.com, Deadline: 9/16/11, www: <http://www.see.ed.ac.uk/icmts>

April 15 - 19, 2012, * **IEEE International Reliability Physics Symposium**, Location: Hyatt Regency Orange County, Garden Grove, CA, USA, Contact: David Barber, E-mail: dbarbsta@aol.com, Deadline: Not Available, www: <http://www.irps.org>

June 3 - 7, 2012, @ **International Symposium on Power Semiconductor Devices & Integrated Circuits**, Location: Old Sint Jan, Conference Center, Bruges, Belgium, Contact: Sabien De Hanscutter, E-mail: sabien@momentum-pco.be, Deadline: 10/17/11, www: <http://www.ispsd2012.com>

June 3 - 7, 2012, T **IEEE International Power Modulator and High Voltage Conference**, Location: Hilton San Diego Bayfront, San Diego, CA, USA, Contact: Richard Ness, E-Mail: nessengr@san.rr.com, Deadline: Not Available, www: <http://www.nessengr.com/ipmhvc2012/index.html>

June 3 - 7, 2012, T **International Symposium on Power Semiconductor Devices & IC's**, Location: Old Sint Jan, Conference Center, Bruges, Belgium, Contact: Sabien De Hanscutter, E-Mail: sabien@momentum-pco.be, Deadline: 10/17/2011, www: <http://www.ispsd2012.com/>

June 3 - 8, 2012, * **IEEE Photovoltaic Specialists Conference**, Location: TBD, Austin, TX, USA, Contact: Americo Forestieri, E-mail: pvs@wowway.com, Deadline: Not Available, www: <http://www.ieee-pvsc.org>

Spotlight On: IEEE EDS GOLD

The 2011 IEEE GOLD (Graduates of the Last Decade) Mixer, sponsored by the Electron Devices Society, was held at the 2011 IEEE Photovoltaic Specialist Conference (PVSC), in Seattle, Washington.

The GOLD mixer was a great success. Nearly 100 attendees took advantage of the opportunity to network with peers and unwind after a long day at the conference. In addition, 36 students opted to become members of EDS. Thanks to Ravi Todi, EDS's GOLD Chair, for organizing and speaking at the event.

Make Your Reservation Now, for the Next IEEE GOLD Event

Visit the 2011 IEDM Registration page, at <http://www.his.com/~iedm/register/> and be sure to check the box for the IEEE GOLD Event.



Katherine Nelson, a Masters student from Rensselaer Polytechnic Institute, signing up for free IEEE and EDS membership