Team-up for Research Impact
Who’s Who

SCHOOL MANAGEMENT TEAM

Chair
Professor Kam Chan Hin

Associate Chairs
Professor Koh Soo Ngee (Academic)
Professor Tay Beng Kang (Research)
Assoc Prof Cheng Tee Hiang (Administration)
Professor Tan Ooi Kiang (Curriculum and Graduate Studies)

Assistant Chairs
Assoc Prof Goh Wang Ling (Students)
Assoc Prof Chang Chip Hong (Alumni Affairs)
Assoc Prof Teh Kah Chan (Undergraduate Studies)

Division Heads
Assoc Prof Tseng King Jet (Power Engineering)
Assoc Prof Yeo Kiat Seng (Circuits & Systems)
Assoc Prof Tan Yap Peng (Information Engineering)
Professor Wang Dan Wei (Control & Instrumentation)
Assoc Prof Li Kwok Hung (Communication Engineering)
Professor Pey Kin Leong (Microelectronics)

ADVISORY COMMITTEE MEMBERS

Professor Kam Chan Hin (Chairman)
Chair: School of Electrical & Electronic Engineering

Professor Vincent W. S. Chan
Joan and Irwin Jacobs Professor
Department of Electrical Engineering & Computer Science
Claude E Shannon Communication & Network Group
Massachusetts Institute of Technology

Mr Quek Gim Pew
Chief Executive Officer
DSO National Laboratories

Dr Lap S Chan
R&D Director
Chartered Semiconductor Manufacturing Ltd

Mr Khooong Hock Yun
Asst Chief Executive Officer, Industry
Infocomm Development Authority of Singapore

Mr Tan Ah Peng
General Manager
Panasonic Singapore Laboratories Pte Ltd

Mr Ong Chee Beng
Managing Director, Singapore
Sun Microsystems, Asia South

CONTENTS

3 First Words

4 Revolutionary Environmentally-Friendly Super-Chip

5 Shedding Light on System-on-Chip (SoC) Design

6 Establishing Ties Across Belarus

7 Nanyang Professor Dr Lin Chinlon
A Leader in Photonics & Optical Fiber Communications

8 The New Water and Energy Research Laboratory

9 Intelligent Energy Distribution System (IEDS) Projects

10 Si-based Nano-scale Electronic Devices

11 Closing the Processor - Memory Bandwidth Gap with 3-D Integration of ICs

12 Drive on to Greater Heights, Professors!
  - Professor Pey Kin Leong
  - Professor Wang Youyi
  - Professor Er Meng Joo
  - Professor Wen Changyun
Kudos to Our Young Tenured Faculties

14 Assoc Prof Goh Wang Ling, Asst Chair (Students), winner of the Nanyang Teaching Award 2007
NTU Design Team Emerged Second Runner-up in the Grand Final of Freescale Technology Forum Design Challenge Europe
EEE Alumnus Awarded the New NRF (Clean Energy) PhD Scholarship

16 Top NTU Graduate - Low Xue Ni

17 Congratulations, Class of 2008!

18 NTU PhD Graduate Dr Simon Zhang - A Young Professor at Hong Kong Polytechnic University
Dr Zou Qiyue Won 2007 Young Author Best Paper Award
Tan Kah Kee Young Inventors Award 2008

19 New Faculty

22 New Research, Technical & Administrative Staff

23 A Tribute to Assoc Prof Chin Mee Koy

Note that the complete set of publication can be found at http://www.ntu.edu.sg/eee/
CONTENTS

24 Memorandum of Agreement between NTU and Panasonic Semiconductor and the Joint Industry Postgraduate (JIP) Programme Agreement

25 O2Micro’s CEO Visited Division of Circuits and Systems, School of EEE

26 Speech, Touch and Acoustic Tangible Interfaces for Next-generation Applications (STATINA)

27 Visual and Force Feedback - enabled Biomolecular Docking

28 Visiting Researchers at the Division of Power Engineering

29 Year 2 Teaching Awards 2008
   Prof Er Meng Joo

30 Year 3 Teaching Awards 2008
   Assoc Prof Mohammed Yakoob Siyal

31 Mr Yoga Divayana Received IEEE-Laser and Electro-Optics Society Graduate Student Award
   Students Won Third Taiwan Semiconductor Manufacturing Company Outstanding Student Research Award
   Post Doctoral Fellow from EEE Won the Second Prize of “Science as Art” Competition in 2008 Materials Research Society Spring Meeting

32 A High Impact Journal Paper Titled “Mesoscopic Thermo-mechanics”

33 Dancing Robot Show at the Singapore Discovery Centre

34 ICICS 2009 - 7th International Conference on Information, Communications and Signal Processing

35 ISIC 2009 - 12th International Symposium on Integrated Circuits

36 Report on the 1st International Photonics Global Conference (IPGC 2008)
   8-11 Dec 2008, Singapore

   17 - 20 Dec 2008, Hanoi, Vietnam

40 Visitors to EEE

43 Staff Get-together Lunch & Long Service Awards Presentation

44 Roll of Honour 2008

46 From Our Graduates...
   - Chua Cier Siang
   - Weng Zaishan
   - Cecilia Sandra Colkers (Aye Sandar Aung)
   - Yu Tianqi
   - Praneeth Namburi

49 Design and Innovation Project 2008
   - Gold Award: E031 Image Processing Tools For Camera Based Human Computer Interaction
   - Silver Award: E021 A Human-Size Mobile Robot
   - Bronze Award: E019 Unified Communicator

53 Life@NTU

54 EEE Tea Reception

55 EEE Investiture Ceremony

56 KCH Strength Challenge

57 EEE Sports Carnival

58 EEE Graduates’ Evening
First Words

The theme of this issue of E³ World, “Team-up for Research Impact”, reflects the efforts taken by the School of EEE in recent years to become a world class institution in impactful research. Some of the highlights are reported here.

A recent example is the major breakthrough in research on a revolutionary environmentally-friendly Super-Chip that was widely reported in the local and foreign media. The breakthrough was the fruit of collaborative research between scientists from NTU and Rice University, USA, to design a super-chip that consumes 30 times less energy while operating seven times faster than contemporary designs based on the current state-of-the-art Complementary Metal-Oxide Semiconductor (CMOS) process. The NTU team was led by Professor Krishna Palen of Rice University and Director of NTU’s Institute for Sustainable Nanoelectronics (ISNE) and Associate Professor Yeo Kiat Seng, Head of Division of Circuits and Systems. We are hopeful that the NTU-Rice team’s pioneering work on this new generation of probabilistic-based nanoelectronics will lead to diverse applications in media, biomedical, information technology (IT) and consumer electronics.

Another example of collaborative research is the signing of a joint Research Collaboration Agreement on System-on-Chip (SoC) to realize software defined radios (SDR) using advanced silicon technology between NTU and the University of Electronic Science and Technology of China (UESTC), one of the top universities in electronics in China. With the advancement of communication technology and the shift from analog to digital, more functions of contemporary radio systems are now implemented in software, leading towards the concept of the software radio. The rapid developments in microelectronics and interconnect techniques between different communication systems have facilitated the emergence of software radio technology. This agreement will pave the way towards more innovation- and knowledge-based activities which will attract more talents to work in this critical area.

A noteworthy event last year was the signing of a Memorandum of Understanding (MOU) between NTU and Belarusian State University of Informatics and Radioelectronics (BSUIR). The MOU will boost joint research activities and exchange of graduate students and faculty between the two universities. BSUIR is a reputed institution and is the national leader among education institutions of the Republic of Belarus. Located in Minsk, it provides training for highly qualified professionals and scientists in the fields of information science, radio engineering and telecommunications.

Closer to home, a research agreement was signed with the Institute of High Performance Computing (IHPC) to establish a Virtual Lab that will pave the way for research collaboration on next-generation nanoelectronics. The agreement will facilitate research in computational nanoelectronics and plasmonics, to exploit the quantum behavior of electron transport and light interactions in nanometre-scale devices.

The other CRP project on Mesoscopic Structures for Next generation Electronics and Photonics Technology is also progressing well with a workshop held in December 2008 and the visit of many eminent scientific advisors and partners to review the good progress that has been made.

In our quest for research impact, the critical and key ingredient is human talent. So while we groom and nurture our existing faculty, it is imperative that we continually look for new blood to rejuvenate our talent pool. We therefore warmly welcome two young inaugural Nanyang Assistant Professors, Dr Yu Hong Yu and Dr Tan Chuang Seng to the EEE family. Hong Yu’s research interests focus on emerging Si-based Nano-scale Electronic Devices, sub-22nm CMOS devices, SiGe based Nano-wire devices, Si based Photovoltaic devices and Si photonics. Chuan Seng is working on developing technology that place memory circuits directly on processors using CMOS-compatible back-end fabrication processes. He has done substantial fundamental work on 3-D process technology as a graduate student at MIT and recently as a Lee Kuan Yew Postdoctoral Fellow at NTU.

We take this opportunity to congratulate all newly promoted Full Professors in EEE, Professors Er Meng Joo, Pey Kin Leong, Wang Youyi and Wen Changyuan and Associate Professors Ang Diing Sheng, Ang Lay Kee Ricky, Huang Guangbin, Ma Maode, Poenar Daniel Puiu, Tang Xiaohong, Wang Hong and Xiao Gaoxi Kevin. Their promotions represent the culmination of their sustained efforts in excellent research and teaching. We look to them to help propel EEE to greater heights! While we strive for greater research impact, we must never forget our other equally important role and obligation: that is our sacred duty and responsibility as Professors to teach well and prepare the next generation of electrical and electronic engineers for the work which lies ahead - to bring greater prosperity and comfort to one and all.

It is heartening to note that our EEE Alumnus Darryl Wang Kee Soon has been awarded the inaugural Singapore National Research Foundation (Clean Energy) PhD Scholarship. Darryl is one of the 3 scholars to receive this highly-prestigious award and he will pursue his PhD at the University of New South Wales in Australia in the field of silicon photovoltaics under the guidance of the world renown Professor Martin Green.

We also congratulate the 1001 EEE graduates who received their degrees of Bachelor of Engineering (Electrical and Electronic Engineering) and the other 407 who received their MSc, MEng and PhD degrees. The Lee Kuan Yew gold medal was awarded to our top graduate Ms Low Xue Ni.

Finally, the School is greatly saddened by the untimely loss of Associate Professor Chin Mee Koy, 49, who passed away peacefully in November 2008 after a long and courageous battle with cancer. Mee Koy had been with us for more than 15 years during which time he had contributed much to the School and the international photonics research community. His unceasing enthusiasm for photonic science and engineering is an inspiration to us all. Mee Koy will always be remembered and sadly missed.

So with our laudable achievements in year 2008, we look forward with confidence to achieving even greater research impact in 2009!

Professor Kam Chan Hin
Chair
School of Electrical and Electronic Engineering
Scientists from Nanyang Technological University (NTU) and Rice University, United States, have successfully created a super-chip that consumes 30 times less energy while operating seven times faster than contemporary designs based on the state-of-the-art of Complementary Metal-Oxide Semiconductor (CMOS).

The chip was first unveiled at the International Solid-State Circuit Conference at San Francisco on 8 February 2009. This technological breakthrough attracted broad media interest and received wide coverage in press releases (Straits Times, Business Times, Today, MyPaper, LianHeZaoBao, and Berita Harian). The news was also aired on TV (Channel News Asia) and radio (938Live). During the CNA interview, NTU’s team leader, Associate Professor Yeo Kiat Seng, Head of Division of Circuits and Systems, School of Electrical and Electronic Engineering (EEE), College of Engineering, said, “The energy-performance improvement of the super-chip is more than 200 times. We achieve all this by embracing noise as part of our design flow departing from the conventional wisdom of designing a circuit.” Dr Natalie Kong Zhi Hui, a key member of the NTU’s team, reckons “The PCMOS technology contributes significantly towards environmental-friendliness, with an extremely energy-saving attribute. This is due to the fact that the novel technology recycles noise.”

The new art, dubbed Probabilistic CMOS (PCMOS) was conceived by Professor Krishna Palem of Rice University and Director of NTU’s Institute for Sustainable Nanoelectronics (ISNE), while the NTU team played the critical role of turning the design concept into reality. In other words, the super-chip implementing the encryption application based on a PCMOS truly random number generator is a successful proof-of-concept of the PCMOS technology. The results comparison with the conventional CMOS approach are depicted in the figures.

NTU’s unique strength in IC design and strong collaboration with IC manufacturing companies are the main factors that motivated the Singapore-US collaboration. All phases of the project including the critical circuit design phase, design simulation and analysis, design tape-out and test & measurement of the chip were carried out by our very own excellent team of researchers in NTU, with an exceptional contribution from Mr Zhu Ning. The breakthrough is a culmination of various chip designs and testing that started since 2005. In fact, NTU was ranked 16th in the 2008 Worldwide IC design universities research ranking and among the top 3 in Asia, as published in the February 2008 issue of the International Journal of Circuits, Systems, and Computers.

In essence, the chip works by embracing errors and uncertainties. Another important fact is that the implementation of PCMOS piggybacks on the standard CMOS technology that chipmakers have already been using. This means that chipmakers can use existing equipment to support the fabrication of PCMOS chips, resulting in lower entry costs for the new technology.

The NTU-Rice team’s vision is to see a new generation of probabilistic-based nanoelectronics with diverse applications in media, biomedical, information technology (IT) and consumer electronics. “The success of this project would go a long way in promoting the advent of a new generation of ‘green’ IT at lower costs to consumers,” said Professor Yeo. The team plans to continue its follow-up work on proof-of-concept validations for cell phones, graphic cards and medical implants. The goal is to enter the consumer computing market in as little as four years time while aspiring to present PCMOS as a parallel to mainstream CMOS technology.

**Comparison between conventional and probabilistic approaches.**

<table>
<thead>
<tr>
<th></th>
<th>Conventional CMOS</th>
<th>Probabilistic CMOS</th>
<th>Improvement over Conventional CMOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy consumption</td>
<td>96</td>
<td>3.66</td>
<td>~ 30 times</td>
</tr>
<tr>
<td>(nano Joules)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td>3130</td>
<td>400</td>
<td>&gt; 7 times</td>
</tr>
<tr>
<td>(nano Seconds)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prof Krishna Palem of Rice University and Director of NTU’s ISNE (left) with Assoc Prof Yeo Kiat Seng at Lee Kong Chian lecture theatre, NTU.

PCMOS team members (From left): Dr Natalie Kong Zhi Hui, Assoc Prof Goh Wang Ling, PhD student Lan Jingjing, Assoc Prof Yeo Kiat Seng, and Researcher Zhu Ning.
Nanyang Technological University and the University of Electronic Science and Technology of China (UESTC) signed a joint Research Collaboration Agreement on System-on-Chip (SoC) to realise software defined radios (SDR) using advanced silicon technology.

As communications technology continues its rapid transition from analog to digital, more functions of contemporary radio systems are implemented in software, leading toward the software radio. A software radio is an open architecture, which connects modularized and standardized hardware units in bus to construct a base platform and through software embedded to realize various radio communication functions. In a software radio system, channel modulation waveforms are defined in software. That is, waveforms are generated as sampled digital signals, converted from digital to analog via a wideband digital to analog converter (DAC) and then up-converted from IF to RF.

The software radio technology emerges as the fast improvement of microelectronics and the interconnect requirements between different communication systems. It can bring benefits for all the actors involved in the telecommunication market: manufactures, operators, and users.

While the worldwide standardization of global fourth-generation (4G) wireless systems is well underway, developers of 4G systems are facing a dilemma of verifying the compliance of the still evolving dominant standard. It is, due to the nature of the problems, an ideal research project to push the edge of technology, build up the core competency in system-on-the-chip design and create a cohesive R&D team capable of delivering commercially viable intellectual property. Such R&D activities have added benefits in enhancing our specialized manpower training contributed towards value added industry and a knowledge based economy.

As Singapore moves towards more innovation- and knowledge-based activities, attracting and nurturing talents are critical for our success. In the past, capital was important and critical for success. But it is less so in a design- and service-driven economy. In this initiative, several talents will be trained in this cutting-edge research, which some analysts and reports predicted the SoC market will reach US$200 billion by the year 2025, NTU/EEE can chart this new strategy for this transformation. Therefore, the signing of a joint Research Collaboration Agreement on SoC with UESTC on 1 November 2008 comes at a very appropriate time.

As part of the agreement, the two established universities will conduct joint research work and play host to staff, undergraduate and postgraduate student exchange programmes. In addition, both parties will be involved in the coordination of joint academic events.
Establishing Ties Across Belarus

Cooperation between Nanyang Technological University and Belarusian State University of Informatics and Radioelectronics (BSUIR) was sealed recently with the conclusion of the Memorandum of Understanding. This cooperation would mark NTU’s first linkup with a Belarusian partner and it is expected to boost joint research activities and exchange of graduate students and staff between the two universities.

Located at Minsk, BSUIR is immersed in Belarus’ rich culture and history. BSUIR enjoys a high reputation as being the national leader among education institutions of the Republic of Belarus, training highly qualified professionals and scientists in the fields of information science, radioengineering and telecommunications.

Leveraging on both universities’ strategic strengths, the partnership would be a good platform to synergise on each other research works and also provide the opportunity to vie for the Singapore International Graduate Award where successful applicants would be trained by distinguished and world-renowned researchers in NTU.

New Joint Virtual Lab on Computational Nanoelectronics and Plasmonics between NTU-EEE and IHPC

The research agreement was formalised on 5 February 2008 by the Chair of EEE, Prof Kam Chan Hin, and the Executive Director of IHPC, Dr Raj Thampuran (see figure). The virtual lab will investigate topics in computational nanoelectronics and plasmonics, to exploit the quantum behaviors of electron transport and light interactions in nanometre-scale devices. The joint research lab will take off with eight professors from NTU and eight research scientists from IHPC working synergistically on various fundamental topics and novel applications in nanoelectronics and plasmonics. Drawing on the mutual strengths of NTU and IHPC, the new virtual lab looks set to be a catalyst and incubator for new scientific thoughts and innovations, paving the way for the modeling of tomorrow’s nanoelectronics and nanodevices. The joint lab will also aim to provide manpower and PhD student training in this area.

NTU signed a research treaty with the Institute of High Performance Computing (IHPC), paving the way for next-generation nanoelectronics and plasmonics, which was reported online in NTU: http://www2.ntu.edu.sg/ClassACTStaging/Mar08/research/2.asp).

Model union: EEE Chair Prof Kam Chan Hin (left) and IHPC Executive Director Dr Raj Thampuran (right) formalising the research agreement.
Tell us about yourself. What is the significance of your research to engineering & society?

I received my BSEE in National Taiwan University (NTU, Taipei) and my Ph. D. from University of California, Berkeley in EECS. I then went to work for AT&T Bell Labs after my Ph. D. Since then, I have been researching in the field of lasers, photonics technologies and optical fiber-based communications including long-haul core networks and broadband Fiber-to-the-Home for broadband access networks. In the last 30+ years, I have been focusing on the problems and solutions for achieving the limits of ultimate communications bandwidth using photonics and advanced single-mode fibers. I have made original contributions in the field of nonlinear optics and high-speed optical transmission technologies that are essential in today's global long-haul optical networks that interconnect many continents and countries around the world. This ubiquitous global undersea and terrestrial network of networks is what has made Internet possible. Internet has changed the human society and the world in a way which is unprecedented, and it is only possible because we have a laser light based optical fiber networks connecting many parts of the world at the speed of light.

As a leading expert in photonics and optical fiber communications, what are the research directions in this area for the next 5 to 10 years?

Currently the entire world is going through what I called the "Broadband Transformation". Communications and Media are merging, and "Broadband" is the key word. Text alone is replaced by text with images and video, and audio communications (telephone) by visual communications and video distribution (television); narrow-band communication is becoming too basic and broadband high-speed multimedia-based communications are the new directions. In the near future e-mails with text and data and images will be replaced by video e-mails used by people who do not even know how to turn on a computer, not to mention to use a "mouse". Video-based visual communications, with mobile video and multi-media and related signal processing, distribution, communications, etc. are going to be the dominant mode of communications and media, because it is the most natural way of communicating with people. Knowing this, we can see the research directions will focus on 100 Gigabit per second Ethernet and related photonics access systems and technologies. For long-haul optical core networks, ultra-broadband systems with 20-100 Terabit per second systems are the main directions. This is consistent with IDA's iN2015 (Intelligent Nation 2015) vision for Singapore to be among the leading countries in establishing its broadband information infrastructure for the entire society. It also reflects the future need for higher and higher bandwidth per user with high-end ubiquitous multimedia-based applications.

Other advanced photonics research areas like Nanophotonics and Metamaterials and Bio-photonics will address important topics like the green environment, sustainable energy and human healthcare. Examples include green photonics or green optoelectronics with nanostructures for highly efficient low cost solar cells, photonic-crystal based LED devices for energy efficient solid state lighting and displays, silicon photonics for future IC chips with integrated microelectronics and photonics circuits, etc. The field of Biophotonics and Nanophotonics will most likely see many interesting and exciting advances in the next 10 years.

Besides research, what other aspects should academics develop? For example, is teaching important?

Teaching is very important. Younger researchers will learn from your inspiring teaching and be excited and motivated to do research and engineering in some fields of specialty that you taught.

Contact with industry is also essential if you wish to have the first hand knowledge of what the world needs in terms of real products, services and why. This may help to guide your future research directions and create more real-life impact. In principle, a better researcher would be better in teaching, as he or she knows the new technology trends and advances better and have the most updated knowhow. However, I have seen some very good researchers who are really poor teachers due to lack of oral presentation or communications skills or unwillingness to do better preparation for teaching. There are also some teachers who are very good in teaching basic and well established course materials and probably not very effective in original research. In that case, I think they should be encouraged to focus on teaching. The ideal situation is to be good at both research and teaching as well as in advising students in research and projects.
Ever since Nanyang Technological University has been awarded a $10 million competitive research program (CRP) grant for water and energy research by National Research Foundation in 2007, the Power Engineering Division has been making good progress in preparation of the necessary laboratory infrastructure and facilities. A laboratory formerly known as Power Design Laboratory has been transformed and given a new facelift to become a well-equipped research laboratory. It is now known as the Water and Energy Research Laboratory (WERL).

The revamped laboratory shall primarily focus on the NRF-funded CRP which aims to develop self-sustaining water production processes by desalination and wastewater purification based on solar and membrane distillation. The CRP comprises of six projects which are designed to complement one another to support the main objective of achieving a commercially viable ‘zero-energy’ green water production and recycling system. Co-funded by the School of EEE, the WERL has the capabilities to support other research projects beyond the 5-year research grant period.

In order to achieve the primary objective of the research program in water and clean energy research area, several major research facilities in the laboratory are established to cater for the research program. For example, several weather measuring instruments, solar irradiance equipments and solar panels have been deployed in the laboratory as well as on the roof top. Water recycling research and micro grid research facility are also set up in the laboratory to facilitate and expedite research areas in water recycling and renewable energy. Collaboration between Singapore Membrane Technology Centre (SMTC), Institute of Environmental Science and Engineering (IIEE) and the Water and Energy Research Laboratory will provide an excellent research hub for Nanyang Technological University to excel in water recycling research.

The WERL has begun working together with the Intelligent Systems Centre to create a Singapore Solar Map system and this implementation will be completed by third quarter of 2009. Construction work to create a micro grid system in the laboratory is also in progress and its full capabilities and functionality is expected to be seen by second quarter of 2009.

The WERL currently has a manpower team of three support & administration staff, four research fellows, four research engineers, four Ph.D scholars, five M.Sc students and eight final year undergraduate students. The laboratory supervisor is Associate Professor Choo Fook Hoong who is also the Lead Principal Investigator of the CRP. Eight other Principal Investigators from different schools and departments are also part of the research group in driving the primary research program objective.
In February 2008, 5 projects of Power Engineering Division, School of Electrical & Electronic Engineering were awarded a combined grant of S$3.5 million dollars from A*Star. They are:

- Microgrid Energy Management System, PI: Assoc Prof H.B. Gooi
- Open Architecture for Intelligent Power Quality Monitoring & Evaluation System, PI: Professor S.S. Choi
- Design of a Voltage Collapse Monitoring Instrument using Local Information, PI: Assoc Prof M.H. Haque
- Intelligent Trading/Metering/Billing System for Future Smart Distribution System, PI: Assoc Prof P. Wang

These projects aim at setting up a microgrid, both software and hardware prototypes, at the new Sustainable Energy Research Centre (S2-B7c-05) in the School of EEE, NTU for grid connection or islanding operation. The hardware components include dc-dc and dc-ac power converters/inverters, smart meters, solar panels (at the roof top of Block S2, School of EEE, NTU), LV distribution system, sensing and communication devices for monitoring and control. The software components include the controller schemes, detection algorithms and optimization algorithms for cost minimization and energy trading.

The test setup will demonstrate:

- how the proposed prototypes can coordinate and schedule price-sensitive loads and Distributed Energy Resources (DERs) such as photovoltaics, fuel cells and wind generators;
- the software algorithms and control schemes for minimizing schedule cost or maximizing revenue of microgrid while ensuring its secure operation;
- how the developed web-based GUI is used for interfacing with local DERs, loads, distribution networks and market operators via low cost communication devices; and
- intelligent software applications for power quality monitoring and for voltage collapse detection.

Upon completion, the setup may serve as the platform for testbedding the suitability of add-on microgrid sub-systems. These may include power line communication based smart meters and plug-in hybrid electric vehicles.
Si-based Nano-scale Electronic Devices

Dr Yu HongYu obtained his B.Eng. degree from Tsinghua University, Beijing in 1999. In 2001, he received his M.ASc. degree from Uni. of Toronto on the work of organic light emitting devices. From Jan 2001 to Jun 2004, he was associated with Silicon Nano Device Lab of NUS for his PhD degree, working on the advanced gate stack for nanoscale CMOS technology. In NUS, he was awarded with a NUS President Graduate Fellowship and later an IEEE Electron Device Society Graduate Fellowship. From Jun 2004 to Jan 2008, he was with IMEC, Leuven, Belgium, as a senior researcher in the Si process and device technology division. He joined school of EEE at NTU starting from Feb 2008, being awarded with the inaugural Nanyang Assistant Professorship. He has authored or co-authored more than 130 publications in the top-tied international journals and conferences (with an SCI h-index of 16), including 20 IEDM/VLSI conference papers, more than 30 IEEE electron device letters, and several invited talks. In 2007, along with 3 other papers respectively from IBM, Toshiba, and SamSung, his 1st authored paper was selected as the highlight paper in Tech. Sym. VLSI held in Kyoto, Japan (ranked top 2% among all the submissions). In addition, he has published more than 15 USA/EU patents. His current research interests focus on emerging Si-based Nano Electronic Device, e.g. novel Non-Volatile Memory; sub-22nm CMOS devices; SiGe based Nano-wire devices; Si based Photovoltaic devices; and Si photonics. He is a member of IEEE.

1) Future generation of non-volatile memory (NVM) devices.

Memory devices, instead of logic devices, have already become the driving force for the "Moore's law". Our group is working on several promising future generation NVM devices (e.g. floating-gate NVM or emerging resistive-RAM).

2) Novel devices based on Si or carbon/graphene for green IC.

IC power consumption is not only a package thermal issue but also a significant and fast growing part of the world electricity consumption. We are working on novel switching devices based on carbon (e.g. Graphene) or Si to address this concern.

3) Si or carbon-based photovoltaic & nano-photonic devices.

Growing attention worldwide is focused on energy supplies, due to the concern of the impact of climate change and global warming. Photovoltaics, the direct conversion of sunlight to electricity using solar cells, provides a clean and more cost-effective electricity option, and is recognized as one of the most promising option for a sustainable energy source. Our group is working on both 2nd-generation (thin-film based) and 3rd-generation (nano-structure based) solar cells, aiming at improving the efficiency of the device or reducing the device manufacturing cost.
Imagine a familiar situation where you need to travel between your home and office every day. You need to put up with time lost during commute as well as paying for the fuel. One possible solution is to have your home in another floor of your office building. In this way, all you need to do is simply to go up and down between floors and you can save time and cost. This simple idea can similarly be applied to boost the overall performance of a computer.

As the computing capability in current and future microprocessors continues to increase as a direct result of scaling (together with performance boosters in recent technology nodes) and introduction of multi-core architecture, the effective computing performance (measured in Millions Instructions per Second or MISP) does not necessarily increase at the same pace. A big part of this is due to the widening performance gap between processor and memory. The rate of improvement in microprocessor speed exceeds the rate of improvement in memory (Dynamic Random Access Memory or DRAM) speed. Memory speed is inherently slower and data need to travel between memory and processor via off-chip interconnections known as data buses. Due to large latency and limited channels in the data buses, the processor is data-deprived and one ends up with a serious data bandwidth problem. Hence, computer designers are faced with an increasing processor to memory bandwidth gap, which now is the primary obstacle to improved computer system performance. Power consumption in data buses is also increasing rapidly.

One attractive solution to the above bottleneck is to place memory directly on processor in a 3-D fashion to close this processor-memory bandwidth gap. By doing so, one ends up with much shorter vertical interconnection between processor and memory blocks. Short vertical interconnects will result in smaller latency and less power consumption. In this 3-D architecture, more data buses can be built from fine-pitch vertical via as one is no longer limited by the number of pin count. This translates into improved bandwidth at lower power consumption hence a significant improvement in the overall performance.

Armed with a generous start-up grant under the inaugural Nanyang Assistant Professorship, Dr Tan Chuan Seng and his research group look into the enabling technology that needs to be developed to place memory directly on the processor using CMOS-compatible back-end fabrication processes. He has done substantial fundamental work on 3-D process technology as a graduate student at MIT and more recently as a Lee Kuan Yew Postdoctoral Fellow at NTU.
Promotions

Drive on to Greater Heights, Professors!

Meet the recently promoted EEE Profs who talk about the contribution of their research to engineering and society and their interesting hobbies.

**Professor Pey Kin Leong**

My field of specialization is in Silicon Nanoelectronics for advanced CMOS processes and device reliability.

One of the key factors for my achievement is that I keep in close contact with my counterparts in wafer fab and IC packaging industry so that I have the latest development and issues related to research and development of future ICs. This allows me to understand the research opportunities in the Si nanoelectroncs for near and future device and circuit applications.

Some of the research results and IPs generated by my research team are being recognized and used in today’s state-of-the-art logic and memory technologies. One such example is the technology that my research team developed for forming metal local interconnections (called silicide technology) of less than 20nm thick between nanoscale transistors that are being used and becomes a standard process in today’s ICs. Another example is that lately, my research team just unearthed the localized chemical information of a breakdown path of less than 10nm in start-of-the-art ultrathin gate oxide of less than 2.0nm. These result findings allow the Si technology to advance its processes as well as to better understand device reliability of tinny devices that perform cross-functions in today’s fast-pace knowledge-based world.

**Professor Wang Youyi**

During the last 17 years, I have witnessed NTU’s evolution from a teaching-based university to a research-based university. Today, NTU is a vibrant and comprehensive university. I am very happy that I have been a part of NTU during this period.

Singapore is “small” in terms of natural resources, but is “big” in terms of manpower and technology. NTU plays a key role as a developer of high quality manpower resource to further the growth and development of Singapore’s economy in this high-tech era.

During the last 17 years, we have seen the appearance of many new technologies and fields, such as computer technology, information technology, E-business, material science, bio-science, nano-technology, etc. Development of these technologies provides us with many challenges and opportunities. The era of I.T. is now past. Looking forward, I believe that we are now entering the era of E.T. (energy technology). I see an increasing demand for manpower in the fields of power and energy engineering. World class university education and research provides the lifeblood for the advancement of Singapore.

**Kudos to Our Young Tenured Faculties**

We also extend our heartiest congratulations to the following colleagues, who were promoted to Associate Professorship with tenure: Associate Professors Ang Diing Shenp, Ang Lay Kee Ricky, Huang Guangbin, Ma Maode, Poenar Daniel Puiu, Tang Xiaohong, Wang Hong and Xiao Gaoxi Kevin. This is the pioneer batch of assistant professors who were promoted under the new promotion and tenure award scheme which involves sending the academic dossiers of these young assistant professors to international reviewers for appraisal. This rigorous system ensures that our young faculties are recognized with the same rigor as those in other top universities around the world. We look forward to their sustained contributions in propelling EEE and NTU to even greater heights!

...continued on page 13
Professor Er Meng Joo

Prof Er’s field of specialization is Computational Intelligence, in particular Intelligent Control Theory with Applications in Robotics and Automation. He has co-authored 3 books, 12 book chapters and more than 300 refereed international journal papers and conference papers. He was bestowed the top 1% Most Cited Paper Award by Web of Science in 2007. He won both the Institution of Engineers, Singapore (IES) Prestigious Publication Award (Application) (in 1996) and the IES Prestigious Publication Award (Theory) (in 2001). He has been invited as a keynote speaker, panelist and invited speaker for more than 60 conferences/workshops/seminars/technical talks overseas. Currently, he serves as the Editor-in-Chief of IES Journal B-Intelligent Devices and Systems, an Area Editor of International Journal of Intelligent Systems Science and an Associate Editor of eight refereed international journals. Prof Er always strikes a balance between research and teaching as he believes one should not compromise teaching duties while doing research. He won the Teacher of the Year Award, School of EEE in 1999, Year 2 Teaching Excellence Award in 2008 and the Best Session Presentation Award at the World Congress on Computational Intelligence 2006 held in Vancouver, Canada. Furthermore, he has more than 30 international and local awards to his credit.

When asked about his success factors, he says that he publishes his research results in high impact journals and makes it a point to attend major international conferences so as to meet people and keep himself abreast of latest developments in his field of specialization. He believes that it takes some time to earn international recognition and is important for one to keep doing impactful research.

Prof Er plays many sports and enjoys Karaoke. He has been invited to perform at the EEE night over the last few years.

Professor Wen Changyun

I have been doing research in the field of control over the past 23 years. One of my major achievements in adaptive control is solving a long-standing bottleneck problem in decentralized adaptive control using several different approaches. Together with my research students, I proposed a cycle analysis method to systematically analyze and design switching systems and established sufficient stability conditions for impulsive systems. These results have been widely applied, such as controlling and synchronizing chaotic systems. Through synchronizing chaotic systems, several secure communication schemes, which require less bandwidth while still enhance transmission security, have been developed. Inspired by ideas and methodologies in control theory, I developed a series of innovative technologies in optical signal processing which enable data transmission systems to be efficiently and economically upgraded to high-bandwidth networks, in collaboration with several other colleagues.

I was invited to serve as Associate Editor for the three flagship journals in Control – IEEE Transactions on Automatic Control, Automatica and IEEE Control Systems Magazine, respectively. I have also been actively involved in organizing international conferences, playing the roles of General Chair, General Co-Chair, Technical Program Committee Chair, Program Committee Member, General Advisor, Publicity Chair. I received the 2005 IES Prestigious Engineering Achievement Award from the Institution of Engineers, Singapore.

Prof Wen likes driving. He gave free driving lessons to friends overseas. He must be a good driving instructor as the learners passed their driving tests without attending driving school.

...continued from page 12

The Associate Professors are...

1. Tang Xiaohong
2. Ma Maode
3. Ang Lay Kee Ricky
4. Huang Guangbin
5. Wang Hong
6. Poenar Daniel Puiu
7. Ang Diing Shenp
8. Xiao Gaoxi Kevin
Awards

What course do you teach?
I teach EE2004 Digital Electronics, which is a year-2 course.

How do you cope with large classes?
I try to recognize the faces and acknowledge them. Somehow I am always lucky that students are attentive and polite in class. That makes my teaching easy and enjoyable.

How do you make an engineering course interesting?
I am not sure if my lessons are interesting but I do constantly make an effort to relate theories to practical applications. I find that such approach nearly always interest students and is helpful in their understanding of concepts. In addition, I try to get students to participate in the tutorial classes as well as during lectures. By constantly asking simple questions, we can promote active learning, thinking and participation. Lots of smiling and encouragement also help in getting students to reciprocate.

Give some examples of how you have inspired students, e.g. success stories.
I don’t know if I have inspired students but if I know that a student needs help, I will do my best to assist. If I notice any weakness in a student, I will not hesitate to let the student know. It is best that a student learn now than to make the same mistake again.

What would you recommend to your fellow lecturers to improve their teaching?
Be patient and understanding.

Assoc Prof Goh Wang Ling, Asst Chair (Students), winner of the Nanyang Teaching Award 2007

NTU Design Team Emerged Second Runner-up in the Grand Final of Freescale Technology Forum Design Challenge Europe

The NTU team led by School of Electrical and Electronic Engineering (EEE) student Mr Li Chenghan and comprising of Mr Wang Cunzhe and Mr Pelie Woo Pak Leng (both from EEE) and School of Mechanical and Aerospace Engineering student, Mr Thia Wei Soon emerged second runner-up in the Grand Final of the Freescale Technology Forum Design Challenge Europe held on 7 October, 2008 in Paris, France. The advisor of the team is Professor Er Meng Joo, School of EEE, whose timely guidance and help have contributed significantly to the success of the team. The challenge was open to embedded designers in France, Italy, United Kingdom, Israel, Finland, Sweden, Germany, Russia, Spain, Czech Republic, Turkey, Ukraine, Slovakia, Romania and Switzerland. The theme of this year’s challenge is “green”. Participants are required to design and develop a prototype that is beneficial to the environment using Freescale products.

After the registration was closed in February this year, more than 150 registrations were received by the organizer. Mr Li Chenghan who was an exchange student at the Royal Institute of Technology in Sweden submitted a project proposal entitled “Kinetic Energy Recovery System for Vehicles” on consultation with Professor Carl-Mikael, Royal Institute of Technology, Sweden. His proposal is one of the five finalists selected by Freescale for the Grand Final held in Paris, France. After his return from Sweden in July, the team worked tirelessly to put theory into practice and it took them about a month to develop a working prototype. This design contains three basic parts: a control unit, an infinitely continuously variable transmission gearbox and an energy storing unit. The operation of the working prototype can be viewed at http://www.youtube.com/watch?v=UHPriOloikVE.

Assoc Prof Goh Wang Ling, Asst Chair (Students), winner of several awards in the past.

Assoc Prof Goh Wang Ling, Asst Chair (Students), winner of the Nanyang Teaching Award 2007

NTU Design Team Emerged Second Runner-up in the Grand Final of Freescale Technology Forum Design Challenge Europe

The NTU team led by School of Electrical and Electronic Engineering (EEE) student Mr Li Chenghan and comprising of Mr Wang Cunzhe and Mr Pelie Woo Pak Leng (both from EEE) and School of Mechanical and Aerospace Engineering student, Mr Thia Wei Soon emerged second runner-up in the Grand Final of the Freescale Technology Forum Design Challenge Europe held on 7 October, 2008 in Paris, France. The advisor of the team is Professor Er Meng Joo, School of EEE, whose timely guidance and help have contributed significantly to the success of the team. The challenge was open to embedded designers in France, Italy, United Kingdom, Israel, Finland, Sweden, Germany, Russia, Spain, Czech Republic, Turkey, Ukraine, Slovakia, Romania and Switzerland. The theme of this year’s challenge is “green”. Participants are required to design and develop a prototype that is beneficial to the environment using Freescale products.

After the registration was closed in February this year, more than 150 registrations were received by the organizer. Mr Li Chenghan who was an exchange student at the Royal Institute of Technology in Sweden submitted a project proposal entitled “Kinetic Energy Recovery System for Vehicles” on consultation with Professor Carl-Mikael, Royal Institute of Technology, Sweden. His proposal is one of the five finalists selected by Freescale for the Grand Final held in Paris, France. After his return from Sweden in July, the team worked tirelessly to put theory into practice and it took them about a month to develop a working prototype. This design contains three basic parts: a control unit, an infinitely continuously variable transmission gearbox and an energy storing unit. The operation of the working prototype can be viewed at http://www.youtube.com/watch?v=UHPriOloikVE.
EEE Alumnus Awarded the New NRF (Clean Energy) PhD Scholarship

We are proud to announce that our 2006 EEE alumnus Darryl Wang Kee Soon, 27, has been awarded the inaugural Singapore National Research Foundation (Clean Energy) PhD Scholarship. He is one of the 3 scholars to receive this highly-prestigious award from former Deputy Prime Minister and current NRF chairman Dr Tony Tan. Darryl will pursue his PhD at the University of New South Wales in Australia in the field of silicon photovoltaics under the guidance of the world-famous Professor Martin Green, who received the Alternative Nobel Prize in 2002 for his contributions in photovoltaics research. Darryl hopes to set up his own photovoltaics consultancy practice in the future.

Darryl believes in living life to the fullest by tasting a variety of experience. The Hwa Chong Junior College alumnus was an active student during his undergraduate days in NTU. He represented NTU Hall 3 in weiqi and was Hall 3’s darts captain in 2004. He was also the NTU weiqi chairman in 2004 and was in charge of organizing university and inter-school competitions while in office. Besides these, he was in the NTU Air Rifle team for 2 years, representing the university in inter-varsity and national competitions.

Darryl went to the University of Toronto for an exchange program in the 2004 Fall semester. Subsequently, he did his Industrial Attachment in Shanghai under the inaugural Global Immersion Program. He continued to balance his outstanding extra-curricular activities achievements with his excellent grades in the final year. He eventually became the valedictorian of the 2006 School of EEE graduates and gave a rousing speech at the graduation ceremony. In recognition of his excellent all-round achievements, Darryl received 3 graduation medals and awards and was also one of the 2 recipients of the prestigious Professional Engineers Board Gold Medal in the country in 2006. Subsequently, he worked as a research officer in the Institute of Microelectronics until 2008.

Darryl chose to study in NTU because he feels that with NTU’s strong technical history, he can obtain a thorough engineering training from NTU that can give him an advantage at the workplace. He also favoured the rich hostel-living culture in NTU and was involved in the university and hostel activities during his stay in Hall 3 for his undergraduate days. Darryl was pleased with the numerous self-development opportunities available in NTU such as gaining cultural and international exposure with the Global Immersion Program in Asia, Europe and the USA. He was also glad that undergraduate research opportunities were abundant with the URECA program and the close ties NTU has with A*STAR research institutes and companies such as Chartered Semiconductor Manufacturing Ltd. NTU currently also offers other degree programs such as the Integrated Bachelor of Engineering (Electrical & Electronic Engineering) and Master of Science (Electrical & Computer Engineering) Programme with the prestigious Georgia Institute of Technology in USA. In a nutshell, Darryl was and is still certain that NTU can offer immense opportunities for an undergraduate to grow in his or her desired ways.

We wish Darryl all the best in his PhD training at the University of New South Wales and his future endeavours.

...continued from page 14

In the Grand Final held in Paris on 7 October, this prototype was showcased and the forum attendees and challenge participants voted for the champion, first runner-up and second runner-up. The champion goes to “Zero Power Platform (ZPP)” by Stefan Heinbockel from Siemens AG, Germany, the first runner-up goes to “Smart Heating System” from Telecom Bretagne, France and the NTU team clinched the second runner-up. The NTU team is the only Asian team to be placed in the top three positions and the team received a cash prize of US$2000 and a trophy from Freescale. The prototype attracted a lot of visitors and companies, including Valeo, a French automotive components manufacturer, which has expressed interest in this invention during the forum.

Darryl (2nd from right) and his family members with Dr Tony Tan (centre).

A proud moment for Mr Lin Chenghan (left) and Prof Er Meng Joo (right).
I had chosen to study at NTU because it is one of the world-renowned technological universities. The beautiful standalone campus at one corner of Singapore provides an ideal environment for academic pursuit and stay.

I resided in the Hall of Residence 13 for most part of my undergraduate years. One of the highlights of my hostel life was definitely being in the Freshmen Orientation organizing Committee for my hall for 2 years. The entire experience from planning to execution of the program was very tedious but lots of fun. The initial discussion on the nature of program, thinking of how to deliver a memorable experience to the freshmen enabling them to have fun and to assimilate better into university life was both a tiring and long drawn process. The preparation for each camp took around 6 months. However, the moment we watched the freshmen going through the program that we specially prepared for them, the satisfaction we had confirmed that our effort was truly worthwhile.

Besides the non-academic activities, the 5 weeks of DIP was also great fun to me. Initially our project did not start off smoothly. There were many arguments over the topic and how we should go about doing the project. During the start of the project, all of us were unsure of what to do and how to approach the project. Everyone was just as dazed and confused as everyone else. Everyday we started our project at 8.30am and stayed till 6pm. Over this period, the bonding within our group gets stronger and stronger. I vividly remember that one of my group mates brought along a Korean drama serial, “Full House” and we all watched and got hooked to it – of course after the project sessions. Eventually, everything went well and we managed to achieve good grades while having loads of fun in between. We were definitely living up to the mantra of “Work hard and play hard”.

I was attached to the Institute of Infocomm Research for my industrial attachment where I managed to get a first hand experience of how research work is like. Beside the technical skills and knowledge I acquired during my stay in I²R, I also learnt that work was unlike studying. There is given textbook or syllabus. No one-right answer to every problem. No lecturer to go through my work step by step. All in all there is no spoon feeding. In order to learn and make the most out of my attachment stint, I had to be proactive. A positive attitude definitely helped during my attachment and I even managed to publish some research papers.

Although my current job is not directly related to my specialisation (I am now working in IT department while my specialisation was in electromagnetic propagation, microwave and RF, and antenna design), the soft skills that I had acquired during my course of study such as report writing, presentation skills, interpersonal skills, having an analytical mind and adopting a positive attitude had all aided me tremendously to settle into my new work environment and would definitely put me in good state for my future career development.

I was Top NTU Graduate.

Low Xue Ni
23rd July 2008 was an exciting and memorable day for Class of 2008! Graduands waited eagerly to receive their graduation scrolls on stage while their family members and friends watched that significant moment from the viewing gallery in the Nanyang Auditorium. Pride and happiness were etched on faces and some joyful tears were seen rolling down cheeks.

On this very special day, three Convocation Ceremonies were organized for the Class of 2008. One thousand and one EEE students received their degree of Bachelor of Engineering (Electrical and Electronic Engineering) and four hundreds and seven received their MSc, MEng and PhD degrees. After each ceremony, graduates and their guests were invited to the Convocation Reception held at the lobby of the School of Biological Sciences.

The graduates were hailed with three roaring “Yum Seng” toasts by the EEE School Management Committee and VIPs. This traditional gesture is given to graduates to cheer them on their successes and to also commemorate this noteworthy high point in their life’s journey.

We sincerely wish all our Graduates success in their career and a life full of joie de vivre.
Awards

NTU PhD Graduate Dr Simon Zhang - A Young Professor at Hong Kong Polytechnic University

Graduated with a PhD degree from the School of Electrical & Electronic Engineering (EEE), Nanyang Technological University (NTU) in 2006, Dr Zhang worked as a SMF postdoctoral fellow under the supervision of Assoc Prof Liu Ai Qun. After a short immersion for research and teaching at University of Maryland (College Park), he later grabbed an opportunity to start his academic career in Hong Kong. His PhD research focused in the field of microelectromechanical systems (MEMS) technology. His fruitful study in EEE had opened up plenty of career opportunities to him. As a young researcher, Dr Zhang filed 5 US patents, authored 30 journal papers, co-authored 1 book and received 4 state-level and international awards. In recalling his life in NTU, he said "EEE has a fascinating system, if not the best, to polish raw students into shining diamonds. We have adequate resources; we have to mingle and brew new ideas. Just keep concentrating on the research work year by year, then suddenly we find that we are among the top. That is really thrilling."

NTU is a relatively young university with a short history of PhD training. NTU's first PhD student graduated in 1993. "We are planting a forest and Simon is a tree of the forest. PhD is a high quality training. Excellent development is the core for a PhD multidisciplinary training. These high quality products must be tested in the market." said Prof Liu, who has trained eight PhD graduates since 2001. "All of them got respectable jobs with high salaries and work in institutes or institutions."

Dr Zou Qiyue Won 2007 Young Author Best Paper Award

Assoc Prof Lin Zhiping's former M.Eng student, Dr Zou Qiyue, recently received the prestigious 2007 Young Author Best Paper Award from the IEEE Signal Processing (SP) Society for the paper titled “The Cramer-Rao Lower Bound for Bilinear Systems”. This paper is co-authored by Zou Qiyue, Lin Zhiping and R. J. Ober and published in the IEEE Transactions on Signal Processing (SP), volume 54, number 5, pp. 1666 – 1680, May 2006. The Young Author Best Paper Award honors the author(s) of an especially meritorious paper dealing with a subject related to the (IEEE Signal Processing) Society’s technical scope and appearing in one of the Society’s solely owned Transactions and who, upon the date of submission of the paper, is less than 30 years of age. The prize shall consist of $500 per author and a certificate.

The paper addressed the fundamental problem of evaluating the performance of parameter estimation for a general bilinear system with specific application to biomedical problems arising in surface plasmon resonance experiments. It presented an analytical expression for the Cramer-Rao lower bound (CRLB) for parameter estimation. The paper also demonstrated how to select optimal experimental parameters from the CRLB to improve the accuracy of estimation. The work reported in the paper is part of Dr. Zou's project when he was studying towards M.Eng degree in the School of Electrical & Electronic Engineering (EEE), NTU from 2002 to 2004.

Tan Kah Kee Young Inventors Award 2008

Mr Teo Hang Tong Edwin under the supervision of Professor Tay Beng Kang was awarded the Silver medal in the Tan Kah Kee Young Inventors award (OPEN SECTION) for the creation of the Carbon Nanomattress which is a new hybrid material with tunable viscoelastic properties.

The Carbon Nanomattress (CNM) is a unique smart hybrid material engineered to be fully tunable and simple to fabricate. Even though the fabrication process is simple, the approach is very unique. It uses a plasma process to create a seemingly floating ultra hard film on top of an aligned forest of carbon nanotubes (CNTs). In short it is a 2-dimension (2D) on 1-dimension (1D) approach, since thin films are generally described as 2D while CNTs are 1D. Key features of this material system consist of an ultra hard surface of Diamond-like Carbon (DLC) with an elastic CNT bottom layer "fixed" together by strong covalent bonds. The entire material could be fabricated in one single process making production simple and straightforward.

Interestingly, this hybrid material was inspired by falling snow on a bush. While on a research attachment in Japan, the inventor noticed how snow could be collected on top of a bush hedge. Noticing how a smooth layer of snow could be formed on a seemingly rough top surface, the same concept was adopted to fabricate the CNM. All it took was replacing the bush with aligned CNTs and snow with Carbon ions and the CNM was conceived.
New Faculty
(from January 2008 to January 2009 )

Division of Power Engineering

Dr Gahan Amaratunga
Cheng Tsang Man Visiting Professor
January 2009

Gahan Amaratunga is the 1966 Professor in Engineering at the University of Cambridge. He currently heads the Electronics, Power and Energy Conversion Group, one of four major research groups within the Electrical Engineering Division of the Cambridge Engineering Faculty. He has worked for 24 years on integrated and discrete electronic devices for power conversion, and on the science and technology of carbon based electronics for 21 years.

He has an active research programme on the synthesis and electronic applications of carbon nanotubes and other nanoscale materials. His group has many ‘firsts’ emanating from his research in carbon, including field emission from N-doped thin film amorphous carbon and diamond, laboratory synthesis of carbon nanonions, tetrahedral amorphous carbon (amorphous diamond)-Si heterojunctions, deterministic growth of single isolated carbon nanotubes in devices, high current nanotube field emitters and the polymer-nanotube composite solar cells. He is also has research interest in nanomagnetic materials for spin transport devices.

He has previously held faculty positions at the Universities of Liverpool (Chair in Electrical Engineering), Cambridge, and Southampton. He has held the UK Royal Academy of Engineering Overseas Research Award at Stanford University and been a Royal Society visitor at the School of Physics, University of Sydney. He has published over 450 journal and conference papers. Professor Amaratunga was elected a Fellow of the Royal Academy of Engineering in 2004. In 2007 he was awarded the Royal Academy of Engineering Silver Medal for outstanding personal contributions to British engineering.

Implementation of acoustic array and seismic fusion algorithms for perimeter security systems. During his post-doctoral research, he is exposed to the challenges of localizing and classification of human footsteps based on seismic signals and has experience in DOA estimation of acoustic sources for both indoor as well as outdoor applications. His Ph.D. research was mainly on partial-update and selective-tap adaptive algorithms with applications to mono- and multi-channel acoustic system identification (echo cancellation) for hands-free telephony. He has also published works on acoustic blind channel identification for speech dereverberation. His other research interests include speech enhancement, blind deconvolution algorithms, speech recognition as well as acoustic propagation in solids. He was the recipient of the best student paper award at the International Workshop on Acoustic Echo and Noise Control 2005.

Division of Circuits & Systems

Dr Shi Xiaomeng
Teaching Fellow
01 June 2008

Dr. Shi Xiaomeng received her B.Sc. degree in Microelectronics from Peking University, China, in 2003. She then received her Ph.D. degree in Elect. Eng. from Nanyang Technological University, Singapore, in 2007. From August 2006 to June 2007, she worked as a Project Officer in NTU. From July 2007 to May 2008, she worked as a Research Fellow in Center for Integrated Circuits & Systems, NTU. Her research interests are in Device modeling, IC packaging and Testability of VLSI. She has been cited in Marquis Who’s Who in Science and Engineering.

His paper titled “Chemical-shift artifact correction in water-fat separation with bipolar multi-echo sequences” won the second place best poster award at the International Symposium on Magnetic Resonance in Medicine (ISMRM) 2007. Recently, he has developed a new imaging technique that enables distortion-free MRI near metallic implants with clinically feasible scan times.

Division of Information Engineering

Dr Andy Khong
Assistant Professor
05 May 2008

Dr. Khong joined NTU as an Assistant Professor in the School of Electrical and Electronic Engineering in May 2008. Prior to that, he obtained his Ph.D. (02-05) in acoustic signal processing from the Department of Electrical and Electronic Engineering, Imperial College London, after which he also served as a research associate (05-08) in the same department. He obtained his B.Eng. (98-02) in NTU majoring in communication engineering.

Andy's postdoctoral research involved in developing signal processing algorithms for vehicle destination inference as well as the design and implementation of acoustic array and seismic fusion algorithms for perimeter security systems. During his post-doctoral research, he is exposed to the challenges of localizing and classification of human footsteps based on seismic signals and has experience in DOA estimation of acoustic sources for both indoor as well as outdoor applications. His Ph.D. research was mainly on partial-update and selective-tap adaptive algorithms with applications to mono- and multi-channel acoustic system identification (echo cancellation) for hands-free telephony. He has also published works on acoustic blind channel identification for speech dereverberation. His other research interests include speech enhancement, blind deconvolution algorithms, speech recognition as well as acoustic propagation in solids. He was the recipient of the best student paper award at the International Workshop on Acoustic Echo and Noise Control 2005.

...continued on page 20
Division of Communication Engineering

Dr Chinlon Lin
Nanyang Visiting Professor
April 2008

Professor Lin received his BSEE from National Taiwan University in 1967, MS from University of Illinois (Champaign-Urbana) in 1970, and Ph.D. from University of California, Berkeley in 1974. At UC Berkeley he was a recipient of an IBM Graduate Fellowship. He joined AT&T Bell Labs’ Laser Sciences Research Department, Holmdel, NJ, in 1974. At Bell Labs, his research included studies of nonlinear optics in fibers and high-speed semiconductor lasers. He originated and demonstrated the first idea of both dispersion-shifted fibers (DSF) and dispersion-compensating fibers (DCF) that have become the ubiquitous fiber infrastructure of today’s long-haul high-speed fiber transmission systems and global undersea optical fiber networks. In 1984 he was on leave from Bell Labs as a Visiting Professor at the Tech. University of Denmark. He joined Bellcore (Bell Communications Research) in 1986, where he was Director of Broadband Lightwave Systems Research. He led a group working on broadband optical access architectures and technologies such as FTTH (Fiber-to-the-Home), FTTC, HFC systems, DWDM tunable filters and EDFA for high-capacity digital and analog video systems, and lightwave systems video distribution for HFC networks. He joined Tyco Submarine Systems B & D Labs (formerly AT&T Submarine Systems) in September 1997, to work on DWDM global long-haul undersea fiber networks. In May 2000 he founded Jedai Broadband Networks, a startup on Fiber-to-the Business high-speed access solutions for the cable TV industry in the US.

From 2003 to 2007 he was with Chinese University of Hong Kong (CUHK) as Professor of Photonics and Director of Institute of Optical Science and Technology and the Center for Advanced Research in Photonics, and as a Professor of both the Electronic Engineering and Information Engineering departments. At CUHK, he was involved in research on Next-Generation Lightwave Systems and Broadband Optical Access Networks, and Nonlinear Photonic Signal Processing using Photonic Crystal Fibers. He also initiated a small research effort in Biophotonics, focusing on Bio-Sensing and Bio-Imaging, with applications to cancer cell apoptosis studies.

Professor Lin has published over 180 papers and international conference presentations, contributed several invited book chapters and holds 12 patents. He was an Associate Editor for IEEE Journal of Lightwave Technology and IEEE Photonics Technology Letters, and was on the technical program committees for OFC (Optical Fiber Communications Conference) and European Conference on Optical Communications (ECOC). He has edited 2 books, the more recent one being “Broadband Optical Access Networks and Fiber-to-the Home”, published by Wiley in August 2006.

He is a Fellow of both IEEE’s LEOS (Lasers and Electro-Optical Society) and OSA (Optical Society of America). He has also served as a Technical Advisor to ITRI (Industrial Technology Research Institute) in Taiwan and ASTR (Applied Science and Technology Research Institute) in Hong Kong. He is also a Bao Yu-Xiang Guest Chair Professor of Zhejiang University, Hangzhou, China, and a Guest Chair Professor of National Chiao-Tung University, Hsinchu, Taiwan.

Dr Chin-Hui Lee
Cheng Tsang Man Visiting Professor
June 2008

Chin-Hui Lee is a professor at School of Electrical and Computer Engineering, Georgia Institute of Technology. Dr. Lee received the B.S. degree in Electrical Engineering from National Taiwan University, Taipei, in 1973, the M.S. degree in Engineering and Applied Science from Yale University, New Haven, in 1977, and the Ph.D. degree in Electrical Engineering with a minor in Statistics from University of Washington, Seattle, in 1981.

Dr. Lee started his professional career at Verbex Corporation, Bedford, MA, and was involved in research on connected word recognition. In 1984, he became affiliated with Digital Sound Corporation, Santa Barbara, where he engaged in research and product development in speech coding, speech synthesis, speech recognition and signal processing for the development of the DSC-2000 Voice Server. Between 1986 and 2001, he was with Bell Laboratories, Murray Hill, New Jersey, where he became a Distinguished Member of Technical Staff and Director of the Dialogue Systems Research Department. His research interests include multimedia communication, multimedia signal and information processing, speech and speaker recognition, speech and language modeling, spoken dialogue processing, adaptive and discriminative learning, biometric authentication, and information retrieval. From August 2001 to August 2002 he was a visiting professor at School of Computing, The National University of Singapore. In September 2002, he joined the Faculty Georgia Institute of Technology.

Prof. Lee has participated actively in professional societies. He is a member of the IEEE Signal Processing Society (SPS), Communication Society, and the International Speech Communication Association (ISCA). In 1991–1995, he was an associate editor for the IEEE Transactions on Speech and Audio Processing. During the same period, he served as a member of the ARPA Spoken Language Coordination Committee. In 1995–1998 he was a member of the Speech Processing Technical Committee and later became the chairman from 1997 to 1998. In 1996, he helped promote the SPS Multimedia Signal Processing Technical Committee in which he is a founding member.

Dr. Lee is a Fellow of the IEEE, and has published more than 250 papers and 25 patents on the subject of automatic speech and speaker recognition. He received the SPS Senior Award in 1994 and the SPS Best Paper Award in 1997 and 1999, respectively. In 1997, he was awarded the prestigious Bell Labs President’s Gold Award for his contributions to the Lucent Speech Processing Solutions product. Dr. Lee often gives seminal lectures to a wide international audience. In 2000, he was named one of the six Distinguished Lecturers by the IEEE Signal Processing Society. He was also named one of the two ISCA’s inaugural Distinguished Lecturers in 2007–2008. Recently he won the SPS’s 2006 Technical Achievement Award for “Exceptional Contributions to the Field of Automatic Speech Recognition”.

Cheng Tsang Man Visiting Professor
January 2008

Vincent W. S. Chan is the Joan and Irwin Jacobs Professor of Electrical Engineering & Computer Science and Aeronautics & Astronautics at MIT.

He received his BS (71), MS(71), EE(72), and Ph.D.(74) degrees in electrical engineering from MIT in the area of communications. From 1974 to 1977, he was an assistant professor with the School of Electrical Engineering at Cornell University. He joined Lincoln Laboratory in 1977 as a staff member of the Satellite Communication System Engineering Group working on military communications and networking. In January 1981, he became the Assistant Leader of the Communication Technology Group starting a research and development program on optical space communications. In July 1983, he formed and became Leader of the Optical Communication Technology Group and Manager of the LITE (Laser Intersatellite Transmission Experiment) Program.
Being a member of IEEE, focus on emerging Si-based Nano Electronic Device, e.g. novel Non-Volatile Memory; sub-22nm CMOS devices; SiGe based Nano-wire devices; Si based Photovoltaic devices; and Si photonics.
New Research, Technical & Administrative Staff
(from January 2008 to December 2008)

Chair's Office
Tan Lye Neo, Elsa Lee Wai Leng
Neo Teng Kim Mary Lo Yen Leng, Yvonne Douglas Tilaka Tan Chong Lern, Gareth Rebecca Ng Poh Woon

Division of Power Engineering
Ding Yi Huang Jiyian Shen Weixiang Wang Xiaoyu Dong Jiuxiang Gao Feng Nguyen Huy Tung Zhu Xunlin Aung Myint Khang Chandana Jayampathi Gajodayake Lin Xue-jin Elvin Muhammad Zuhdi Siow Lip Kian Yan Shining Zhang Jia Hum Kam Ming Wang Tianjiao You Jia

Division of Circuits & Systems
Law Syn Pui Nagarajan Mahalingam Lu Yang Soh Weshan

Division of Information Engineering
Chen Zhenzhong Ji Peifeng Pong Hon Keat Puhan Niladri Bhari Zhou Rong Chuah Seong Ping Dahyanto Harlino Dwya Venkataraman Hung Tzu-Yi Sim Kim Song Vijay Meenakshisundaram Zhang Yi Agus Trinajaya Kwete Fu Kangkang Mao Dansheng Ng Lai Kwan Nguyen Viet Anh Phan Buu Minh Reuben Johannes Yap Xuexin

Division of Control & Instrumentation
Zhang Jingxin Che Weiwei Lau Shek Kwan, Mark Sun Mingxuan Wang Yang Yu Mei Zhao Yanlong Dinh Nguyen Vinh Phuc Hu Kunlun John Stephen Mullane Meng Wei Nopphawat Kritudomrat San Linn Wang Hongxia Zhai Lianxin Li Rui Gao Tingting Hang Yue Li Tao Ma Shiao Yue Siew Peng Chan Hian Kuan

Division of Communication Engineering
Zheng Boyu Zhou Jie Huang Xiaodong Liu Zilong Meng Yusong Bobby Koh Kok Sun Nguyen Duc Duong Sun Xiaofeng

Division of Microelectronics
Huang Hui Yang Huiying Zhao Luming Anastasia Sorkin Ang Ran Chen Xiaofeng Dai Haitao Ding Ying Huang Kai Ji Xianghong Li Haijun Li Jingqi Li Junshuai Tu Xiaoguang Wang Yanggang Wong Chi Lok Yang Yi Yi Mingdong Yuan Guanghui Zhang Baolin Zhang Douguo Zhang Jian Zhang Qinyuan Zhang Weili Zhang Xuejin Zhu Shalui Zhu Yuanhui Pham Huynh Tram Hu Zhijian

Centre for Signal Processing Centre
Zhang Tongtong Guo Xufeng Ye Myint Lu Dawei

Positioning and Wireless Technology Centre
Lu Liru Yu Qian Lim Wei Chee Priyanka Mondal Tan Weihua Tang Xiaoyan Xu Ying Zhong Weiyu Koh Kee Siong Kyaw Myat Thu Xua Jingjing Xua Xiaotian

Satellite Engineering Centre
Chua Tai Wei Narayanaswamy Nagarajan Bu Huizheng Chew Wee Beng, Eric

Network Technology Research Centre
Ren Lina Technical Specialist
A Tribute to
Assoc Prof Chin Mee Koy

The EEE community mourns the loss of our colleague, Assoc Prof Chin Mee Koy, who passed away peacefully on 18 November 2008, at the age of 49 after a long brave battle with nasopharyngeal cancer.

Assoc Prof Chin joined NTU in 1993 and was one of the founders of the Photonics Laboratory in the School - the first photonics laboratory of its kind in Singapore. His effort had resulted in the recognition of NTU’s photonics research by the international community and culminated in the formation of the Photonics Research Centre in the School of EEE in 2003.

As a scientist, Assoc Prof Chin was enthusiastic, creative and rigorous. He had an excellent research track record. Throughout his career, Assoc Prof Chin had contributed significantly to photonics and engineering. One of his major contributions was in the design and realization of high-speed quantum-well electro-absorption modulator for which his papers were widely cited. Another area was in nanophotonics, where he pioneered the modeling and realization of micro-ring resonators as highly integrated components in photonic integrated circuits. In spite of his illness, in the past 5 years, his publications were many and varied, covering innovative designs of optical resonator system, vertical waveguide coupler, polarizer, DWDM devices and nanofabrication techniques of such devices. Till his very last days, he worked diligently as the General Chair of the IEEE Photonics Global @ Singapore conference, which was held on 9 – 12 December 2008. His effort raised the international prestige of the conference, which was attended by a number of eminent international scientists.

Assoc Prof Chin was not only a good researcher and lecturer, but also a good friend to his colleagues and students. He was well loved and respected by students. His students remembered that Assoc Prof Chin preferred being addressed as ‘advisor’ rather than ‘supervisor’, because for him a ‘supervisor’ is like ‘the one who watches behind your back while you are working’. He believed in working together with his students on equal grounds rather than instructing his students like a superior. He was a very casual and approachable mentor with no air of superiority, and gave his students the most optimal environment to excel in what they sought.

While we grieve the loss of a good colleague, Mrs Chin Mee Koy and her four young children mourn the loss of a caring husband and father, who had been the sole breadwinner of the family. The University had assisted the late Assoc Prof Chin’s family to cope during the difficult period in various ways, and one of these was a fund-raising exercise to help alleviate the long-term financial situation of the family. Faculty and staff members in the Nanyang Community have rallied around the family to provide support in one way or another. Our thoughts are with Mrs. Chin and the four children as they deal with their grief.

Assoc Prof Chin had made significant contributions to NTU and the international photonics research community. His love for photonic science and engineering never faded away even until his last moment. Science and engineering were his passion. As a friend, colleague and teacher, Assoc Prof Chin will always be well remembered and sadly missed.
Memorandum of Agreement between NTU and Panasonic Semiconductor and the Joint Industry Postgraduate (JIP) Programme Agreement

Prof Kam Chan Hin (right) exchanging the MOA and JIP Agreements with Mr Akinobu Minagawa (left), Managing Director, Panasonic Semiconductor.

A Memorandum of Agreement (MOA) was signed on 27 Dec 2007 between the School of Electrical and Electronic Engineering (EEE), Nanyang Technological University (NTU) and Panasonic Semiconductor Asia Pte Ltd.

NTU and Panasonic Semiconductor had established the first Memorandum of Understanding (MOU) about two and a half years ago to undertake the research and development of digital audio amplifiers. The research collaboration created an important platform for professors and graduate students from NTU and engineers from Panasonic to share and exchange ideas. This MOA further extends and strengthens the collaboration between NTU and Panasonic into other research areas such as design of integrated circuits for power management, audio and video applications.

A Joint Industry Postgraduate (JIP) Agreement was also signed by the School of EEE, NTU, Panasonic Semiconductor and Economic Development Board (EDB) on the same day. This tripartite partnership between NTU, Panasonic and EDB is probably one of the best partnerships that leverages on the strength of each party and creates a win-win situation for all partners. First, it will enhance the research capabilities of NTU which provides graduate training and expertise in circuit design and theoretical analysis. Second, it will strengthen the R&D capabilities of Panasonic which provides the market knowledge and know-how in designing low cost, reliable and high performance integrated circuits (ICs) for consumer electronic products. Finally, it will sustain the growth of the semiconductor industries in Singapore with EDB providing the necessary institutional support for manpower training.

The IC design industry is an important component in the ecosystem of the semiconductor industry. In the last few years, there has been dramatic growth in IC design activities in Singapore because of the increasing number of electronics companies going into research, design and product development here. As Singapore's economy further expands into the high value added arena, it need more skilled manpower with expertise in analog, mixed-signal, digital and RF IC designs to sustain the growth of this industry. This is because IC design companies depend heavily on technological innovation, scientific advancement and engineering excellence to stay on top. In this respect, the Singapore government has made substantial investments through education and manpower training for the continued growth of this industry.

Both NTU and Panasonic Semiconductor have committed at total of $2.3 million for the postgraduate training and scholarships. The graduate students will be jointly supervised by professors from NTU and the R&D staff from Panasonic Semiconductor. This shows how academics and industries can work hand-in-hand to produce synergetic research outcomes.
Singapore’s semiconductor industry has grown by leaps and bounds over the years as the country stepped up efforts to transform itself into a knowledge- and innovation-driven hub. Singapore is a hot favorite for semiconductor manufacturing and design solutions with $23 billion in annual sales. One of the important factors behind this accomplishment is Singapore’s highly skilled and tech-savvy talent pool which comprises of over 1,000 highly qualified IC design engineers (of which about two-thirds are RF, analogue and mixed signal designers) and more than 10,000 fresh engineering graduates joining the workforce every year. Singapore has a complete semiconductor value chain from design through to manufacturing, including research and development and HQ activities. Any company can dream of doing just about anything here. Singapore also provides operating companies with a flexible business environment to either ramp up or scale back on production quickly.

This winning formula appeals to O2Micro, a leading supplier of innovative power management and security components and systems, and it opened its R&D center in Singapore in 1999. With a staff strength of more than 40 employees, together with its aggressive investment in R&D, O2Micro has stayed close to their customers while maintaining their technology lead and as one of Singapore’s top performing R&D teams. O2Micro’s patent portfolio has increased from 38 patents in 2002 to 376 patents in 2007. O2Micro strong Intellectual Property is the reason for it attaining approximately 50% of the market share in inverter and about 40% of the market share in CardBus/PCI Express. Its sales have grown from $40 million in 2000 to $165 million in 2007 and achieved a record profit of $25 million in 2007.

In his talk, Mr Du shared with the audience O2Micro’s recipe for success and his plans for O2Micro’s future. Indeed, O2Micro is doing research into energy efficiency, environment awareness and internet security. These key areas are fast evolving and they will change the way we live, play and work.

About 200 staff and students as well as some industrialists attended the talk which provided a good platform for students and new players in the IC design and semiconductor industry to interact and gain new insight into this exciting research area.

The Division is hopeful that with more partnership with industrial players, the School of EEE is able to build stronger ties with the industry, prepare its students for the high-end job market and get more scholarships for students to do IC design. Students selected for the scholarship will work on cutting edge research projects which will be tailored to meet industry trends and demand.

About 200 staff and students as well as some industrialists attended the talk which provided a good platform for students and new players in the IC design and semiconductor industry to interact and gain new insight into this exciting research area.

The Division is hopeful that with more partnership with industrial players, the School of EEE is able to build stronger ties with the industry, prepare its students for the high-end job market and get more scholarships for students to do IC design. Students selected for the scholarship will work on cutting edge research projects which will be tailored to meet industry trends and demand.
This project aims to develop a new paradigm for human-machine interaction by transforming everyday objects into a human-machine interface. Current input devices such as the alphanumeric keyboard or optical pointing device limit the ease of use of portable gadgets and prohibit humans from interacting with machines in a natural way. The goal of this work is to remove such constraints by employing a network of sensors which capitalizes on the acoustic propagation through the solid medium and in turn detects vibrations caused by the human touch. New signal processing algorithms employing time-reversal and acoustical holography techniques, which are intended to overcome the shortcomings of the traditional time-difference-of-arrival method, will be developed to localize the wave generating source. We also incorporate a voice-command module by developing new dereverberation algorithms which address the well-known common-zeros problem when the system is used with limited number of microphones in an enclosed environment. To achieve hi-fidelity audio reproduction for users’ feedback, directional audio beam focusing algorithms will be incorporated with conventional loudspeakers with the aim of creating and controlling “tune-in” zones that maximize sound energy. This research will benefit the medical, educational and the commercial industries.

The proposed research encompasses several innovative elements: the development of novel human-machine interface, acoustic source localization algorithms for vibrations in solids, blind system identification and deconvolution algorithms and research into the interaction of directional sound beam with spherical wave for hi-fidelity audio beam focusing.

The outcomes of this research will be of high value to the commercial, defense, educational and medical industry as well as to the academic community involved in the development and operation of interactive digital media applications for both portable and stationed devices. In terms of multimedia home entertainment, the outcome of this project will improve ways in which humans operate musical instruments on PCs or games on gaming consoles. This research will also benefit patients with physical, sensory as well as developmental disabilities, undergoing physiotherapy or requiring assistive technologies. Recently, Singapore has established a S$12m rehabilitation facility for such purposes and this research will leverage on such infrastructure for commercial roll-out and exploitation. As an example, software applications can be developed according to patients’ requirements for motor disability rehabilitation. Developers of instant messaging (IM) applications such as Skype, Microsoft Live Messenger and the recently developed Google Lively can benefit from this technology since functions requiring complex user input operations can now be built around such application core. New applications can include virtual blackboard sharing, avatar control, image manipulation and sharing. Through the use of audio beam focusing technology, IM users can interact in the virtual world without the need for headphones.
Visual and Force Feedback-enabled Biomolecular Docking

The computer graphics methods and techniques allow real-time interactive visualization and manipulation of 3-dimensional (3D) objects in virtual environment. The assembly of molecules in a 3D space or molecular docking is used for rational drug design. These techniques help the user to understand molecular interactions and to evaluate the design of pharmaceutical drugs. In recent years, besides the visualization techniques, there has been increasing interest in using haptic interfaces to facilitate the exploration and analysis of molecular docking. Haptic device could enable the users to manipulate the molecules and feel its interaction during the docking process in virtual laboratory or even in shared collaborative environment. Research group led by Asst Prof Olga Sourina is working on methods and algorithms for haptic-based docking in a Virtual Reality (VR) environment to predict favourable transmembrane helix interaction. The project has two main directions. First, we develop molecular docking system that can be used both in research and education. The system is implemented as a stand alone application, and currently we are working on its implementation in collaborative virtual environment for educational application. Second, we develop helix-helix docking system that is a part of biological research conducted in SBS. Currently, we are developing a prototype of Transmembrane α-helices Docking System HMolDock (Haptic-based Molecular Docking) using the haptic device PHANTOM 1.5/6DOF (6 degrees of freedom). The project is supported by 3 years MOE research grant RG10/06. This is an interdisciplinary research in collaboration with School of Biological Science.

The visualization and haptic rendering methods and algorithms developed in this project are applied in other research projects such as Virtual Orthopedic Surgery, Visual Data Mining, etc.
Dr M.P. Selvan and Mr G. Saravana Ilango, faculty members of the Department of Electrical and Electronics Engineering of the National Institute of Technology Tiruchirappalli (NITT), India, have been sponsored by NITT to undergo training in the field of power engineering at the School of Electrical and Electronic Engineering, Nanyang Technological University (NTU), Singapore. The training at a foreign university is one of the activities of NITT under the Technical Education Quality Improvement Programme (TEQIP) sponsored by the World Bank and initiated by the Government of India to promote academic excellence of the NITT faculty. They are working with Prof Lalit Goel and Assoc Prof Wang Peng of NTU’s School of EEE, Singapore, during this one-month training. Their project is mainly on reliability management of distribution systems with distributed generators. This visit and discussions they had with the School faculty members will be a good initiative for exchanging technical ideas. This visit will also provide an initiative for future interactions, collaborative research and joint publications, which will enhance the growth of power engineering education and research at both institutes.

Another Visiting Researcher is Mdm Qin Wenping, a visiting scholar under the financial support of Chinese government. The visiting period is from August 2008 to August 2009. Mdm Qin is a lecturer from the College of Power Engineering at Taiyuan University of Technology, China. Her research areas include power system analysis, power system protection, and power system planning and operation. She is currently working on the impact of reactive power sources on power system operation and reliability with Assoc Prof Wang Peng.
What course do you teach?
I teach Linear Algebra, a topic in Engineering Mathematics II (EE2007).

How big is the class?
The class has about 500 to 600 students.

Are there any challenges specific to the course that you are teaching?
EE2007 is commonly deemed as a very difficult course by many students and being mathematics, it involves details. It is a challenge to make the subject matter interesting. Besides, due to the different background of students and wide variations in students’ ability, it is challenging to find a level and a pace which most students find comfortable.

It is often difficult to teach a big class as the students’ ability could vary greatly. How do you reach out to both the strong and weak students effectively?
I always encourage students to ask questions and participate in discussion not only in tutorials but also in lectures. Being a firm believer of active learning, I frequently encourage students to be passionate about learning and emphasize the importance of knowledge. I encourage them to read books and think beyond the classroom. I give extra quizzes to students and motivate them to take part in the quizzes by giving copies of my book entitled “Engineering Mathematics with Real-World Applications” as prizes. To the weaker students, I encourage them to see me during consultation hours. Every individual has different needs. I try my best to help them whenever I can. It is important that we care for the development of a student, regardless of his or her ability. One Ministry of Education Scholar from China sent me an email to show his appreciation of my teaching methods on 23 December, 2006. He wrote “... the way you enlightened me in creative problem solving have been an unforgettable experience and it would benefit me for the rest of my life...”. I was also interviewed by the EEE Club for the EEE Graduation Year Book on 28 March, 2007 and the EEE Club’s Annual Magazine Bandwidth on 2 May, 2008 regarding my teaching philosophy and methodologies.

What do you do to engage students’ interest during formal contact hours?
Contrary to the perception of students, mathematics is actually a very interesting subject. I think the most beautiful thing about mathematical problems is that there is frequently more than one approach to solve the same problem. This is certainly the case in Linear Algebra. I frequently show different approaches in solving the same problem and discuss the pros and cons of the approaches. Besides, mathematics, being a “mother of science”, is used in all engineering courses and it is useful to demonstrate their applications in some engineering courses which students have learnt or are learning. For example, students have learnt how to solve differential equations in previous years. I show the inter-relationship between differential equations and Linear Algebra and students find it interesting when they are able to connect what they are learning with what they have learnt before. Furthermore, many students have actually known how to solve a problem but they do not normally know why we are solving a problem in a certain way. I frequently show them “why” as well as “how” and I find that they can appreciate the subject matter better.

How do you sustain students’ interest in an engineering course which is typically technical and dry?
In order to make Linear Algebra interesting and easier to understand, I make use of software tools such as MATLAB to help them visualize some abstract concepts and give them some useful external links as extra resources. I also demonstrate possible applications of some of the concepts to students during the lectures so that they can appreciate what they are learning.

Recent enrolment trends show that students’ interest in traditional engineering disciplines is waning. What can be done to improve the situation?
The reason why students are moving away from traditional engineering disciplines is not because professors are not doing a good job. I think the shift is primarily due to publicity and propaganda by peers. In order to improve the situation, it is important for us show that traditional engineering disciplines are actually very interesting and are very important to the economy. We can begin by publicizing that we do have outstanding students in traditional engineering disciplines. For example, Mr Li Chenghan, a third-year EEE student led an NTU team in the Freescale Technology Forum Design Challenge Europe held on 7 October, 2008 and the team emerged Second Runners-Up beating more than 150 other teams. More details of their achievements can be found at http://www.ntu.edu.sg/eee. Their achievements not only show that we do have excellent students in EEE but also traditional engineering disciplines are pretty much alive. One can argue that without the knowledge and know-hows in traditional engineering disciplines, the team would not have won. Another reason why students’ interest in traditional engineering disciplines is waning is that potential students perceive engineering disciplines as very technical, try and boring. In this context, it is important for professors to find all possible ways to make the subject matter interesting and exciting. In this context, I like to congratulate the School of EEE in their foresight in giving the Teaching Excellence Awards to professors who achieve outstanding teaching performance annually.
Year 3 Teaching Awards 2008
Assoc Prof Mohammed Yakoob Siyal

What course do you teach?
I teach EE3002 Microprocessor (third year) and EE4758 Computer Security (final year). I also am responsible for a Software Engineering tutorial (final year).

Are there any challenges specific to the course that you are teaching?
For EE3002, the class size is large (about 250 - 350 in each class and there are 3 groups) and for most students this is the first course in this area. Thus it is a real challenge to keep them engaged and interested (Well I would say awake).

It is often difficult to teach a big class as the students’ ability could vary greatly. How do you reach out to both the strong and weak students effectively?
My philosophy is that each student is capable of learning, provided he/she has the right environment. As the saying goes “The more relaxed the learning environment is, the more a student will not fear failure. The sticker the learning environment is, the greater the student will fear failure”. Thus, I create a conducive environment in the class and encourage students to ask questions and clarify their doubts. I always encourage students regardless their level of understanding as ones a wise person said “The Thumps up awakens the good student. The index finger forces out the weak students”.

What do you do to engage students’ interest during formal contact hours?
In a large class student tend to loose focus and some even fall asleep. Thus in order to keep them focused, motivated and interested, I tell them short jokes, motivating stories, quotes and challenging but interesting (and related to the subject) brain teasers. This technique has helped students as I have received numerous e-mails from students thanking me to have motivated them and lots of them request for those motivational quotes and stories so that their siblings/friends can benefits from it as well.

How do you sustain students’ interest in an engineering course which is typically technical and dry?
Engineering courses don’t have to be dry, as professor can prepare lecture slides in such a way that the boring and dry subject becomes more interesting. I make extensive use of PowerPoint and animation. I integrate simulation and demos in my lectures so that students have a good idea about how things work. For example, for Microprocessor subject, I simulate the whole computer system (memory, CPU, Registers) using animation techniques and run that simulation to demonstrate hardware/software (assembly language) concepts. After the class, students have a clear idea as they can visualize the whole system and can relate it to everyday life.

Recent enrolment trends show that students’ interest in traditional engineering disciplines is waning. What can be done to improve the situation?
Make the course contents appealing and most important of all present it in an interesting way. The Internet and gadgets have totally changed the education landscape, and the education delivery methods must change according. Over the years I realized that students love animation, and practical example and all these additional tools make the subjects more interesting. Also a professor must love teaching, must know the material and must know his students.
Mr Yoga Divayana Received IEEE-Laser and Electro-Optics Society Graduate Student Award

Mr Yoga Divayana, a Singapore Millennium Foundation post-doctoral fellow at School of EEE, was honored with the 2008 IEEE-Laser and Electro-Optics Society (IEEE-LEOS) graduate student award presented by the Institute of Electrical and Electronics Engineers, IEEE-LEOS, for his contributions in interface modification, exciton confining structure and quenching effect in organic light-emitting diodes. It is the first time that a Singapore-based graduate student won the award since its establishment in 1999.

The IEEE Lasers & Electro-Optics Society established the Graduate Student Fellowship Program to provide Graduate Fellowships to outstanding LEOS student members pursuing graduate education within the LEOS field of interest (electro-optics, lasers, photonics, optics, or closely related fields). Up to twelve Fellowships of one-time honorariums are awarded, based on the student membership in each of the main geographical regions: Americas-Europe/Mid-East/Africa-Asia/Pacific. A travel grant to travel and lodging expenses plus a complimentary conference registration were also given to each Fellowship recipient to attend the LEOS Annual Meeting for the award presentation.

During the three years of PhD study, Yoga Divayana has published 10 first-author papers in the international peer-reviewed journals, among them are one paper in the world’s foremost Physics Journal of Physical Review Letters; this work was also selected for publication in the Virtual Journal of Biological Physics Research, four papers in the Journal of Applied Physics Letters, a paper in the Journal of Organic Electronics, and four papers in others highly respected scientific journals. He has also contributed 5 papers in various international conferences.

Students Won Third Taiwan Semiconductor Manufacturing Company Outstanding Student Research Award

Miss Ong Yi Ching and Mr Li Xiang, PhD Students in EEE, have received the bronze and commendation awards in the 3rd Taiwan Semiconductor Manufacturing Company (TSMC) Outstanding Student Research Award under category III: Physics, Chemistry of Material for Nano-Scale Devices, respectively. The awards are for their contributions in the study of the failure mechanisms of advanced dielectric materials using physical characterization tools such as scanning tunneling microscopy (STM), scanning transmission electron microscopy (STEM) and electron energy loss spectroscopy (EELS).

The high resolution capability of STM technique allows localized property of the gate stack to be investigated, hence avoiding area-averaging effect in the conventional electrical study on capacitor or transistor structures. It provides useful information particularly to the understanding of intrinsic trap generation mechanism under electrical stress. Study on the interaction between the as-processed defects in the respective layers of the gate stacked, hence the implication to the reliability of the entire gate stacked, is also presented. The STEM-EELS technique is used to unearth the mystery of the Nano-Scale percolation path induced by dielectric breakdown. The significant advancement of the work is the bridging of the microscopic material properties (e.g., local dielectric function, band structures and bonding) with macroscopic electrical properties. The findings from these two techniques are critical to the development of dielectric systems made from polymeric, ceramics, low-k, and high-k materials for future device applications.

Post Doctoral Fellow from EEE Won the Second Prize of “Science as Art” Competition in 2008 Materials Research Society Spring Meeting

Dr Yang Huiying, a LKY post-doctoral fellow in EEE, was awarded second place prize of “Science as Art” competition in 2008 Materials Research Society (MRS) Spring Meeting for her ZnO nanoneedles work. This is a cross-sectional scanning electron microscope photograph of an array of newly synthesized, highly crystalline ZnO nanoneedles deposited by ion beam sputtering method. Besides the excellent performances the ZnO nanoneedles exhibited, this microphotograph represents itself an aesthetic landscape painting full of art and beauty. After color is added to the SEM image, the nanoneedles looks like beautiful mountains in a Chinese painting.

Mr Yoga Divayana in Lake of Geneva during a conference in Switzerland.

Dr Yang and her winning work.
This treatise presents A/P Sun’s systematic work in the past few years, including the formulation, verification and applications of his original theories of bond order-length-strength correlation and the local bond average approach. The article also reports the following breakthroughs: (1) Provision of predictive observations and materials design from the perspective of bond formation, dissociation, relaxation and vibration, and the associated energetics and dynamics of charge polarization, repopulation, localization, and densification. (2) Unification of the mechanical behavior of monatomic chains, nanotubes, nanowires, nanograins, nanocavities, liquid and solid skins, nanocomposites and interfaces under thermal stimulus. (3) Discovery of the origin for the superhydrophobicity, superlubricity, and superfluidity at nanocontacts. (4) Provision of means for bond energy and atomic energy level determination.

Carrying an impact factor of 20.845, Progress in Materials Science publishes bimonthly authoritative reviews of recent advances in the science of materials and their exploitation in engineering.
Dancing Robot Show at the Singapore Discovery Centre

The Young Talents Showcase is a joint collaboration between the School of Electrical and Electronic Engineering (EEE), NTU and the Singapore Discovery Centre (SDC) to use robotics to bring the Singapore Story to the public. Supervised by Professor Er Meng Joo, this project involves showcasing recent projects done in the field of entertainment humanoid robots in NTU at the SDC. A team of twelve students participated in the project. The twelve students are:

1. Sreejith Balakrishnan (Overall Coordinator)
2. Jonathan Chon Kok Wai (Head of Dance Team)
3. Tan Teck Chin (MAE student and designer of the Interactive Robot)
4. Chen Xinyi
5. Chua Qijing
6. Kristo
7. Lee Kay Peng
8. Lin Wen'an
9. See Wei Xiang Jerrick
10. Seen Jian Yi, Roger
11. Tan Junjie
12. Wee Phie Lip

The robots used for this project are the popular Robonova-1 humanoids by Hitec. Following a month’s meticulous work, the students were able to adapt the robots to dance to music as well as interact and play in a lively manner. The Robonova-1 were modified to include Bluetooth communication capability. Wireless communication over Bluetooth by the robots and an external computer ensures flawless coordination between the three robots as well as between the dance steps and the music. Apart from dancing robots, the program also involves an interactive session during which the audience is given a chance to command the robot through remote control to perform various interesting movements. The robot used for the interactive session was ingeniously modified to enable it to be transformed into wheeled robot by the press of a button thus reminding the audience of the famous show “Transformers”.

This is of course in addition to functions like cartwheels, somersaults, one-hand push-ups and many more.

The dancing robot show together with the students’ wishes for future Singapore were successfully featured and launched on Friday 14 March, 2008 in the Young Talents Showcase at the SDC. The launch and its shows were warmly received by the public. Furthermore, the launch was featured in Channel 8, Channel U and CAN news segments on the same day. This is in addition to an earlier Chinese news program where Sreejith was interviewed in the show, Zao An Ni Hao. The dancing robot show was originally scheduled to end on 6 April, 2008. Due to an overwhelming response from the public, the show was extended till 31 May, 2008.
The International Conference on Information, Communications and Signal Processing is a biennial event since 1997. We had an average of over 700 submissions in each conference. Following on these successes, we are pleased to announce that ICICS2009, the seventh International Conference on Information, Communications and Signal Processing will be held in Macau from 7 to 10 December 2009. The conference will cover all major areas in signal processing, information and communication technologies along with tutorial sessions and invited sessions in areas of current interest. Researchers around the world would be able to exchange ideas and latest research results in areas such as multimedia systems, computer systems, communications, networking and related fields. We look forward to your participation so as to make this conference a success.

The ICICS 2009 conference is organized and sponsored by the School of Electrical and Electronic Engineering (EEE), NTU and University of Macau. As a major conference in information, communications and signal processing in the Asia-Pacific region, this conference is technically sponsored by IEEE Singapore Communications Chapter, IEEE Singapore Signal Processing Chapter, IEEE Singapore Circuits & Systems Chapter, IEEE Macau CAS / COM Joint Chapter, and IEEE Macau Section. The International Advisory Committee (IAC), Organizing Committee, and Technical Program Committee (TPC) for the conference have been duly constituted and a website for the conference has been launched at http://www.icics.org.

The first-round Call for Papers for ICICS 2009 was recently broadcast with the paper submission deadline as 1 May 2009. Suggestions for Special Sessions and Tutorials are also solicited together with participation in the Technical Exhibition planned to be held along with the conference. We look forward to your contribution to make this conference successful. More details on the conference can be found in the conference's official web pages at http://www.icics.org. Suggestions, feedback and comments may be conveyed to secretariat@icics.org.
The International Symposium on Integrated Circuits (ISIC) dates back to 1985 and is now recognized as one of the major conferences in the highly important field of theory, design, and implementation of integrated circuits and systems. The ISIC-2009, organized by Nanyang Technological University and IEEE Singapore Section, will be held in Singapore from 14 to 16 December 2009. The theme of the ISIC-2009 is “Green Integrated Circuits and Systems” to promote more energy-efficient chip designs and the development of environmentally friendly circuits/systems techniques to reduce power dissipation. The ISIC-2009 will offer a rich program of the highest quality with distinguished invited speakers from all over the world and provide a broad forum of exchanges for researchers and IC designers. The ISIC-2009 will award the Best Paper Prize for the first time. The Proceedings of the Symposium will be indexed in IEEE Xplore, ISI Proceedings and Engineering Index (EI). A Special Issue on “Green Integrated Circuits and Systems” consisting of selected papers will be published with World Scientific in the Journal of Circuits, Systems and Computers indexed by SCI.

Prospective authors are invited to submit original papers as well as proposals for special sessions on the topics including but not limited to:

**A. INTEGRATED CIRCUITS**
- Analog IC
- Digital IC
- Mixed-Signal IC
- RF/MM-Wave IC

**B. DEVICE AND IC TECHNOLOGY**
- Semiconductor Devices
- Fabrication and Assembly
- Testing and Yield Enhancement
- Reliability and Failure Analysis

**C. INTEGRATED SYSTEMS**
- System-on-Chip (SoC)
- System-in-Package (SiP)
- Reconfigurable Systems
- Sensor Systems

**D. DESIGN AUTOMATION**
- Logic and System Synthesis
- Simulation, Verification and Testability
- Signal Integrity/EMC/EMI
- Computer-Aided Design

**Tutorials:** The tutorials will be held on Monday, 14 December 2009. The organizing committee is soliciting for proposals of tutorial sessions. Interested individuals may submit their proposals to the conference manager.

**Special Sessions:** The organizing committee is soliciting for proposals of special sessions. Interested individuals can find details at: [http://www.ISIC2009.org](http://www.ISIC2009.org) and submit their proposals to the conference manager.

**Paper submissions:** A maximum 4-page manuscript, including title, authors’ names, affiliations and e-mail addresses, and a short abstract is requested. Papers must be submitted electronically in IEEE PDF format through the conference website at: [http://www.ISIC2009.org](http://www.ISIC2009.org). Only electronic submission is accepted.

**IMPORTANT DATES**

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deadline for submission of papers in Regular Sessions</td>
<td>1 June 2009</td>
</tr>
<tr>
<td>Deadline for submission of tutorial proposals</td>
<td>1 June 2009</td>
</tr>
<tr>
<td>Deadline for special session proposals</td>
<td>1 May 2009</td>
</tr>
<tr>
<td>Notification of paper acceptance</td>
<td>1 September 2009</td>
</tr>
<tr>
<td>Submission of camera-ready papers</td>
<td>30 October 2009</td>
</tr>
</tbody>
</table>

**ISIC-2009 Conference Manager:** Mary Teng  
c/o A’Tenga C. E., 80 Genting Lane, Genting Block, #10-04, Ruby Industrial Complex, Singapore 349565.  
Tel: +65-90309898, Fax: +65-68440630, Email: atenga.mary@gmail.com
The 1st International Photonics Global Conference (IPGC 2008) was held from 8-11 Dec 2008 in Singapore. The conference was organized by IEEE LEOS Singapore Chapter. The School of Electrical and Electronic Engineering, Nanyang Technological University (NTU) is the main supporter and sponsor.

It is the aim of this conference to bring together researchers, scientists, engineers, academicians and students all around the world to share the latest research that will enhance and facilitate the development of photonics technology. This conference consists of 4 parallel symposia covering the major areas of Photonics, from fundamentals to applications. These include:

1. Nanophotonics
2. International Conference on Optical Communications and Networks (ICOCN)
3. Biophotonics
4. High-power lasers and their industrial applications

We were highly honored to have 4 renowned plenary speakers, Prof John Pendry from Imperial College; Prof Arthur Chiou from National Yang-Ming University; Prof Alan Willner from University of Southern California and Prof Horst Weber from Technical University Berlin to share with us their insight and perspectives on current trends, convergence technologies and the strategic updates in the photonics research. We have received an overwhelming response and we are pleased to have 283 delegates from 32 countries attended our conference. We have also organized 3 short courses on 8 Dec in NTU and received 247 registrations.

...continued on page 37
Prof Chin Mee Koy is the general chair of IPGC 2008. He has contributed substantially in bringing us a top quality conference and technical program. Prof Chong Tow Chong, the executive director of the science and engineering research council, was the Guest of Honour at the opening ceremony of the conference. In his speech, Prof Chong said, “Photonics is the revolutionary technology of the 21st century which would make as huge an impact as what electronics did in the 20th century. Photonics is an enabling technology for telecommunications, electronics, medicine and entertainment. Its area of influence has expanded and advanced to the frontiers of science to a wide spectrum of industries”.

A banquet was held at the NTU One-North Campus for the conference delegates, organizing committee members and VIP guests. Prof Er Meng Hwa, Senior Associate Provost, was the Guest of Honour. At the banquet, 4 best student paper awards were presented. The awards were sponsored by Photonics Research Centre, NTU. The papers were selected based on the originality and impact of the research work. This conference served as a great platform for networking opportunities and provided an excellent opportunity for interactions among all participants. Our 1st IPGC conference was a rewarding and memorable event.

Prof John Pendry from Imperial College UK delivering his plenary talk on “Metamaterials Open New Horizons in Electromagnetism.”

Front row: Distinguished Speakers at the conference (from left to right: Alan Willner from University of Southern California; Horst Weber from Technical University; Berlin John Pendry from Imperial College; Arthur Chio from National Yang-Ming University; and Gerd Keiser from Boston University).

Last row: Committee Members of the conference (from left to right: Chen Chihao, I2R; Desmond Lim, DSTA; Zhong Wende, NTU; Perry Shum, NTU; Poh Boon Phua, DSO; and Yu Changyuan, NUS).
General Information
The tenth International Conference on Control, Automation, Robotics and Vision (ICARCV 2008) was held from 17 to 20 December 2008 in Melia Hanoi Hotel, Hanoi, Vietnam.

Inaugurated in 1990 by the School of Electrical and Electronic Engineering, ICARCV is a biennial event and has proven to be a premium forum where researchers and engineers in the area of Control, Automation, Robotics and Vision meet to interact and exchange the latest theoretical and experimental results. The past nine conferences of the series had been very successful with some 400 delegates from 50 countries in each conference. For the first time, the ICARCV conference went to Hanoi, the capital city of Vietnam.

ICARCV 2008 was co-organized by the Vietnamese Academy of Science and Technology. The conference also acknowledged the cooperation of the Vietnam Mechatronics Association and the technical sponsorship provided by the various IEEE Societies.

Technical program
The conference received a very good response to the Call for Papers with a total 829 submissions including invited session papers from 49 countries. All the submitted papers were processed by the Technical Program Committee which had 74 members who are worldwide well known researchers. Each member handled the review of 10-20 papers and had to seek review reports from international experts, in addition to the member’s own evaluation. The rigorous review process ensured that only high quality papers were accepted. Indeed, 346 papers were finally accepted for presentation in 57 oral sessions and 70 papers were presented in 3 poster sessions. In addition, the Technical Program also included 3 keynote addresses and 2 plenary panel discussions. The 3 keynotes were

1. Networked Control for Autonomous Systems by Professor Richard Murray, California Institute of Technology, USA

2. Entertainment and Art Robot: Learning from Observation Paradigm for Humanoid Robot Dancing by Professor Katsushi Ikeuchi, The University of Tokyo, Japan

3. Wavelets and Advanced Biomedical Imaging by Professor Michael Unser, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland

...continued on page 39
The 2 plenary panel sessions were

1. Robotics: The Present and the Future

2. Control of Complex Systems

As in the past ICARCV conferences, all accepted papers vied for the Best Paper Award. Based on reviewers’ reports and also the recommendation of Technical Program Committee, 16 papers were nominated for the Best Paper Award. These 16 papers were further evaluated by members of the International Advisory Committee to shortlist 5 finalists. The Best Paper was then chosen by the Best Paper Selection Committee after further assessment of the oral presentation of the 5 finalists during the conference. The selection of the best paper was based on technical quality and written as well as oral presentations. The Best Paper Award was announced and presented during the conference banquet.

A CD-ROM containing preprints of all the accepted papers was given to each registered participant. The official conference proceedings would be published by IEEE and included in the IEEE Xplore Database.

Social program

Two social activities were organized for all delegates. The first was the conference banquet held on 18 December 2008 at the Melia Hanoi Ballroom. Besides enjoying a sumptuous 9-course dinner, the guests were delighted throughout the evening by a fine Vietnamese cultural performance. The second social activity organized was a day tour to Ha Long Bay on 20 December 2008. Ha Long Bay is a beautiful nature sight nearby Hanoi, it is a UNESCO World Natural Heritage Site and is currently one of the top candidates of the New Seven Wonders of Nature Nominees. The delegates enjoyed the scenery of Ha Long Bay on foot as well as on a cruise where a seafood lunch was served.

ICARCV 2010

The future ICARCV will strive to continue as a premium conference, for this purpose a permanent email address (secretariat@icarcv.org) and website (http://www.icarcv.org) have been setup. The eleventh International Conference on Control, Automation, Robotics and Vision (ICARCV 2010) will be held in December 2010 in Singapore. More information is available at the conference website.
Visitors to EEE (from Oct 2007 to Sep 2008)

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Country</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Heiyrich Diesinger</td>
<td>Institut d’Electronique, Microelectronique Nanotechnologies</td>
<td>France</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Dr. Hsia Liang Choo</td>
<td>Senior VP, Chartered</td>
<td>Singapore</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Dr. Kwok Kenneth</td>
<td>DSO National Laboratories</td>
<td>Singapore</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Dr. Markus Wachter</td>
<td>German Institute of Science and Technology Pte Ltd</td>
<td>Singapore</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Dr. Norman Jouppi</td>
<td>Hewlett Packard</td>
<td>USA</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Dr. Lim Khiang Wee</td>
<td>Director IMRE</td>
<td>Singapore</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Mr. Manohar Khatriani</td>
<td>Assistant Managing Director, EDB</td>
<td>Singapore</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Mr. Quek Tong Soon</td>
<td>DSO National Laboratories</td>
<td>Singapore</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. Alain Martin</td>
<td>CalTech</td>
<td>USA</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. C.C. Jay Kuo</td>
<td>University of Southern California</td>
<td>USA</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. David Anderson</td>
<td>Georgia Institute of Technology</td>
<td>USA</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. Dogheche Elloy</td>
<td>Universite Valenciennes</td>
<td>France</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. Ivan Andonovic</td>
<td>University of Strathclyde</td>
<td>Scotland</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. James Meindl</td>
<td>Georgia Institute of Technology</td>
<td>USA</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. King N. Ngan</td>
<td>Department of Electronic Engineering, Chinese University of Hong Kong</td>
<td>Hong Kong</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. Lin Zhong</td>
<td>Rice University</td>
<td>USA</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. Michael Rabin</td>
<td>Harvard University</td>
<td>USA</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. Myung Hoon Sunwoo</td>
<td>School of Electrical and Computer Engineering, Ajou University</td>
<td>Korea</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Prof. Sri Parameswaran</td>
<td>University of New South Wales</td>
<td>Australia</td>
<td>Oct 07</td>
</tr>
<tr>
<td>Dr. Aby Sam</td>
<td>Hindustan College of Engineering</td>
<td>India</td>
<td>Nov 07</td>
</tr>
<tr>
<td>Dr. Jan-Erik Mueller</td>
<td>Infineon Technologies</td>
<td>Munich, Germany</td>
<td>Nov 07</td>
</tr>
<tr>
<td>Dr. N Kumaresan</td>
<td>Institute of Technology, Tiruchirappalli, Tamil Nadu</td>
<td>India</td>
<td>Nov 07</td>
</tr>
<tr>
<td>Dr. R. Devanathan</td>
<td>Hindustan College of Engineering</td>
<td>India</td>
<td>Nov 07</td>
</tr>
<tr>
<td>Dr. Rudolf Koch</td>
<td>Infineon Technologies</td>
<td>Munich, Germany</td>
<td>Nov 07</td>
</tr>
<tr>
<td>Prof. Charles M. Lieber</td>
<td>Harvard University</td>
<td>USA</td>
<td>Nov 07</td>
</tr>
<tr>
<td>Prof. Ling Guan</td>
<td>Ryerson University, Toronto</td>
<td>Canada</td>
<td>Nov 07</td>
</tr>
<tr>
<td>Prof. Nam Ling</td>
<td>Santa Clara University, California</td>
<td>USA</td>
<td>Nov 07</td>
</tr>
<tr>
<td>Prof. Rainer Kronberger</td>
<td>University of Applied Sciences Cologne</td>
<td>Germany</td>
<td>Nov 07</td>
</tr>
<tr>
<td>Dr. Boon-Teck Ooi</td>
<td>McGill University</td>
<td>Canada</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. Jean-Philippe</td>
<td>Ovarlez, Chief Scientist, ONERA</td>
<td>France</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Dr. Jocelyn Fiorina</td>
<td>Telecommunication Department, SUPELEC</td>
<td>France</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Dr. Jose Picheral</td>
<td>Signal &amp; System Department, SUPELEC</td>
<td>France</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. Alfred O. Hero III</td>
<td>University of Michigan</td>
<td>USA</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. Andrzej Kos</td>
<td>AGH-University of Science &amp; Technology University</td>
<td>Switzerland</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. Christian VIARD-GAUDIN</td>
<td>University of Nantes</td>
<td>France</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. Dr.ing. Olav Fosso</td>
<td>Norwegian University of Science and Technology (NTNU)</td>
<td>Norway</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. G. A. Fleury</td>
<td>Head, Signal &amp; Systems Department, SUPELEC</td>
<td>France</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. Jean Vuillemin</td>
<td>Ecole Normale Superieure; I2R Scientific Advisory Board (SAB) member</td>
<td>France</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. Marc Lesturgue</td>
<td>Head, EM Department, SUPELEC</td>
<td>France</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. Tian-Bo Deng</td>
<td>Department of Information Science, Faculty of Science, Toho University, Funabashi</td>
<td>Japan</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. Wan-Chi Siu</td>
<td>Hong Kong Polytechnic University</td>
<td>Hong Kong</td>
<td>Dec 07</td>
</tr>
<tr>
<td>Prof. Zeno Stossel</td>
<td>Lucerne University of Applied Sciences and Arts</td>
<td>Switzerland</td>
<td>Dec 07</td>
</tr>
<tr>
<td>BG. Dana H. Born</td>
<td>US Air Force Academy (USAF)</td>
<td>USA</td>
<td>Jan 08</td>
</tr>
<tr>
<td>Dr. Josep Casanovas</td>
<td>Universitat Politecnica de Catalunya Delegation</td>
<td>Spain</td>
<td>Jan 08</td>
</tr>
<tr>
<td>Dr. Lluis Torres</td>
<td>Universitat Politecnica de Catalunya Delegation</td>
<td>Spain</td>
<td>Jan 08</td>
</tr>
<tr>
<td>Prof. Avi Gover</td>
<td>Tel-Aviv University</td>
<td>Israel</td>
<td>Jan 08</td>
</tr>
<tr>
<td>Prof. Ming-Ting Sun</td>
<td>Department of Electrical Engineering, University of Washington</td>
<td>USA</td>
<td>Jan 08</td>
</tr>
<tr>
<td>Prof. Tiffany Jing Li</td>
<td>Lehigh University</td>
<td>USA</td>
<td>Jan 08</td>
</tr>
<tr>
<td>Name</td>
<td>Institution</td>
<td>Country</td>
<td>Period</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------------------------------------------------------</td>
<td>----------------</td>
<td>--------</td>
</tr>
<tr>
<td>Prof Vincent W. S. Chan</td>
<td>Massachusetts Institute of Technology</td>
<td>USA</td>
<td>Jan 08</td>
</tr>
<tr>
<td>Prof Walter Kellermann</td>
<td>University of Erlangen-Nuremberg</td>
<td>Germany</td>
<td>Jan 08</td>
</tr>
<tr>
<td>Prof Zheng Chongxun</td>
<td>Xi’an Jiaotong University</td>
<td>China</td>
<td>Jan 08</td>
</tr>
<tr>
<td>Prof Ba-Ngu VO</td>
<td>University of Melbourne</td>
<td>Australia</td>
<td>Feb 08</td>
</tr>
<tr>
<td>Prof Hu Weisheng</td>
<td>Shanghai Jiaotong</td>
<td>China</td>
<td>Feb 08</td>
</tr>
<tr>
<td>Dr Hairul Azhar Abdul Rashid</td>
<td>Multimedia University</td>
<td>Malaysia</td>
<td>Mar 08</td>
</tr>
<tr>
<td>Dr Yukinori Matsumoto</td>
<td>Sanyo</td>
<td>Japan</td>
<td>Mar 08</td>
</tr>
<tr>
<td>Mr Lawrence Tze</td>
<td>Vice-President, Marvell Semiconductor</td>
<td>USA</td>
<td>Mar 08</td>
</tr>
<tr>
<td>Mr J N Loughhead</td>
<td>Institution of Engineering and Technology</td>
<td>UK</td>
<td>Mar 08</td>
</tr>
<tr>
<td>Prof Jose C. Principe</td>
<td>Electrical and Computer Engineering University of Florida, Gainesville</td>
<td>USA</td>
<td>Mar 08</td>
</tr>
<tr>
<td>Prof Chen Liuting</td>
<td>Chongqing University of Posts and Telecommunications</td>
<td>China</td>
<td>Mar 08</td>
</tr>
<tr>
<td>Prof Karl K. Berggren</td>
<td>Massachusetts Institute of Technology</td>
<td>USA</td>
<td>Mar 08</td>
</tr>
<tr>
<td>Dr Alan Lau</td>
<td>Stanford University</td>
<td>USA</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Dr Jacqueline Lecourtier</td>
<td>French National Research Agency</td>
<td>France</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Mr Masaq Arakawa</td>
<td>Panasonic Electric Works Asia Pacific Pte Ltd</td>
<td>Singapore</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Prof Chen Hsiao Hwa</td>
<td>National Cheng Kung University</td>
<td>Taiwan</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Prof Jean-Jacques Gagnepain</td>
<td>Centre National De La Recherche Scientifique</td>
<td>France</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Prof Michael Fiddy</td>
<td>The University of North Carolina at Charlotte</td>
<td>USA</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Prof Mille Millnert</td>
<td>Linkoping University</td>
<td>Sweden</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Prof Tor Sverre Lande</td>
<td>Department of Informatics, University of Oslo</td>
<td>Norway</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Prof Sven Nordholm</td>
<td>Western Australian Telecommunication Research Institute</td>
<td>Australia</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Prof Su Weizhou</td>
<td>South China University of Technology</td>
<td>China</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Prof Wen Xisen</td>
<td>National University of Defense Technology</td>
<td>China</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Prof William Salaneck</td>
<td>Linkoping University</td>
<td>Sweden</td>
<td>Apr 08</td>
</tr>
<tr>
<td>Dr Stephen Lin</td>
<td>Microsoft Research Asia</td>
<td>Singapore</td>
<td>May 08</td>
</tr>
<tr>
<td>Mr Sterling Du</td>
<td>CEO, O2Micro</td>
<td>USA</td>
<td>May 08</td>
</tr>
<tr>
<td>Prof Frank Lewis</td>
<td>University of Texas at Arlington</td>
<td>USA</td>
<td>May 08</td>
</tr>
<tr>
<td>Prof Fu Minyue</td>
<td>University of Newcastle</td>
<td>Australia</td>
<td>May 08</td>
</tr>
<tr>
<td>Prof Mohan Kumar</td>
<td>University of Texas at Arlington</td>
<td>USA</td>
<td>May 08</td>
</tr>
<tr>
<td>Prof S. Y. Kung</td>
<td>Princeton University</td>
<td>USA</td>
<td>May 08</td>
</tr>
<tr>
<td>Prof Vincent John Mooney III</td>
<td>Georgia Institute of Technology, Atlanta, Georgia</td>
<td>USA</td>
<td>May 08</td>
</tr>
<tr>
<td>Prof Yuan Dongfeng</td>
<td>Shandong University</td>
<td>China</td>
<td>May 08</td>
</tr>
<tr>
<td>Dr Guy Gogniat</td>
<td>University of South Brittany</td>
<td>France</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Dr Kok Swang Tan</td>
<td>Health Canada</td>
<td>Canada</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Dr Lei Wang</td>
<td>RSISE, Australian National University</td>
<td>Australia</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Mr Tan Yong Teck</td>
<td>Starhub</td>
<td>Singapore</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Prof Anurag Sharma</td>
<td>Indian Institute of Technology, Delhi</td>
<td>India</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Prof Chua-Chin Wang</td>
<td>National Sun Yat-Sen University</td>
<td>Taiwan</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Prof Eric Martin</td>
<td>University of South Brittany</td>
<td>France</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Prof Lee Chin Hui</td>
<td>Georgia Institute of Technology</td>
<td>USA</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Prof Mehmet Fatih TASGETIREN</td>
<td>Sultan Qaboos University</td>
<td>Sultanate of Oman</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Prof Saifur Rahman</td>
<td>Virginia Tech Advanced Res. Inst.</td>
<td>USA</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Prof Xin YAO</td>
<td>University of Birmingham</td>
<td>UK</td>
<td>Jun 08</td>
</tr>
<tr>
<td>Dr Christopher A. White</td>
<td>Bell Labs</td>
<td>USA</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Dr Debasis Mitra</td>
<td>Bell Labs</td>
<td>USA</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Dr David Taubman</td>
<td>University of New South Wales</td>
<td>Australia</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Dr Ulrich Speidel</td>
<td>The University of Auckland</td>
<td>Newzeland</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Name</td>
<td>Institution</td>
<td>Country</td>
<td>Period</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>Dr Utpal Garain</td>
<td>Indian Statistical Institute, Kolkata</td>
<td>India</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Dr Yang Heng</td>
<td>Seattle Technology Inc., Xi’an</td>
<td>China</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Mr John Lin</td>
<td>Economic Development Board</td>
<td>Singapore</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Mr Ong Ve’ Paul</td>
<td>Economic Development Board</td>
<td>Singapore</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Mr Philbert Gomez</td>
<td>Economic Development Board</td>
<td>Singapore</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Prof Ajit Chaturvedi</td>
<td>IIT Kanpur</td>
<td>India</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Prof Changhuei Yang</td>
<td>California Institute of Technology</td>
<td>USA</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Prof Didier Decoster</td>
<td>Institute of Electronics, Microelectronics and Nanotechnology</td>
<td>France</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Prof James Wyant</td>
<td>The University of Arizona, Tucson Arizona</td>
<td>USA</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Prof Nasser Kehtarnavaz</td>
<td>Department of Electrical Engineering, University of Texas at Dallas</td>
<td>USA</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Prof Petar M. Djuric</td>
<td>Stony Brook University</td>
<td>USA</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Prof Zhang Guiqing</td>
<td>Shandong Jianzhu University</td>
<td>China</td>
<td>Jul 08</td>
</tr>
<tr>
<td>Dr Burger</td>
<td>Solar Energy Research Institute of Singapore, NUS</td>
<td>Singapore</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Dr Young-Kai Chen</td>
<td>Bell Laboratories, Alcatel-Lucent</td>
<td>USA</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Mdm Qin Wenping</td>
<td>Taiyuan University of Technology</td>
<td>China</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Mr Rogalla</td>
<td>Solar Energy Research Institute of Singapore, NUS</td>
<td>Singapore</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Arie Feuer</td>
<td>Technion</td>
<td>Israel</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Federico Capasso</td>
<td>Harvard University</td>
<td>USA</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof He Sai ling</td>
<td>Zhe jiang University</td>
<td>China</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Joachim Luther</td>
<td>Solar Energy Research Institute of Singapore</td>
<td>Singapore</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Kotaro Hirasawa</td>
<td>Waseda University</td>
<td>Japan</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Luther</td>
<td>Solar Energy Research Institute of Singapore, NUS</td>
<td>Singapore</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof M. P. Batura</td>
<td>Rector, Blarusan State University of Informatics and Radioelectronics (BSUIR)</td>
<td>Indonesia</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Nicola Marzari</td>
<td>Massachusetts Institute of Technology</td>
<td>USA</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Sailing He</td>
<td>Royal Institute of Technology (Sweden)/ Zhejiang University</td>
<td>China</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Steve McLaughlin</td>
<td>Georgia Institute of Technology</td>
<td>USA</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Sulistjono</td>
<td>Rektor - Institut Teknologi Sepuluh Nopember</td>
<td>Indonesia</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Victor E. Borisienko</td>
<td>Belarusian State University of Informatics and Radioelectronics</td>
<td>Belarus</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Prof Yang Guang-Hong</td>
<td>Northeastern University</td>
<td>China</td>
<td>Aug 08</td>
</tr>
<tr>
<td>Dr Gavin Conibeer</td>
<td>University of New South Wales</td>
<td>Australia</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Dr Hilmi Volkan Demir</td>
<td>Bilkent University</td>
<td>Turkey</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Dr Kurichi Kumar</td>
<td>Rolls Royce Singapore Pte Ltd</td>
<td>Singapore</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Dr Pan Quanke</td>
<td>Liaocheng University</td>
<td>China</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Dr Terence Goh</td>
<td>ST Engineering</td>
<td>Singapore</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Mr Boyi Low</td>
<td>Singapore Economic Development Board</td>
<td>Singapore</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Mr Desmond Low</td>
<td>Atlantis</td>
<td>Singapore</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Mr Eddy Liem</td>
<td>Prima</td>
<td>Singapore</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Mr Niels Peter De Boer</td>
<td>Vestas Technology R&amp;D Singapore Pte Ltd</td>
<td>Singapore</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Mr Prakash Agarwal</td>
<td>iKoa Corporation</td>
<td>USA</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Mr Primus Cheng</td>
<td>Prima</td>
<td>Singapore</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Ms Anita Teo</td>
<td>Rolls Royce Singapore Pte Ltd</td>
<td>Singapore</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Ms Aris Toh</td>
<td>Singapore Economic Development Board</td>
<td>Singapore</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Prof L Eric Cross</td>
<td>The Pennsylvania State University</td>
<td>USA</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Prof Liu Juin J.</td>
<td>University of Central Florida</td>
<td>USA</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Prof Ma Jiang Guo</td>
<td>University of Electronic Science and Technology of China</td>
<td>China</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Prof Mannar Jawahar</td>
<td>Anna University</td>
<td>India</td>
<td>Sep 08</td>
</tr>
<tr>
<td>Prof Wang Xiaodong</td>
<td>Columbia University</td>
<td>New York</td>
<td>Sep 08</td>
</tr>
</tbody>
</table>
Staff Get-together Lunch & Long Service Awards Presentation
Monday, 25 February 2008 at Hilltop Garden Restaurant, Club CSC @ Bukit Batok

Names of recipients under SWRFC Group A (EEE)

### 10 Years Long Service Award

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Name</th>
<th>Appointment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Dr Chan Pak Kwong</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>2.</td>
<td>Dr Chang Chip Hong</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>3.</td>
<td>Dr Chau Lap Pui</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>4.</td>
<td>Dr Farook Sattar</td>
<td>Asst Prof</td>
</tr>
<tr>
<td>5.</td>
<td>Mdm Goh Sau Fong</td>
<td>Asst Mgr (Res)</td>
</tr>
<tr>
<td>6.</td>
<td>Dr Gwee Bah Hwee</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>7.</td>
<td>Miss Mok Hoong Mai</td>
<td>Higher Clerical Officer</td>
</tr>
<tr>
<td>8.</td>
<td>Miss Lee Chiao Woon</td>
<td>Lab Exe</td>
</tr>
</tbody>
</table>

### 15 Years Long Service Award

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Name</th>
<th>Appointment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Dr Ali Ithekhar Maswood</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>2.</td>
<td>Dr Au Yueng Tim Cheung</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>3.</td>
<td>Dr Bogdan Jaroslaw Falkowski</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>4.</td>
<td>Dr Chan Kap Lok</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>5.</td>
<td>Dr Chiam Tee Chye</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>6.</td>
<td>Miss Choo Guay Khee, Pauline</td>
<td>Asst Mgr</td>
</tr>
<tr>
<td>7.</td>
<td>Dr Er Meng Joo</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>8.</td>
<td>Mdm Fatimah Bte Supki</td>
<td>Higher Clerical Officer</td>
</tr>
<tr>
<td>9.</td>
<td>Dr Govinda Bol Shrestha</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>10.</td>
<td>Mr Heng Swee Hai, Michael</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>11.</td>
<td>Dr K Radhakrishnan</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>12.</td>
<td>Dr Lalit Kumar Goel</td>
<td>Professor</td>
</tr>
<tr>
<td>13.</td>
<td>Dr Lee Ching Kiwong</td>
<td>Assoc Prof</td>
</tr>
</tbody>
</table>

### 20 Years Long Service Award

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Name</th>
<th>Appointment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mr Chua Hock Chuan</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>2.</td>
<td>M David Robert Neubronner</td>
<td>Sr Lab Exe</td>
</tr>
<tr>
<td>3.</td>
<td>Miss Rohama Bte Abdul Mu'min</td>
<td>Senior Clerical Officer</td>
</tr>
</tbody>
</table>

### 25 Years Long Service Award

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Name</th>
<th>Appointment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Dr Kam Chan Hin (Chair, EEE)</td>
<td>Professor</td>
</tr>
<tr>
<td>2.</td>
<td>Dr Chan Chee Keong</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>3.</td>
<td>Miss Chia Peck Lan, Agnes</td>
<td>Senior Clerical Officer (Sp Gr)</td>
</tr>
<tr>
<td>4.</td>
<td>Mr Chow Kam Wah</td>
<td>Prin Lab Exe</td>
</tr>
<tr>
<td>5.</td>
<td>Mrs Kuo-Lim Gek Lye</td>
<td>Lab Mgr</td>
</tr>
<tr>
<td>6.</td>
<td>Mrs Lee-Wong Li Eng</td>
<td>Lab Mgr</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Name</th>
<th>Appointment</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Mdm Neo Bee Geok</td>
<td>Lab Mgr</td>
</tr>
<tr>
<td>8.</td>
<td>Mr Poh Khoon Yong</td>
<td>Sr Lab Exe</td>
</tr>
<tr>
<td>9.</td>
<td>Dr Tan Boon Tiong</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>10.</td>
<td>Dr Tan Soon Hie</td>
<td>Assoc Prof</td>
</tr>
<tr>
<td>11.</td>
<td>Mrs Wu-ong Leh Woo</td>
<td>Sr Lab Exe</td>
</tr>
</tbody>
</table>
Roll of Honour 2008

<table>
<thead>
<tr>
<th>AWARD/PRISE TITLE</th>
<th>AWARD CRITERIA</th>
<th>NAME OF WINNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Lee Kuan Yew Gold Medal</td>
<td>The prize is awarded to a student who is first in general proficiency throughout the programme of study and has been awarded a First Class Honours for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>LOW XUE NII</td>
</tr>
<tr>
<td>2 University Scholars Award</td>
<td>The medal is awarded to the student who has achieved excellent academic performance, displayed strong leadership ability and demonstrated potential for contributing to society.</td>
<td></td>
</tr>
<tr>
<td>3 ABB Gold Medal cum Book Prize</td>
<td>The prize is awarded to a student who has obtained at least a Second Class Honours (Upper) with highest aggregate marks in any two prescribed electives for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering): EE4265 Process Control, EE4268 Robotics and Automation, EE4273 Digital Control Systems</td>
<td>LI WU</td>
</tr>
<tr>
<td>4 Association of Consulting Engineers Singapore Gold Medal</td>
<td>The medal is awarded to a student who has obtained the highest weighted average marks in the final year examination for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>LOW XUE NII</td>
</tr>
<tr>
<td>5 Defence Science &amp; Technology Agency Gold Medal</td>
<td>The medal is awarded to a student who has obtained at least a Second Class Honours (Upper) with highest mark in ‘EE4079 Final Year Project’ for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>TAN WAI CHERN</td>
</tr>
<tr>
<td>6 IEEE Power Engineering Chapter (Singapore) Gold Medal cum Book Prize</td>
<td>The prize is awarded to the final year student with highest aggregate marks in any three prescribed electives for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering): EE4601 Power Engineering Design I, EE4602 Power Engineering Design II, EE4630 Power System Analysis &amp; Control, EE4631 Electricity Utilisation Systems, EE4652 Power Electronics &amp; Drives, EE4633 Power Apparatus &amp; System Protection</td>
<td>LI JIMIN</td>
</tr>
<tr>
<td>7 Institution of Engineers Singapore Gold Medal</td>
<td>The medal is awarded to a student who is first in general proficiency throughout the programme of study at the University for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>LOW XUE NII</td>
</tr>
<tr>
<td>8 Micron Gold Medal</td>
<td>The medal is awarded to the final year student with highest aggregate marks in any two prescribed electives for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering): EE4303 Mixed-Signal IC Design, EE4344 Analysis &amp; Design of Integrated Circuits, EE613 CMOS Process &amp; Device Simulation, EE6456 Microfabrication Engineering</td>
<td>ZHANG LI</td>
</tr>
<tr>
<td>9 Motorola Foundation Gold Medal</td>
<td>The medal is awarded to the final year student with highest aggregate marks in any three prescribed electives for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering): EE4105 Cellular Communication System Design, EE4109 Microwave Circuit &amp; System Design, EE4110 Optical Communication System Design, EE4151 RF &amp; Microwave Engineering, EE4152 Digital Communications, EE4153 Telecommunication Systems, EE4188 Wireless Communications, EE4189 Spread Spectrum Communications</td>
<td>CHER ZHONG MING</td>
</tr>
<tr>
<td>10 NTU Alumni Gold Medal</td>
<td>The medal is awarded to a final year student who has excelled in both academic performance and extra-curricular activities in the School of Electrical &amp; Electronic Engineering.</td>
<td>ZHANG LI</td>
</tr>
<tr>
<td>11 Panasonic Gold Medal</td>
<td>The medal is awarded to the final year student with highest aggregate marks in any three prescribed electives for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering): EE4303 Mixed-Signal IC Design, EE4304 Radio Frequency Integrated System Design, EE4340 VLSI Systems, EE4341 Advanced Analog Circuits, EE4343 Radio Frequency Circuits, EE4344 Analysis &amp; Design of Integrated Circuits</td>
<td>TANG HOWARD</td>
</tr>
<tr>
<td>12 Qioptiq Singapore Gold Medal</td>
<td>The medal is awarded to the best final year student with highest aggregate marks in any three prescribed electives for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering): EE4815 Optical Design, EE4816 Photonic Devices &amp; Systems Design, EE4836 Semiconductor Optoelectronics, EE4839 Laser Engineering, EE4839 Fibre Optic Communications</td>
<td>PANG LIANG</td>
</tr>
<tr>
<td>13 Rossie Heng-Ko Poh Choo Gold Medal</td>
<td>The medal is awarded to a student who has obtained a First Class Honours with highest aggregate mark for EE4041 Human Resource Management for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>PANG LIANG</td>
</tr>
<tr>
<td>14 Thomson Asia Pacific Holdings Gold Medal</td>
<td>The medal is awarded to a student who has obtained at least a Second Class Honours (Upper) with highest aggregate mark in ‘EE4265 Process Control’ on the condition that he has also taken either ‘EE4207 Control Engineering Design’ or ‘EE4208 Intelligent System Design’ for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>YUAN YINGNA</td>
</tr>
<tr>
<td>15 ABB Book Prize</td>
<td>The prize is awarded to a student who has obtained at least a Second Class Honours (Upper) with highest aggregate mark in ‘EE4273 Digital Control Systems’ on the condition that he has also taken either ‘EE4207 Control Engineering Design’ or ‘EE4208 Intelligent System Design’ for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>HUANG GUOXIANG</td>
</tr>
<tr>
<td>16 ABB Book Prize</td>
<td>The prize is awarded to a student who has obtained at least a Second Class Honours (Upper) with highest aggregate mark in ‘EE4273 Digital Control Systems’ on the condition that he has also taken either ‘EE4207 Control Engineering Design’ or ‘EE4208 Intelligent System Design’ for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>WONG CHEE YOON</td>
</tr>
<tr>
<td>17 ABB Book Prize</td>
<td>The prize is awarded to a student who has obtained at least a Second Class Honours (Upper) with highest aggregate mark in ‘EE4273 Digital Control Systems’ on the condition that he has also taken either ‘EE4207 Control Engineering Design’ or ‘EE4208 Intelligent System Design’ for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>LE MINH DUC</td>
</tr>
<tr>
<td>18 ABB Book Prize</td>
<td>The prize is awarded to a student who has obtained at least a Second Class Honours (Upper) with highest aggregate mark in ‘EE4273 Digital Control Systems’ on the condition that he has also taken either ‘EE4207 Control Engineering Design’ or ‘EE4208 Intelligent System Design’ for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>GUO MIN</td>
</tr>
<tr>
<td>19 Agilent Technologies Book Prize for Computer Networking</td>
<td>The prize is awarded to a final year student with highest mark in ‘EE4761 Computer Networking’ for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>TAN KA WEI</td>
</tr>
<tr>
<td>Award/Prize Title</td>
<td>Award Criteria</td>
<td>Name of Winner</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Agilent Technologies Book Prize for Enterprise Network Design</td>
<td>The prize is awarded to a final year student with highest aggregate marks in 'EE471B Enterprise Network Design for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).'</td>
<td>Ge Bin</td>
</tr>
<tr>
<td>21 IEEE Control Chapter (Singapore) Prize</td>
<td>The prize is awarded to the best final year student with highest aggregate marks in any three prescribed electives for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering): - EE4207 Control Engineering Design - EE4208 Intelligent Systems Design - EE4265 Process Control Systems - EE4266 Computer Vision - EE4268 Robotics &amp; Automation - EE4273 Digital Control Systems - EE4285 Computational Intelligence - EE4483 Artificial Intelligence &amp; Data Mining</td>
<td>Lixiu Ni</td>
</tr>
<tr>
<td>22 IEEE Microwave Technology and Techniques/Antennas Propagation Prize</td>
<td>The prize is awarded to a student who has obtained at least a Second Class Honours (Upper) with highest aggregate marks in 'EE3001 Engineering Electromagnetics,' 'EE4109 Microwave Circuit &amp; System Design' and 'EE4151 RF &amp; Microwave Engineering' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Low Xue Ni</td>
</tr>
<tr>
<td>23 IEEE Power Electronics Book Prize</td>
<td>The prize is awarded to a student who has obtained at least a Second Class Honours (Upper) with highest aggregate mark in 'EE4532 Power Electronics and Drives' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Pei Wei Xiong Francis</td>
</tr>
<tr>
<td>24 IEEE Reliability/CMPT/EDI Chapter (Singapore) Book Prize</td>
<td>The prize is awarded to the best final year student with highest aggregate marks in any three prescribed electives for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering): - EE4434 Analysis &amp; Design of Integrated Circuits - EE4513 CMOS Process &amp; Device Simulation - EE4614 Device Parameter Extraction &amp; Layout Implementation - EE4645 Microfabrication Engineering - EE4646 VLSI Technology - EE4647 Microfabrication Devices - EE4648 Flat-Panel Display Technologies - EE4694 Reliability &amp; Failure Analysis - EE4695 Semiconductor Physics</td>
<td>Fu Kangkang</td>
</tr>
<tr>
<td>25 Lucent GSP Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4188 Wireless Communications' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Low Xue Ni</td>
</tr>
<tr>
<td>26 Motorola Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4105 Cellular Communication System Design' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Cher Zhong Min</td>
</tr>
<tr>
<td>27 Motorola Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4340 VLSI Systems' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Tang Howard</td>
</tr>
<tr>
<td>28 Motorola Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4344 Analysis &amp; Design of Integrated Circuits' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Yuyun Jun</td>
</tr>
<tr>
<td>29 Motorola Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4441 Advanced Analog Circuits' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Lirub</td>
</tr>
</tbody>
</table>

---continued from page 44---

<table>
<thead>
<tr>
<th>Award/Prize Title</th>
<th>Award Criteria</th>
<th>Name of Winner</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Motorola Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4153 Telecommunication Systems' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Tan Wai Chern</td>
</tr>
<tr>
<td>31 Motorola Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4151 RF &amp; Microwave Engineering' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Low Xue Ni</td>
</tr>
<tr>
<td>32 Motorola Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4268 Robotics &amp; Automation' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Du Juan Ran</td>
</tr>
<tr>
<td>33 Motorola Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4268 Robotics &amp; Automation' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Li Wu</td>
</tr>
<tr>
<td>34 NTU Class of 1985 Cash Prizes Award</td>
<td>The prize is awarded to a student who has obtained at least a Second Class Honours (Upper) with highest aggregate marks in 'HW310 Professional Communication,' 'EE4040 Engineers &amp; Society' and 'EE4041 Human Resource Management' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Low Xue Ni</td>
</tr>
<tr>
<td>35 Singapore Power Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4531 Electricity Utilisation Systems' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Chan Joo Lin</td>
</tr>
<tr>
<td>36 Singapore Power Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4532 Power Electronics &amp; Drives' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Pei Wei Xiong Francis</td>
</tr>
<tr>
<td>37 Singapore Power Book Prize</td>
<td>The prize is awarded to a final year student who is best in 'EE4533 Power Apparatus &amp; System Protection' for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Ng Li Tian</td>
</tr>
<tr>
<td>38 Infocomm Development Authority of Singapore Book Prize</td>
<td>The prize is awarded to a top student for 'EE3802 Microprocessors' in the third year examination for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Goh Teck Lun</td>
</tr>
<tr>
<td>39 Lucent Foundation Book Prize</td>
<td>The prize is awarded to a student who is best for 'EE3017 Computer Communications' in the third year examination for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Tan Wai Chern</td>
</tr>
<tr>
<td>40 Singapore Power Book Prize</td>
<td>The prize is awarded to the best student for 'EE2005 AC Circuits &amp; Machines' in the second year examination for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Yang Yang</td>
</tr>
<tr>
<td>41 Singapore Power Book Prize</td>
<td>The prize is awarded to the best student for 'EE3015 Power Systems &amp; Conversion' in the third year examination for the degree of Bachelor of Engineering (Electrical &amp; Electronic Engineering).</td>
<td>Chen Jianhong</td>
</tr>
<tr>
<td>42 Industrial Attachment Book Prize</td>
<td>The prize is awarded to a student with the best overall performance for Industrial Attachment in the School of Electrical and Electronic Engineering.</td>
<td>Umayi Kalyanaramudu Harishkumar</td>
</tr>
<tr>
<td>43 Industrial Attachment Book Prize</td>
<td>The prize is awarded to a student with meritorious overall performance for Industrial Attachment in the School of Electrical and Electronic Engineering.</td>
<td>Tan Kiah Poh, Wang Ting</td>
</tr>
<tr>
<td>44 Industrial Attachment Book Prize</td>
<td>The prize is awarded to a student with commendable overall performance for Industrial Attachment in the School of Electrical and Electronic Engineering.</td>
<td>Chan Jun Wei, Alan Toshifune, Kostusbab Ravi, Ngor Pengyi, Yeo Chuan Tian</td>
</tr>
</tbody>
</table>
Chua Cier Siang

Firstly, I would like to thank E3world for giving me the chance to share my undergraduate experiences in this issue. Recalling what I did and what I have achieved over the past three years, I feel enriched, fulfilled and overjoyed. I have made the right decision to step into NTU EEE for my undergraduate degree. My skill sets are broader through various hands-on training and more importantly I am able to develop my personal interest.

I was graduated from polytechnic, my life was changed significantly after I started my education in NTU. The fast-paced learning in NTU demanded a lot of self motivation and time management from the student himself/herself. I almost dropped out of the course at the beginning, but the encouragements from family and friends made me persevered through this undergraduate degree. In addition, the support from tutors had also helped me strived for and achieved good grades.

During the third and final years, I was invited to participate in the URECA and FYP-URECA project. URECA offered me a chance to experience research work. I had the opportunity to work on an interesting topic in antenna design under the supervision of A/P Shen ZhongXiang. I am grateful to my supervisor for helping me prepared for my first conference paper and had it published in the IEEE Antenna Propagation Society International Symposium.

My industrial attachment was with Motorola Electronics Singapore. I gained valuable experiences in designing cellphone antenna through simulation, prototyping, testing and optimizing the design to meet radiation requirements. Here, I had a great chance to apply what I learned to real world applications, especially the knowledge gained from URECA, which is the antenna theory.

As a result of my efforts in the past three years of study in NTU, I have been awarded the Nanyang President's Graduate Scholarship to pursue a post graduate degree in NTU. I am now embarking on yet another journey of my life for a higher degree.

Weng Zaishan

I decided to study at NTU during one of the tea sessions that was held at Hotel Intercontinental back in 2004. Besides being attracted to the strong establishment of the engineering programme, I was particular impressed by the upcoming plans to provide many new opportunities and enhance the whole undergraduate experience.

The four-year period I spent in NTU was one of the most wonderful time that I have experienced. During this time, I learnt a lot and gained many valuable experiences. On one hand, I attained sound technical knowledge through the rigorous curriculum of lectures, tutorials and practical lab sessions. The conducive learning environment and readily available research facilities made learning enjoyable and fostering greater understanding to the subjects. On the other hand, I gained many of inter-personal skills through participating in many interesting extracurricular activities.

My stay in Hall of Residence 15 had provided me with a great platform to forge friendships, take part in many interesting activities and develop skills such as leadership and organizational skills. One of the fulfilling positions I took up during my stay was the block representative. As the block representative, I took part in organizing events such as inter-block games, block suppers and gatherings to strengthen the bonding between my block mates and create a vibrant campus life. Another interesting experience was when I also took up a role as logistic officer for the stage production for my hall, which took place at the Singapore reperatory theatre. It was a fresh experience for me doing the backstage work of a stage production, putting up banners, posters and managing equipments, transport and food ensuring a smooth flow of support backstage.

In Year 3, I took part in Global Immersion Programme (GIP), studying at University of Washington, USA, for a period of six months. During my stay, I had many chances to engage with the locals, experiencing their culture and way of life first hand through lessons and various school projects. In addition, this experience broadened my perspective and strengthened my interpersonal skills, through the many interactions with students from different background and cultures. On top of that, I became more independent after having a taste of living on my own.

I took part in the Ureca Techno Garage program when I was doing my final year project. The UTG program provided me with a hands-on experience through working on a project. I am glad to have such a great opportunity to experience the thrill and excitement of research and apply the knowledge that I learnt in class. Vastly in contrast to the structured academic study environment, the UTG program is one about expecting unexpected and constantly meeting with novel challenges. From there, I have learnt how to gather resources to solve a problem. On top of that, the friendship and bonding that was built during the program were most valuable.

Gathering after graduation
(Cier Siang is sitting at the third from left).

Zaishan at Suzallo Library, University of Washington, Seattle (USA) during GIP (2007).
...continued from page 46

Cecilia Sandra Colkers (Aye Sandar Aung)

Life is unpredictable! It is so true for me because when I completed my study at the Polytechnic, I told myself that was the end of my studies! I never thought that I would be back in school so soon. Within one year, I found myself looking up for undergraduate courses in local universities. I remembered vividly how I decided to further my studies in NTU. It was a clear choice for me since I wanted a world-class engineering degree that is well-structured and rewarding. Thus, I decided to pursue the bachelor degree in NTU, School of Electrical and Electronic Engineering (EEE). In 2003, I started my part-time undergrad course in NTU, without knowing much of what the university life as a part-time student would be. All I had in mind was that it’s going to be a 5-year program and I told myself that I would do my very best.

Since I did excel in my diploma studies, I thought it would be easier for me in NTU as I had a strong foundation. I had my first university shock in the 1st semester exams. It was nothing like that.

My NTU life has been challenging, rewarding and ever exciting. I have acquired not only academic knowledge but the skills and memories that will last a lifetime. I am taking in all my invaluable experiences that I could take aspirations come true!

To everyone, may their hard work be rewarded and their aspirations come true!

Yu Tianqi

NTU campus made its first impression on me as a conducive place to study and stay. Its spacious academic complexes and garden-like environment appealed to me as an ideal venue for a university.

First impression lasts. My feeling remains the same after the four years of study there. However, what NTU instilled in me was more than that.

The first thing I picked up was to be brave enough to cherish and pursue one’s dreams. Looking back, I couldn’t believe all that have happened since July 2004. I was a young adolescent that time, and now, I have already started working, trying to create a future of my own. I like a well known quote from Carl Schurz, a German-born American Senator, “Ideals are like stars; you will not succeed in touching them with your hands, but like the seafaring man on the desert of waters, you choose them as your guides, and following them, you reach your destiny.” This particular quote has much inspired my undergraduate days. The busy-nonlinears-enriching studies and the fun exchange experience; the demanding-but-fruitful IA and the wonderful ECA activities, etc., etc. All the tiniest bits adding up to made me who I am now. Nothing is impossible. All we need is a true desire and a little bit of determination.

Another important lesson dawned upon me only recently during a friend’s convocation ceremony. “Among the three things, you can only choose two.” Said the Dean during his speech, “To sleep, to study or to play. That’s all University is about.” The words struck a chord in me – that was so true! I hadn’t realized that I had unconsciously made my choice – to play and to study. In my early days in university, there were always so many things I was interested in that I wanted to try them all. It was precisely through unsuccessfully juggling those multiple tasks at hand that I learned that we frequently need to make a clear choice. Understand what you really want, prioritize them and make the smart choice - even if that means giving up certain things.

Graduating from NTU was like leaving an ivory tower and entering a whole new world. I know that there’s still a long road in front of me. And I feel fortunate that I have all these experiences that I could take with me to help me in times of needs. A million thanks to the professors and friends who have taken care of me in one way or another.

To everyone, may their hard work be rewarded and their aspirations come true!
I got to know about NTU when a friend asked me to attend a seminar “Some Universities from Singapore”. During the presentation, I was quite impressed, especially after speaking to some of my seniors who were studying there. After that, I took NTU’s entrance examination, got through with it and I decided to study at NTU.

The facilities and opportunities at NTU were way above my expectations. By facilities, I meant computing, sports and recreation, accommodation, etc. By opportunities, I meant programmes such as URECA. As far as coursework is concerned, I was not quite sure what I was expecting before coming here, but I enjoyed it throughout my undergraduate studies. The period I am most proud of is my Industrial Attachment. This was one of the best learning experiences for me.

I completely enjoyed all my four years at NTU, the freedom and responsibilities at the same time, not having much to worry about, hanging out and watching movies with friends, the very relaxed life in hostels, playing squash late at night, cooking whatever we could when we were hungry, rushing off early in the morning trying to find the correct lab, and even the exam rush which lasts for a month every semester followed by the long vacation which we would so look forward to during the exams.

Four years at NTU have prepared me better for my future career as well as for my life in general. During these four years, I was able to choose a field in which I wanted to build my career and work towards it. When I was working with Dr. Vitali in my sophomore year as part of the URECA programme, I developed an interest in Neuroscience, which turned into a passion when I was working with Dr. Guan’s group at the Institute for Infocomm Research during my Industrial Attachment. I also got an opportunity to explore more in this field while working with Dr. Cindy and Dr. Vivekanand on my final year project. Coursework during the final year also helped me understand a little bit more in this field. I am currently working as a Research Assistant at Cognitive Neuroscience Lab of DUKE-NUS Graduate Medical School.
Design and Innovation Project (DIP) is a five-week compulsory program for all full-time second year EEE students. In the academic year 2007/2008, DIP was held during the special session from 5 May to 6 June 2008. Through the DIP, students were introduced to electrical and electronic engineering projects with an opportunity to exercise their creative and innovative qualities in a group project environment and were given a chance to experience the imaginative world of aspiring engineers, innovators and technopreneurs. Since the Call for DIP Project Proposal was sent to students in January 2008, they had actively participated in the program including project proposal and execution. In this year, there were totally 44 DIP projects with 30 projects proposed by students together with staff or students alone. There were 844 students registered for DIP. Among these, 533 students did their own proposed projects.

In order to encourage students and their supervisors to come up with the best innovative design, Design and Innovation Competition was held in two rounds. In the preliminary round conducted on 3 June 2008, all the 44 project teams were divided into 6 groups and the winning team from each group participated in the final on 5 June 2008. In the final, the six finalists had their projects exhibited and presented to a panel of judges, consisting of the Associate Chair (Academic) and the Heads of Divisions of the School or their representatives. With some sponsorship received this year, prizes were awarded in the following categories: Gold ($2000 popular voucher), Silver ($1000 popular voucher), Bronze ($500 popular voucher) and three Merits ($200 popular voucher each). The top three winners in the 2007 DIP final were:

**Gold Prize**
Title: Image Processing Tools for Camera Based Human Computer Interaction
Supervisor: Assoc Prof Chan Kap Luk and Prof Ma Kai Kuang

**Silver Prize**
Title: A Mobile Human Size Robot
Supervisor: Prof Er Meng Joo and Assoc Prof Chu Yun Chung

**Bronze Prize**
Title: Unified Communicator
Supervisor: Assoc Prof Shum Ping and Asst Prof Chong Han Joo Peter

The EEE DIP committee members would also like to express their sincere appreciation to the following professional institutes or organizations for their kind and valuable sponsorship to the DIP competition prizes:

- Industrial Electronics Chapter, IEEE Singapore Section
- MTT/AP Chapter, IEEE Singapore Section
- Farnell Components Pte Ltd
- Jardine OneSolution (2001) Pte Ltd
- Precision Technologies Pte Ltd
- Air Products Singapore Pte Ltd

...continued on page 50
Person to person communication and interaction using our body and hand gestures is a lifelong skill that we have acquired effortlessly and naturally without much difficulty. Since the invention of computers, communication and interaction with computers have been done through various input devices such as keyboard and mouse. Working with these devices is a new skill that we have to acquire and master. Recent advancement in technology makes it possible for us to communicate and interact with our computers in much more natural ways, such as using a pen or a touch screen. In this project, the DIP students set out to utilize the latest computer vision and computer graphics technologies to realize a new and innovative way of interacting with computer naturally without using any device attached to our body, that is, using our hands as input devices.

This is a challenging project for the EEE second year DIP students. The project requires the students to know image processing and computer vision technologies, computer graphics and animation technologies, the use of 3D graphics software tools as well as C++ programming skills to implement such a natural interface for human computer interaction. Under the supervision of Associate Professor Chan Kap Luk and Professor Ma Kai Kuang, students took a crash course in image and video processing. They learned the principles and the implementation of face and hand detection and tracking algorithms. With the assistance on software programming from MSc student, Mao Dansheng, they developed a more robust hand detection and tracking program by combining pattern model and colour model based detection algorithms in OpenCV. The program uses pattern model to find the fist in the video and acquire the colour model on the spot. Subsequent tracking of the hand is based on the on-line colour model. Another crash course that the students have gone through is 3D computer graphics and animation. With these, live video can be mixed with virtual graphics objects creating a mixed reality visual display as shown in the figure. Through integration of the hand detection and tracking by a USB webcam and the corresponding graphics rendering driven by hand tracking, a natural interface for human computer interaction is achieved (See figure).

Such a natural interface technology can have a much wider impact on our daily life, be it at work or at home. It can enhance our experience in home entertainment, game playing, education, presentations, product advertising, biological and medical data visualization, and 3D tool prototyping, etc.

Gold Award: E031- Image Processing Tools for Camera Based Human Computer Interaction

Silver Award: E021- A Human-Size Mobile Robot

The EE2079 Design and Innovation Project (DIP) program is a five-week compulsory program held during the special session in May for all full-time second-year EEE students. The DIP group E021, supervised by Professor Er Meng Joo and co-supervised by Assoc Prof Chu Yun Chung, designed and developed a Human-Size Mobile Robot from scratch. The project won the Silver Award in the DIP Final Competition which involved six teams selected from the preliminary rounds involving more than twenty teams.

Robotics has pervaded all parts of human life in recent years and its potential applications in industrial, commercial and military sectors are enormous. The group has identified tourism as one of the potential application sectors where the robots could add an additional dimension to visitor experiences and leave a lasting impression of Singapore.

The developed robot, called SECTOUNOVA-1 (ST-1), functions not only as a tour-guide but also can serve as a patrolling office where additional security features for surveillance are incorporated. The highlight of this project is that a human-size robot was developed from scratch and the hardware and intelligent interactive human-robot interface was incorporated. The salient features of ST-1 are:

- Aesthetic design comprising cheap and recycled materials so that the product becomes environmentally-friendly
- Powered by two 12V rechargeable batteries charged by solar panels
- Navigation through line sensors along a pre-defined path
- Safety features include wireless emergency stop button and also switching ON/OFF via SMS
- Surveillance capability at night with a camera mounted for beaming live footage to the control room in real time
- Interactions with tourists by presenting various exhibits (in a museum set-up) at pre-defined points
- Additional Interaction through SMS Q&A sessions with visitors after a guided tour
- Autonomous functionality with real-time interaction with the control room, e.g. notifying low battery via SMS

All these features were incorporated by the team of twenty students with additional inputs and advice sought from Prof Er and Prof Chu. During the final competition, excellent demonstration of the salient features of the robot was shown to the panel of judges.

The winning team with their supervisors Prof Er Meng Joo and Assoc Prof Chu Yun Chung (3rd and 4th from right in the 1st row).
Bronze Award: E019 - Unified Communicator

For the DIP Group E019 supervised by Prof Shum Ping and co-supervised by Prof Peter Chong, the May holidays could not be any more enriching and unforgettable. The team's project was on creating a dynamic and wholesome communication system to be used by different organizations to connect individuals through the internet. At the end of the brief five weeks, the team not only managed to construct from scratch a unified communication solution they called “U-Comm”, but also forged lasting friendships with one another and emerged as a unified team braving through all the late nights, demonstrations and presentations together all the way into the finals.

At the start of the project, Prof Shum gave the group a Chinese saying, “峥嵘岁月莫松劲, 崎岖道路有尽头” with the embedded meaning of not giving up during times of hardship as even the rockiest paths will lead to an opening. This spirit of embracing all obstacles was indeed found in the team as everyone worked relentlessly throughout the initial phase of learning foreign techniques and programming language, as well as the pressing deadlines and fruitless ventures. Prof Shum’s insightful refusal for giving us a target result spurs us to constantly learn and seek perfection in our work. At their own initiative, the team members sacrificed much of their leisure time as they worked in to wee hours as well as on weekends, constantly encouraged by one another’s support and Prof Shum’s occasional treats.

Working with 20 members with varying capabilities, perspectives and talents was no mean feat, but through frequent meetings and constant cooperation the team were able to fully utilize the potential of each and every member. The team formed produced three different products (U-Base – dynamic website, U-Room – virtual conference room and U-Phone – virtual phone) in the end, and the workload was distributed evenly as the team added initiatives such as publicity and marketing, and even produced their very own product-demonstration video. After each milestone the group overcame, they never forgot to pamper themselves with team-building events such as having meals together with the professors and former students, barbeque gatherings and karaoke sessions as they eagerly waited for the results of the preliminary rounds. Their sense of belonging and closeness was further intensified by sharing feelings of encouragement and gratitude towards one another that would not have surfaced otherwise.

Seldom would NTU engineering students have such a chance to work with a large number of students, professors and lab technicians, even more rare was the chance for them to interact extensively with one another from day-to-night during the DIP period. This exposure to real-life working environment was further enhanced as Prof Shum invited his former students and prominent companies from the industries such as IBM and Photonitech Pte Ltd to take a look at the team’s products and offer their valuable opinions. It was a humbling experience for the team members to mingle with these professionals as well as to see how the knowledge they amassed from their EEE course can contribute to the society.

In the end the “U-Comm” team emerged overall bronze medallist for the DIP competition but they were in the heart of Prof Shum his “Gold Medal Team” due to their perseverance and positive attitude towards learning. Regardless of the result, the skills they learned and the bonds they shared will be carried with them as they embrace their future endeavours.
Life@NTU

8th March 2008. That was the date NTU opened her doors to welcome prospective students and their parents to visit her campus. The response to her invitation saw a respectable 8,860 visitors who thronged the grounds of NTU from 10am to 6pm.

Some had arrived by cars, others via taxis or public buses while most utilized the free shuttle bus services that were provided from Boon Lay MRT Station, Jurong East MRT Station and Bencoolen ST (Plaza by the Park) which conveniently brought them to the campus. A group of around 600 JC MOE Scholars also visited the campus with the arrangements coordinated specially by the Scholarships Section of OAFA.

The NTU Open House is an annual event organized to provide the target audience with an immersive experience of our campus and to make an impression on them about the achievements and established strengths of NTU. It also aimed to reinforce her position as a premier University, educating leaders for the world. This integrated event was held concurrently at the lobby of the School of Biological Sciences, The Quad and Nanyang Auditorium and was coordinated with the following themes:

- Discover L.I.F.E.@NTU
- Discover Engineering@NTU
- Discover Science@NTU
- Discover URECA@NTU

The themed events offered insights into the value of research and undergraduate education in NTU. Students from the various Clubs, Societies and the Students’ Union showcased their rich cultural activities and events. Talks by the various Schools were scheduled at 5 different designated venues. They aimed to bring greater awareness to the public on the various exciting programmes offered by different Schools.

Campus Tours and Schools Tours were organized for interested public to have a better insight to the facilities available in the campus and Schools. Over at the School of EEE, visitors made stops at Power Systems Laboratory, Network Technology Research Centre, Digital Signal Processing Laboratory and Autonomous Robotics Research Laboratory.
At a time when A-level and polytechnic graduates were pondering on which university to study in and what programmes to take, the School of Electrical and Electronic Engineering (EEE) organized an Admission Tea Reception on 10 May 2008 to assist them in making the right decision.

The event was held in the ballroom of Marina Mandarin Hotel, a convenient and popular location. The ambience was conducive for the informal discussion and Q&A sessions that ensued between students and professors.

An overwhelming 350 A-level and polytechnic graduates attended the event. The students’ eagerness was evident in their early arrival, many registered promptly at 2.30 pm for the event that commenced at 3.00 pm.

Several of our esteemed faculty members were present to attend to the students’ enthusiastic questions about the programmes offered by the School of EEE. Student representatives were also there to share their experience and revealed that a student’s life need not merely revolve around examinations and grades by highlighting the fun side of campus life.

Throughout the event, the potential students gained much insight on the life of an EEE undergraduate and what they can expect in the future. Professor Lalit K Goel communicated valuable information on academic issues and career prospects of EEE graduates, to help motivate dithering students. A list of Frequently Asked Questions (FAQ) was also given out to the students to address more popular concerns.
The EEE Investiture Ceremony was held on the 15 September 2008 in the Hall 3 Function hall. It was an extremely well organized ceremony in which the portfolios were officially passed on from the outgoing 26th committee, to the new 27th committee. The event was graced by the EEE Chair, Prof Kam Chan Hin, Prof Koh Soo Ngee, Prof Alex Kot Chichung, Prof Rusli, Prof Goh Wang Ling, Prof Teh Kah Chan and Prof Chang Chip Hong.

The event started with a speech by the outgoing president of the EEE Club, Yu Shanshan. She talked about her wonderful experience as the president and offered best wishes to the 27th committee. This was followed by a commendation speech by Prof Kam. He appreciated the outgoing committee and encouraged the new committee to work hard and make the club proud. He explained how the time spent in the club will pay back by developing skills and interactions. He also offered a token of appreciation to all the members of the 26th committee for their success and hard work. He left the podium with a token of appreciation presented by the new president of the committee, Tan Poh Lye Ivan. This was followed by the award presentation, to encourage the members to work harder and achieve higher goals. The title of Mr EEE went to Benaga while that of Miss EEE was bagged by Jianglan. This was succeeded by the Best Sub-Committee Member Award; to reward the hard work of all members of each department who played an active role in supporting their main-committee members which led to the success of the club as a whole.

After the award ceremony, a video on the EEE club that showcased the motto of the club: “We serve, We thrive, We lead” was screened. It highlighted the various events held last year, especially the EEE week, which was a grand success. Next was a spectacular musical performance by Stephen, Adela and Aldo, who showed their talents on stage.

The members of both the 26th and 27th committee were then called on stage for the Handover Ceremony in which the positions of various departments were officially handed over to the new committee. This was followed by the torch passing ceremony, which in itself was the most symbolic event in the ceremony as it represented the handing over of responsibilities to the new committee.

The event was concluded by a speech from the new president, Ivan. He thanked the 26th committee and promised to live up to the expectations and to raise the flag of the EEE club to a much higher level.
The Kam Chan Hin (KCH) Strength Challenge is an annual event organized by the EEE club. Named after the chair of EEE School, the event aims at bringing together EEE students and professors by putting them together in a competitive arena. The event is well known in NTU for having the largest banner printed by any club. This year, the publicity department outdid the previous years’ banner, with a spectacular two storey high banner, placed in front of LT23. The event as usual, attracted a large crowd and a warm response from both participants and audience. Numerous games which tested both strength and mind were organized by the Special projects division of the EEE club. The event allowed students to take a break from the rut of study and participate in fun and games.

The event commenced with the arrival of the chair of EEE school, Prof Kam Chan Hin and seven EEE professors namely, Prof Tay Beng Kang, Prof Yu Lee Wu, Prof Goh Wang Ling, Prof Chang Chip Hong, Prof Shum Ping, Prof Sun Xiaowei and Prof Yu Hong Yu. In his opening address, Prof Kam Chan Hin talked about how the event is able to help Professors take time off their hectic schedules to have fun and how this challenge is always able to derive innovative ways of testing “muscles and brains”. Six teams of students participants and each with a professor attached were set out to win the KCH challenge.

The KCH challenge had three rounds of games with two teams to be eliminated after each round. The first game played was the “Engineering Challenge”. In this game, the teams had to build the tallest structure possible using only straws!! At the end of the game, each of the structures was subjected to stability tests, to see if they collapsed when moved slightly or when wind was blown through them. The structures that failed the test were disqualified. The teams with the four tallest and strongest structures were qualified for the next round. In the second round the teams played the “Puzzle Game”. Even though the rain clouds rolled in, the spirits of the participants were not dampened. The objective of the game was to get as many pieces of the puzzle together as possible. Each team was given a different puzzle and the pieces were mixed. Hence, teams had to trade pieces with their team leader carrying their chairs as they moved around. The two teams that had the maximum number of pieces qualified to the finals.

As the teams battled it out, a simultaneous McSpicy giveaway was held outside LT23, whereby the EEE students were treated to McDonald’s burger and fruit juice. This became the biggest crowd-puller, as students, hungry after their lectures lined up to grab their burger.

The two teams that made it to the finals battled it out in three games to win the title of KCH champion. The first game played was “Ball Pens”, where each team had to carry a tennis ball from one end to another using the tips of four ball point pens only. The fastest team to do so won the game. The second game was “Movie Titles” where three team members from each team had to enact ten movie titles to the rest of their team mates. The movie titles included King Kong, Matrix and Jurassic park, and many amusing actors were discovered as the players acted out their roles. The last game played was the bean calculator. In this game, each team had to calculate an answer to a question and then show their answer by collecting beans from a bowl, using chopsticks. Only one bean could be collected at a time and three types of beans were kept, which represented one point, five points and ten points. The team, VIVA FOREVER, led by Prof Shum Ping emerged as the winner and the runner-up was team Super Mesh, led by Prof Goh Wang Ling. The event ended with the prize giving ceremony, where Prof Kam Chan Hin was invited to give away the cash prizes and certificates. His concluding remarks aptly summarized the event, “The event was very interesting and was a demonstration of team work.”

The Kam Chan Hin (KCH) Strength Challenge is an annual event organized by the EEE club. Named after the chair of EEE School, the event aims at bringing together EEE students and professors by putting them together in a competitive arena. The event is well known in NTU for having the largest banner printed by any club. This year, the publicity department outdid the previous years’ banner, with a spectacular two storey high banner, placed in front of LT23. The event as usual, attracted a large crowd and a warm response from both participants and audience. Numerous games which tested both strength and mind were organized by the Special projects division of the EEE club. The event allowed students to take a break from the rut of study and participate in fun and games.

The event commenced with the arrival of the chair of EEE school, Prof Kam Chan Hin and seven EEE professors namely, Prof Tay Beng Kang, Prof Yu Lee Wu, Prof Goh Wang Ling, Prof Chang Chip Hong, Prof Shum Ping, Prof Sun Xiaowei and Prof Yu Hong Yu. In his opening address, Prof Kam Chan Hin talked about how the event is able to help Professors take time off their hectic schedules to have fun and how this challenge is always able to derive innovative ways of testing “muscles and brains”. Six teams of students participants and each with a professor attached were set out to win the KCH challenge.

The KCH challenge had three rounds of games with two teams to be eliminated after each round. The first game played was the “Engineering Challenge”. In this game, the teams had to build the tallest structure possible using only straws!! At the end of the game, each of the structures was subjected to stability tests, to see if they collapsed when moved slightly or when wind was blown through them. The structures that failed the test were disqualified. The teams with the four tallest and strongest structures were qualified for the next round. In the second round the teams played the “Puzzle Game”. Even though the rain clouds rolled in, the spirits of the participants were not dampened. The objective of the game was to get as many pieces of the puzzle together as possible. Each team was given a different puzzle and the pieces were mixed. Hence, teams had to trade pieces with their team leader carrying their chairs as they moved around. The two teams that had the maximum number of pieces qualified to the finals.

As the teams battled it out, a simultaneous McSpicy giveaway was held outside LT23, whereby the EEE students were treated to McDonald’s burger and fruit juice. This became the biggest crowd-puller, as students, hungry after their lectures lined up to grab their burger.

The two teams that made it to the finals battled it out in three games to win the title of KCH champion. The first game played was “Ball Pens”, where each team had to carry a tennis ball from one end to another using the tips of four ball point pens only. The fastest team to do so won the game. The second game was “Movie Titles” where three team members from each team had to enact ten movie titles to the rest of their team mates. The movie titles included King Kong, Matrix and Jurassic park, and many amusing actors were discovered as the players acted out their roles. The last game played was the bean calculator. In this game, each team had to calculate an answer to a question and then show their answer by collecting beans from a bowl, using chopsticks. Only one bean could be collected at a time and three types of beans were kept, which represented one point, five points and ten points. The team, VIVA FOREVER, led by Prof Shum Ping emerged as the winner and the runner-up was team Super Mesh, led by Prof Goh Wang Ling. The event ended with the prize giving ceremony, where Prof Kam Chan Hin was invited to give away the cash prizes and certificates. His concluding remarks aptly summarized the event, “The event was very interesting and was a demonstration of team work.”

The Kam Chan Hin (KCH) Strength Challenge is an annual event organized by the EEE club. Named after the chair of EEE School, the event aims at bringing together EEE students and professors by putting them together in a competitive arena. The event is well known in NTU for having the largest banner printed by any club. This year, the publicity department outdid the previous years’ banner, with a spectacular two storey high banner, placed in front of LT23. The event as usual, attracted a large crowd and a warm response from both participants and audience. Numerous games which tested both strength and mind were organized by the Special projects division of the EEE club. The event allowed students to take a break from the rut of study and participate in fun and games.

The event commenced with the arrival of the chair of EEE school, Prof Kam Chan Hin and seven EEE professors namely, Prof Tay Beng Kang, Prof Yu Lee Wu, Prof Goh Wang Ling, Prof Chang Chip Hong, Prof Shum Ping, Prof Sun Xiaowei and Prof Yu Hong Yu. In his opening address, Prof Kam Chan Hin talked about how the event is able to help Professors take time off their hectic schedules to have fun and how this challenge is always able to derive innovative ways of testing “muscles and brains”. Six teams of students participants and each with a professor attached were set out to win the KCH challenge.

The KCH challenge had three rounds of games with two teams to be eliminated after each round. The first game played was the “Engineering Challenge”. In this game, the teams had to build the tallest structure possible using only straws!! At the end of the game, each of the structures was subjected to stability tests, to see if they collapsed when moved slightly or when wind was blown through them. The structures that failed the test were disqualified. The teams with the four tallest and strongest structures were qualified for the next round. In the second round the teams played the “Puzzle Game”. Even though the rain clouds rolled in, the spirits of the participants were not dampened. The objective of the game was to get as many pieces of the puzzle together as possible. Each team was given a different puzzle and the pieces were mixed. Hence, teams had to trade pieces with their team leader carrying their chairs as they moved around. The two teams that had the maximum number of pieces qualified to the finals.

As the teams battled it out, a simultaneous McSpicy giveaway was held outside LT23, whereby the EEE students were treated to McDonald’s burger and fruit juice. This became the biggest crowd-puller, as students, hungry after their lectures lined up to grab their burger.

The two teams that made it to the finals battled it out in three games to win the title of KCH champion. The first game played was “Ball Pens”, where each team had to carry a tennis ball from one end to another using the tips of four ball point pens only. The fastest team to do so won the game. The second game was “Movie Titles” where three team members from each team had to enact ten movie titles to the rest of their team mates. The movie titles included King Kong, Matrix and Jurassic park, and many amusing actors were discovered as the players acted out their roles. The last game played was the bean calculator. In this game, each team had to calculate an answer to a question and then show their answer by collecting beans from a bowl, using chopsticks. Only one bean could be collected at a time and three types of beans were kept, which represented one point, five points and ten points. The team, VIVA FOREVER, led by Prof Shum Ping emerged as the winner and the runner-up was team Super Mesh, led by Prof Goh Wang Ling. The event ended with the prize giving ceremony, where Prof Kam Chan Hin was invited to give away the cash prizes and certificates. His concluding remarks aptly summarized the event, “The event was very interesting and was a demonstration of team work.”
Put down your heavy thick textbooks for a while, put on your sport’s shoes and rush to the SRC for some fresh air. This was the message the EEE Club sent out to all its students, following the study-burdened mid semester week. In their endeavor to get a near perfect GPA, everyone seems to be engrossed in their studies and have forgotten the need for recreational activities like sports. Thus, the sports department of the EEE Club organized the EEE Sports Carnival 2008 from the 6th to 9th of October 2008. The event, rather than focusing on competition, tried to promote a general vibe of fun and brought together students not only from the school of EEE, but from various schools in NTU.

Spanning over three days, the games played in the sports carnival were futsal, basketball and badminton. For badminton and basketball, a separate category for women was created. Students were allowed to form teams with a few non-EEE students. With over $300 in prizes up for grabs, the sports carnival attracted huge participation, with over 25 teams signing up for all the sports. As teams battled it out in the SRC, elimination was inevitable and it eventually came down to just 4 teams on the final day. The teams that made it to the top 4 in each category, battle to win the coveted title of EEE sports champions.

The sports carnival drew to an end with the closing ceremony. Held in the indoor basketball court of the SRC, the event began with an opening address by the President of the EEE club, Tan Poh Lye Ivan. This was followed by a speech by the guest of honor, Professor Koh Soo Ngee. Professor Koh commended the EEE club for organizing the successful event and highlighted the need for such activities in students’ lives. Bearing this in mind, the finals for the male basketball challenge was played out in front of an audience of over a hundred students. In what was to be an electrifying game, the audience was left at the edge of their seats, as they witnessed a very close match. The closing ceremony concluded with the prize giving ceremony. Team ARJUN was crowned the winner of the badminton championship. Meanwhile in basketball, team 16SM3 and team SHENGJIE won the male and female basketball challenge respectively. The male futsal was won by team FANTASTIC SIX. As the emcee Dilasan very aptly put it “All’s well that ends well”. The EEE carnival was yet another platform for the EEE club to showcase its commitment to its students. And it did so very well, outdoing the previous years’ sports carnival. The students left with a sense of contentment, having witnessed high quality, competitive sport and being nourished with refreshments.
It was a night to be remembered, especially to the graduates as they embark on another phase of their life. The Graduates’ Evening 2008 held on 25th July 2008 was a momentous occasion with over 400 graduates, professors, staff and alumni members attending the dinner function. The evening saw a lot of graduates gathering around the networking area, updating one another of their current ‘whereabouts’ with glimpses of smiles on their faces. When the clock stroked seven, the high-spirited graduates sat themselves in the Marina Mandarin Grand Ballroom.

A few minutes later, graduates stood up and gave their warmest applause to the arriving professors and guest of honor – Senior Associate Provost of NTU, Professor Er Meng Hwa.

The evening’s proceedings began with welcome addresses by Senior Associate Provost, Professor Er Meng Hwa, Chair of the School of EEE, Professor Kam Chan Hin and the Chairperson of the Graduates’ Evening 2008, Mr. Cheah Wai Soon. After all the formal introductions, the much anticipated EEE Graduates’ Evening 2008 was kicked off with a short dance by the hotel staff. Not forgetting the humorous emcee – Daniel Ong from FM 98.7 who livened up the atmosphere while our hungry graduates helped themselves to the first dish. Mess arose shortly after the first dish was served when the eager working-adults wanted to have their memories kept in print, decided to go around the ballroom to look for their friends. It was only until Daniel Ong played a within-10-seconds-to-get-seated-game, then the excited crowd began to return to their original seat. The last graduate who found his seat was made to describe his experiences in EEE. Another game saw the whole...continued on page 59
ballroom in chaos as they look for their own group in Nostalgia game. Group C++ walked away with watches as they were the first to gather their group that had been scattered around the room.

The spirit of our graduates soared even higher when the JAI Band, a group comprising of four of our own NTU alumni, sang melodious and soothing tunes of life. The video clip entitled “Down the Memory Lane” evoked the memories of our graduates during their university life.

Several awards were also presented during the evening. Eight EEE Excellence Awards were given out to outstanding graduates with exceptional commitment to extra-curriculum activities and excellent academic results. The EEE Lifetime Achievement in Teaching Award 2008 was presented first time to Associate Professor Ooi Tian Hock for his special achievement in teaching, while the Teaching Excellence Awards (TEA) 2008 for Year 2, 3 and 4 were presented to Associate Professor Er Meng Joo, Associate Professor Siyal Yakoob and Associate Professor Tan Soon Yim respectively.

Before the night was over, the Graduates’ Evening 2008 committee invited the professors and guests to present a toast to the graduates and congratulated all for their individual achievements and the significant milestone for the next phase of their life.

The event finally rounded off with the long-awaited lucky draw. Mr. Wu Guo won a Sony PSP Slim as second lucky draw prize and the lucky Ms. Peng Yu won the first lucky draw prize – a NEC laptop, proudly sponsored by NEC.

After all the excitement and hype, it was with regret that the night had to come to an end. As the graduates stepped out of the ballroom, their eagerness to start their next phase of life and face future challenges could be felt among all.

**EEE Excellence Award Winners**

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bernard Ricardo Widjaja</td>
</tr>
<tr>
<td>Ding Chow Han</td>
</tr>
<tr>
<td>Huang Zelin</td>
</tr>
<tr>
<td>Joeku Joseph Tom</td>
</tr>
<tr>
<td>Li Rui</td>
</tr>
<tr>
<td>Lu Qimin</td>
</tr>
<tr>
<td>Tan Wai Chern</td>
</tr>
<tr>
<td>Zhao Zhi</td>
</tr>
</tbody>
</table>
Our Vision
To be a world Class Centre of Excellence for Electrical & Electronic Engineering and Technology Innovation

Our Mission
To excel in Teaching, Research and Professional Services in Electrical & Electronic Engineering and to contribute to Technology Innovation and Economic Advancement of the Nation

Editorial Committee
Advisor: Professor Kam Chan Hin
Chairman: Assoc Prof Teoh Eam Khwang
Members:
Assoc Prof Jessica Ng
Assoc Prof Ang Diing Shenp
Assoc Prof Siew Chee Kheong, David
Assoc Prof Yvonne Lam Ying Hung
Assoc Prof Erry Gunawan
Assoc Prof Don Mahinda Vilathgamuwa
Mrs Lee-Phang Siok Mun, Priscilla
Mrs Kuo-Lim Gek Lye, Sophia
Mr Sow Peck Heng
Ms Tan May Ser, Serene

School of Electrical & Electronic Engineering
Nanyang Technological University
Block S2.1, 50 Nanyang Avenue
S2.1-B2-20, General Admin Office
Singapore 639798
Tel: (65) 6790 4229 Fax: (65) 6793 3318
http://www.ntu.edu.sg/eee

Reg No 200604393R

Visit our website: http://www.ntu.edu.sg/eee/
Your feedback and contributions are crucial. We want to hear them. So let’s connect. Email us at e3world@ntu.edu.sg