MISSION

TO DEVELOP AND NURTURE RELATIONSHIPS AMONG INDUSTRY, ALUMNI, STAFF AND STUDENTS THROUGH COMMUNICATION AND INFORMATION

NETWORKING GLOBALLY

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Globalisation and rapid technological advances have changed the way we live and conduct business. They have also opened up tremendous opportunities for us and presented enormous challenges.

In the School of Electrical and Electronic Engineering, we have a very unique situation of embracing globalisation. Our international faculty and foreign students provide a very rich and diversified cultural environment for everyone to have a head start in the networking world.

The School will continue to promote a vibrant learning environment for staff and students to interact closely and achieve networking success.

Professor ER² Meng Hwa
Dean
School of Electrical & Electronic Engineering

The School logo consists of the three letters “EEE” arranged to form a cube, in short, E cube (E³). The 3Es represent the three main activities which the School aims to achieve in the mission statement, i.e. excellence in teaching, excellence in research and excellence in professional services to industry. The 3Es are also designed in an interlocking pattern to form a hexagon. This signifies that the 3 main activities are closely interrelated and aptly separated by very thin lines. Its deep blue colour emphasises the synergy of passion, perseverance, and dedication in the lifelong journey of exploration, learning and discovering in our quest for new knowledge and contributions towards a better future society. The simple and yet elegant design symbolises the commitment of the School to achieve the ultimate goal of E³: Excellence in Engineering Education.
Globalisation is an often-used but the least understood word in modern times. In its simplest sense, globalization refers to the rapid reduction of physical distance as a result of rapid advances in technological innovation. On a large scale, it can also be contrasted with localisation, nationalisation, or regionalisation. Globalism describes the dynamic process of globalisation, which involves the networking of interdependence at multi-continental distances. These networks are created and developed deliberately through the flows and influences of trade, ideas, information, technologies and people. Globalism, however, does not necessarily imply the outcome of universality as is commonly believed. In the same vein, globalisation does not and would not automatically result in the convergence or consensus of ideas, behaviors and cultures.

Globalism and interdependence are both multidimensional phenomena of the increasing pace of globalisation. Globalisation has also resulted in extensive arrays of multilateral cooperative arrangements in all human activity areas eg. Trade, education, sports, defense, religion and technological processes. The very success of multilateral cooperation has generated increased interdependence through global networks of people.

The new global realities challenge organisations to be innovative and creative, to improve performance continuously, to build new alliances and ventures. At the heart of a modern, knowledge-based and knowledge-driven economy is the constant persistence of change. New markets open up as new technologies are discovered, and give rise to new opportunities that in turn attract new competitors.

The key decisive factors for enduring and sustainable competitive advantages lie in the abilities to leverage and manage our most valuable basic human assets: our creativity, our knowledge and our skills. Herein lies the key to the design of advanced business management practices needed to market and harvest the new high-valued products and services.

The key skills required by the economy and markets are enterprise, flexibility and innovation, irrespective of the fields of endeavour. In engineering, services, marketing, finance, human resource management and operations, the human intellectual, conceptual and interactive capabilities are the key determinants of gainful employability. They are also the most significant impact outcomes of educational and schooling processes.

Universities and educational institutions must promote competition, stimulate enterprise, flexibility and innovation by updating learning curriculum and delivery systems to align them with the demands of a global community and economy. There is a great and immediate urgency to invest in capabilities where companies alone cannot or unwilling to: in education, in science and in the creation of a culture of enterprise. And educators and teachers must promote creative partnerships with their students that help them eventually in companies. They must also collaborate globally for competitive advantage; promote a long term vision in a world of short term pressures; benchmark their performance against the best in the world; forge alliances with other institutions and organisations all over the world, and develop strong internal networks with their own employees.

Education and training must supply the skills necessary to engage and drive the global economy. To do this, the education and training sector needs leaders and workers with the vision and skills to develop new approaches to learning and to implement change. Professional development for teachers, trainers, content developers, researchers and all other workers in education and training is essential to allow them to be change agents to achieve the goals of the information economy.

Change leadership is more than just new skills - it is about being entrepreneurial in manipulating, connecting and generating knowledge, and about being expert in how knowledge is created.

The relationship between teaching and learning is changing. Effective learning means more than just behavioral changes, but also includes the competencies to manage, share and create knowledge.

The role and focus of research is also changing. Technology is enabling enhanced communication across continents among researchers, and between researchers and the wider community. This vastly enhances the researchers' access to information, as well as provides access to powerful tools for addressing research issues. Electronic publishing also allows a wider and faster publication of research results and facilitate sharing and remote access to research infrastructure by multiple, geographically disparate research communities.

The key challenge is to diffuse knowledge and understanding from 'early adopters' as quickly as possible to the workforce, and the rest of the population, as a whole.

The ability to respond quickly to changing conditions has become the critical source of competitive advantage for any country. To a significant extent, the education and training sector's ability to adjust quickly to the demands of the global economy will set the pace of adjustment for a country as a whole. It is therefore important that the education and training sector meets the challenges both quickly and adequately.
New EEE Full

Professor Alex Kot Chi Chung

With the increasing economic globalization and the re-structuring of the world political arenas, educational systems worldwide have changed rapidly in their function, curriculum and approach. The impact of globalization upon education raises concerns with endless debates on how education is being delivered, what should be taught and who should have the rights to access. Professors from the “pre-internet” era are caught with the rapid changes in the knowledge economy, whereas the younger ones are excited with the transformation from the classroom blackboard to the electronic whiteboard.

In NTU alone, we have edveNTUre for e-learning, wireless campus network for Internet connection, centralized staff link for handling e-form submission and emails to replace office memos. We are also busy catching up in commercial activities in linking with renowned institutions like MIT and Stanford. The Government is interested in positioning Singapore as a regional educational hub. Well-known institutions are establishing profit making overseas campuses and branding is also on their top priority list.

On the one hand, some of the immediate products of globalization can be seen as: replacing classroom lectures with distance learning machines; tutorial rooms with chat rooms; and a general trend of education becoming a commodity. On the other hand, the globalization of the economy encourages exploration in technological frontiers, enhances the student’s ability to acquire new knowledge and helps us disseminate information and data in a speedy manner. It also breaks the boundaries of time and space between professors and students and makes the curriculum more flexible. With the challenges of the new initiatives and global players, the new educational debates centre on the questions of how to strike a balance in our educational values and policies. Are we ready for the profound changes and the paradigm shift in the basic role of the university?
In a world that is increasingly becoming a global village, education and research face growing international competition. As NTU aims to become a world-class university, as an academic, I am dedicated to learning from colleagues, students and the international academic research community. It is obvious that local publicity alone is insufficient, as good standing in the international research community is becoming increasingly important.

In this article, I would like to share my educational journey with you. Nelson Mandela’s statement that for many people there is, “A Long Way to Freedom” was very true for me. When I finished primary school in 1966, the Cultural Revolution began in China. During that time students were kept out of school. Thus during my teenage years, I lost the opportunity of both a high school and a junior college education. In May 1969 at the age of 15, I voluntarily went to a very remote village as a herdsman on the Hu-Lun-Bei-Er Grassland in Inner Mongolia. From December 1972, I spent five years in the Da-Qing Oil Field in the He-Long-Jiang province as a forger, construction worker, and human resource officer. Later I worked as an oil exploration-team worker, and a computer programmer. However, being self-taught I persisted with my study, even at minus 25°C in vast open snowfields under the twilight of a self-made oil-lamp in a crowded moveable cabin! I took the first national university enrolment examination at the end of the Cultural Revolution in 1977, and was enrolled in Shanghai Jiao Tong University.

I have never regretted those nine years of my life, despite the loss of the golden study period from the ages of 15 – 24, but feel that experiencing the difficult life with ordinary people - peasants, minority headsmen, and oil workers – was an irreplaceable treasure that strengthened my personal character. The extreme hardship I encountered, including several near death experiences, has greatly enriched my life. It was a social education, “My university” (a novel by a very famous Russian writer) and an invaluable learning experience.

To be promoted to a full professor represents for me more recognition than reward. My happiness lasted a few days, and then I quickly returned to normal life under the constant call from my daughter, Daisy, who warned, “Do not over-pride yourself”. I have to keep peace at heart, as colleagues, research staff and students who have worked with me have substantially contributed to what has been accredited to me. More importantly, without the school and the university’s support, it would not have been possible to achieve what we have.

A full professorship depends on the definition, from my understanding, it represents the university’s good standing in the global research community, by international recognition of an individual staff member in their respective academic research area. I fully understand that there are a number of colleagues in our school who are qualified or potentially qualified and I will cheer them on when their time comes, as it surely will!
Assoc Prof Seo Kye Yak of the Division of Circuits and Systems teamed with Prof Flavio Canavero of the Polytechnic of Turin (Italy), Prof Hartmut Grabinski of University of Hannover (Germany), Prof Christos Christopoulos of University of Nottingham (UK) and Assoc Prof Warrachat Khan-Ngern of King Mongkut’s Institute of Technology Ladkrabang (Thailand) to submit an AUNP project proposal to the European Commission on February 2003. A total of 40 projects were submitted to the European Commission, but only 10 projects were finally selected for funding, and Prof Seo’s team project was one of them.

The project “Joint development of teaching materials to improve EMC skills of academic staff and post-graduate electronic designers,” was awarded a total grant of 225,000 euro (US$450,000 approx.) for a period of 2 years. The objective of the project is to develop an innovative university course for training and preparing future electronic designers to design high-speed electronic systems to meet the challenges imposed by the worldwide electromagnetic interference (EMI) regulatory requirements. The target groups are future university teaching staff and future electronic systems designers. To achieve this goal, universities must train future teachers, who will in turn prepare future electronic designers on such matters, by always remaining up-to-date in the latest research developments in this field. The new course will be developed by means of sharing research results, seminars, experience, and the fabrication of a demonstrator to be used for teaching.

In any field of science, university course curricula must be kept up-to-date in order to prepare future engineers and researchers for the actual problems they will face when they graduate. An exchange of experience and a long-term collaboration between various universities is one of the most effective ways of achieving this goal. The project team feels that the various cultural and socio-economic backgrounds of the partners in this project will facilitate greater understanding of today’s technological challenges by viewing them from various perspectives. The AUNP serves the best platform for European and ASEAN universities to work together.
The Tan Kah Kee Young Inventor's Award
Dr Susanto Rahardja and Mr Yu Rongshan

Dr Susanto Rahardja from the Institute for Infocomm Research (I²R), Agency for Science, Technology and Research (A*STAR) and his team mate, Mr Yu Rongshan, won the Tan Kah Kee Young Inventors Award, Gold Award (Open Section), one of two Gold Awards in the Open Section category in June 2003.

Much of the audio entertainment technology, such as fast music downloads and DVD surround sound, depend on media technology that enables the reduction or compression of audio data to a fraction of its original size while losing little or none of its fidelity. Advanced Audio Zip (AAZ), the invention which received the Tan Kah Kee Young Inventors’ Gold Award (Open Category), offers a unified and efficient solution joining scalability and interchangeability while replacing the current separate solutions for “lossy” and “lossless” audio compression. This could well be the next-generation audio codec - software that compresses the audio to a particular coding scheme and then decompresses it during playback.

Lossy audio compression techniques intentionally remove imperceptible audio information in order to achieve high compression ratios. They preserve the essence of the sound, but do not restore the precise bits; thus the higher the compression, the lower the sound quality. Current state-of-the-art technology like MP3 (MPEG-1 Audio Layer-3) and Microsoft’s Windows Media Audio (WMA) technology can deliver compact-disc-quality stereo audio at 10–20 times compression, with a quality degradation imperceptible to many normal users. On the other hand, lossless audio compression techniques restore, after compression, every bit of the original audio data. Nothing is lost or distorted. The progress of network and storage technologies, and the rapidly dropping price per megabyte of storage, encourages greater delivery of audio contents at lossless quality. Potential applications of lossless audio compression include audio archiving, studio, and high-end home users. However, it achieves only limited compression ratios of between 1.5 and 3 times for pop music.

The AAZ provides an efficient and flexible solution for both “lossy” and “lossless” audio compression. In particular, AAZ delivers excellent compression-ratio performance which is comparable to most state-of-the-art, non-scalable, lossless audio-compression algorithms. In addition, AAZ provides the fine grain bit-rate scalability so that the AAZ lossless bit-stream can be re-used as a lossy bit-stream at various lower bit-rates by simply truncating the lossless bit-stream. AAZ is also equipped with abundant functionalities, such as backward compatibility and all these are achieved simultaneously at realizably low complexity.

In response to the official Call for Proposals on MPEG-4 Lossless Audio Coding, the AAZ technology was submitted and evaluated by independent testing determined by MPEG. Under scalable lossless coding evaluation, the AAZ system had the best performance in terms of mean lossless compression ratio for all word lengths, and all sampling rates, for all sequences in the test set. In addition, the AAZ provides critical functionalities and capabilities such as fine grain bit rate scalability from lossy to lossless, high degree random access, backward compatibility to MPEG-4 Advanced Audio Coding, and simultaneously achieves remarkably low complexity. With that, the architecture of AAZ was adopted as Reference Model for scalable lossless coding at MPEG in July 2003.
E3World asked Associate Professor Michael Heng on his perspectives on networking globally. He has been approached several occasions by the International Labour Organisation (ILO), an United Nations agency, as their International Consultant in Vietnam, China and Cambodia.

What have you been doing in China, Vietnam and Cambodia?

In December 2003, I was in Beijing, China, facilitating a high-level ILO-China Policy Review Seminar. This is a follow-up to the groundbreaking work in February 2003 on the first ILO-China Seminar on Social Dialogue. The December Review has also generated further high-level strategic consulting work for 2004-2005.

In September 2003, I was in Cambodia conducting an ILO-funded organizational analysis study of the newly-formed Cambodian Federation of Employers and Business (CAMFEBA). CAMFEBA is comprised of six business associations and several individual business owners representing more than 600 employers.

Last year in August 2002 was my first ILO appointment as the International Consultant to the Government of Vietnam for the implementation of a national trilateral consultative framework for social dialogue at the enterprise, local and national levels, which is expected to play a crucial integral part in Viet Nam’s transition towards a market economy. The successful mission paved the way for a US$2 million ILO project designed to promote sound industrial relations and to strengthen the capacities of industrial relations actors in Viet Nam over the next 3 years. The Project now involves 70 companies in 7 Vietnamese provinces. I returned this year in August 2003 for a program evaluation of its first year and discussed their major activities for 2004.

The World Bank has also decided in October 2002 to integrate the new ILO Project as a part of the World Bank's Comprehensive Poverty Reduction and Growth Strategy (CRPGS) in Vietnam. The CRPGS is a 10-year US$370 million multi-agency total initiative aimed at education, health, job creation and infrastructural development in Vietnam.

How have your international high-level consulting work contributed to your teaching and research in the University?

High-level consulting, especially in other countries, provides fertile opportunities for new ideas to germinate. When the context of the work is unconventional, especially in countries like China and Cambodia, one is confronted with situations that challenge the underlying assumptions of established theories and models. This always points to fresh ideas for further research, some of which get published in academic journals. The resultant lucid understanding of new situations ought to be transferred back to society, in the form of necessary and critical assistance to businesses, industry, and the community. I believe that this to be the true meaning of academic, research and professional impact. A great University must help to bring about a better society. If not, what good is our reservoir of expert knowledge?

How important is it for academic staff and their students to see the world as their current and future frame of reference for action?

The fact of globalisation has created an increasingly interdependent world. The “shrunk” globe can be depicted as a flat chessboard where political boundaries are merely imaginary lines that can be crossed easily by information, knowledge, ideas and technology. As a small, tiny nation-state, Singapore universities and students do not have the luxury of indulging in exotic and esoteric research and study that do not have relevance or benefits to the strategic survival and sustaining prosperity of the country. It is imperative that professors make the creation of knowledge for practice their research motivation, and bring their students as often as possible into the real world via their lessons and learning experiences. Using the real global context as the main frame of reference will focus their students to engage the exciting challenge of managing the dynamic relationship between theory and practice. Gainful employability results from a practical insight that relates classroom lessons and experiences to real-life applications continuously.

How does your international high-level consulting work contribute to the aspirations of the NTU to become a full-fledged, world-class University?

Forging new friendships, further developing personal growth, obtaining respect, reputation, and having a real sense of contribution to my own community and other societies can only add to the reputation of the University. Some of my clients introduce me as a professor from the “Singapore Nanyang University”. The few colleagues who also consult internationally and creating global networks can become role models for others who may be too afraid to venture outside the “ivory tower” to face the uncertainties and humility of the harsh realities of practical life. A regular exposure to the world beyond computers and laboratories can only enhance the insight and worth of professors, who are expected to add and create real knowledge to add value to their students’ learning. Top professors in world-renowned universities invariably have significant consulting involvements with organizations that are willing to validate relevance by paying tangible value for their specialized knowledge and skills.

What advice could you give to those who desire to create significant impact with their specialised and expert knowledge through networking globally?

Develop a healthy curiosity, good listening and observation skills, and have wide interests. Also have a keen desire to practice theory, on top of the passion to discover theories from systematic phenomenon. Gain plenty of industry and business experiences to challenge your academic and specialist knowledge and relentlessly pursue with organisations and the community the answers to the question: What is the public value of your expert knowledge?” Make sure your research papers are grounded in real situations. Your research solutions should really have real-life problems for their applications. Basically, do not be afraid to go out there and engage the world.
University of Tokyo – NTU Signed MOU on Underwater Robotics

A memorandum of understanding was signed on the 26th of July 2003 by the School of Electrical and Electronic Engineering, Nanyang Technological University and Institute of Industrial Science, University of Tokyo to conduct joint research on Underwater Mobile Robotics. Following which, a joint seminar was organized on Autonomous Underwater Vehicles (AUVs).

The theme of the seminar was “AUV/ROV Technologies in Singapore”. University of Tokyo presented their recent sea trials with the newly developed AUV called ‘R2D4’. Three ROV manufactures in Singapore presented their work on underwater construction, surveillance and inspection carried out in this region. The participants (about 80), had the opportunity of getting a glimpse of the in-house constructed NTU AUV called the ‘NTU-UAV’. Under the MOU, R&D work in the area of Underwater Robotics will be carried out jointly with Japan through staff exchange, joint sea trials, and conducting joint seminars, courses and conferences.
A local EEE graduate, you began your doctoral research here in August 2002 and have made considerable achievements in the field of biophotonics. Could you tell me why you choose this area, and the achievements that you have made to date in biophotonics?

Lee Woei Ming: In my final year project in EEE, I was assigned a project to generate a novel holographic technique to produce optical tweezers. Upon receiving this project, I searched for an article that I remembered reading four years ago on "Optical tweezers and Scissors" by Michael W. Berns and his colleagues, in which they introduced a novel biomedicale technique, whereby laser beams are employed as tools for micro-surgery on cells. This time, I read the article with more interest and as I researched into the subject, I was drawn to its technical wizardry and its immense impact on the world of science. The topic has become one of my passions, which I will pursue to improve the technique and to bring its benefits to humanity, while also hoping to use it to answer many of the mysteries that are still confusing scientists.

As for achievements, at present, my Supervisor, Assoc. Professor Yuan Xiancong, Larry, and I have successfully set up two types of optical trapping systems in our Photonics Research Centre. On a personal note, after just one year on the project, I have authored 7 papers and published 5 of them in international journals based in both UK and USA, 2 are still under review.

Our optical trapping group managed to publish 7 publications in prestigious journals such as Applied Physics Letter and Optics Letters etc. Furthermore, an international tech magazine, "Photonics Spectra", also cited one of my published works in its April 2003 issue, which reaffirms the recognition of our novel research.

On the collaboration front, with the help of Dr Yuan, I have also managed to invite Prof Dholakia (St. Andrews University, UK), who is one of leading researchers in the field of optical trapping. He has been kind enough to accept our invitation to visit our school for a month to explore new collaboration areas under the Tan Chin Tuan Fellowship.

On top of the above achievements, we have also managed to have clinched substantial funding for dynamic optical trapping from ASTAR through a joint prepared proposal by Dr Yuan and myself. The project will be funded for a period of 3 years. Such a good track record in one year of optical trapping, has given me more motivation to break new ground. I have started a website for our group to post our work online in order to facilitate information distribution and to attract more collaboration -)

Why did you choose to further your studies to doctoral level?

Lee Woei Ming: Being a local graduate of our school and having done my major in Integrated Circuit design, my natural career choice would have been in the semiconductor industry. However, I have a more profound interest in research. Upon graduation, I considered a position as a postgraduate student. One of my key motives, beside the attractiveness of the research topic, was my supervisor, Assoc. Prof Larry Yuan. His openness to discussing questions and his unwavering support for students gave me the confidence to pursue this course of action. His concern for his students and his strong technical mind were factors that gave me the motivation to take on the challenge. Most importantly, he was willing to take a chance on me. Even though I was an average student in my grades and not a major in Photonics, he took me under his wing. He was able to recognise that my strength was not in coursework but in research. Our final Year Project was selected into the top ten exhibits for COE 2002. In short, he was the instrumental factor in my decision to pursue a doctoral degree in NTU.

I also feel that being able to study postgraduate in NTU provides me with a chance to prove that a local research postgraduate in NTU is as capable as any other student from any top international university. I firmly believe that it is an individual's capability and the supervisory support that counts most. Such capabilities are recognised through the publications of the student. Since international referees judge most of the research papers and the benchmark should be the quality of the student's publications.

You established the . Could you describe how you came to establish this student chapter and tell me about its importance to students?

Lee Woei Ming: The image of postgraduate study in NTU has always been one of isolated groups working in laboratories. We are often seen as a group of people who do not blend into the overall student population. Hence, one of the main purposes of establishing a student chapter under the Optical Society of America was to help foster more relations between the postgraduate and undergraduate communities. And why Optical Society of America? Well, they are the only Optics Society that provide funding for our student outreach programmes and have a dedicated Educational Committee to help students locally and abroad to spread educational information and research on Optics.

The club that I have formed with fellow postgraduates (a mixture of nationalities) in the Photonics Research Centre is also aimed at engendering our passion for research in the undergraduates, to inspire more local undergraduates to join us in research, and to give them a better understanding of a postgraduate's life. Since our club is made up mostly of seniors, it would also be a good ground for new postgraduates to get familiar with local research groups. This free sharing of knowledge is beneficial to all students.

We are also discussing plans to bring optical sciences to secondary and junior college students. We hope that such an outreach programme will bring an awareness of the educational quality of NTU postgraduates to the public, instead of it being hidden in the laboratories.

Describe any one event that has contributed to progress in your study life or your research area?

Lee Woei Ming: A series of events triggered much of my research success for the past year, but one that stands out is the publication of my first journal paper in Optics Express (USA). I published that paper four months after I commenced the course, which was a great encouragement for my subsequent paper. In that particular work, most of the equipment used was inexpensive as it was from my final year project. The paper was quite well received, as a Tech Magazine, Photonics Spectra, cited it and two other papers have cited it since.

This event showed me that to do good research is not necessarily about using expensive and high tech equipment. The main basis of good research is the idea and the implementation of that idea. The simplicity of the method, and the easier the repeatability of the work is what is important for good research. It is this kind of research that will allow science to be learnt and practiced by everyone. Since then I have also written another paper on the explanation of a simple phenomenon whereby two specially designed holograms are overlapped to form a unique moire fringe. I believe that this phenomenon can be used in any classroom to demonstrate the unique laser beam interference. This phenomenon was also reported last year on Journal of Optics American A (USA) from a group of researchers in Brazil, which was independent of my report in the Journal of Optics: A (UK).

As a Singaporean undergraduate student, do you feel that you have changed in any way since studying at doctoral level at NTU?

Lee Woei Ming: In the area of science, I feel blessed that I am able to practice the art of science. Science to me is no longer just a subject to study for examinations. It is a rule by which I live. Even though I was always interested in reading scientific magazines, popular scientific books and surfing scientific web pages, doing science at doctoral level has allowed me the time to study each scientific phenomenon with great depth and passion. In short, I was given the opportunity to doubt science in every way; everyday I am struggling with the right to doubt. It is this struggle that makes my passion for science even deeper.
You joined NTU in July 2002 and have a bachelor's and a master's degree in Engineering from Fudan University, one of the top universities in China. Could you describe the differences in educational experiences between Fudan University and your experiences at NTU?

Chao Chen: I deem it an honour to have had the chance to receive education in FDU and NTU, which are both renowned universities in Asia. As predominately a technological university, NTU offers world-class facilities for scientific research, teaching, and student activities. Most importantly, these facilities are easily accessible to all staff and students. In terms of "software", NTU creates a multicultural stage where worldwide excellent researchers, teachers and students with different cultural backgrounds play important parts. They work together, share the ideas, and communicate with each other. Everyone can benefit a great deal from the multicultural experience.

Although less international, FDU provides comprehensive educational programs. For example, technological students in FDU are encouraged to pursue a minor in journalism, history, philosophy or whatever they are interested in. Through these subjects, FDU is able to imbue her students with a more broadened scope and an enriched character. Just like the other major universities in China, FDU is gradually overcoming the difficulty of lack of funds, and its infrastructure is now under rapid development.

Why did you choose to further your studies to doctoral level at NTU?

Chao Chen: To conduct my own scientific research has long been my dream. It's thus natural for me to have extended my studies to a higher level. When I was about to decide where to go to pursue a PhD, I was lucky enough to pick up a paper that specified the research projects conducted by Prof. Zhu Weiqiang of Sensors & Actuators Lab of NTU. The project on piezoelectric MEMS drew my attention. I loved the project so immediately that I instantly made the decision to submit an application to EEE, NTU with no hesitation.

What is it like to be an international research student at NTU?

Chao Chen: NTU provides a cross-cultural stage in a fair and equal way that people from different backgrounds can feel mutual respect for each other and cooperate smoothly with each other. As this is my first time to be an international research student staying in such a multicultural environment, I really treasure this wonderful experience from which I can learn a lot.

What is the focus of your doctoral research? Why did you choose this area?

Chao Chen: Currently my research work is concentrated on the piezoelectric thin/thick films for MEMS applications and the development of potential devices, such as ultrasonic arrays, microfluidic pumps, etc. I am certain that I have made the right decision to choose this area, which is both interesting and promising. One can just imagine how fascinating it is to fabricate micromachines with such small size below 1 mm, but that have the ability to drive a turbine or to handle microfluids. Single micropump can be used for precise drug delivery into the human body, whereas a combination of ultrasonic transducers and micropumps forms a powerful tool for biomedical characterization and cell separation. Moreover, an array of micropumps may serve as printing jets, probably for high-speed printers of the next generation. I sincerely believe that the coming breakthrough in this research area will change our future lives.

I believe that you have introduced a new method and already have one patent being processed? Could you tell us about the achievements that you have made to date in your area?

Chao Chen: Yes. One of the challenges in this area is to evaluate the piezoelectric properties of fabricated thin/thick films. The film characterization requires high-resolution instrumentation capable of measuring very small displacements down to several angstroms or even less. For this purpose I proposed a modified laser interferometric system. With the introduction of this new method of modulation, this modified interferometer possesses a rather simpler structure and is much less susceptible to environmental disturbances or intensity fluctuations from laser source. High resolutions down to Pico meter have been achieved with simple and low cost instruments. Beyond piezoelectric characterizations, I also established an acetic acid routed sol-gel method for deposition of piezoelectric thin films onto silicon substrate. Based on this technique, we fabricated successfully MEMS ultrasonic sensing arrays on a 4" silicon wafer.

You combine your interests in engineering research with your interests and talent in music. You were once the Student Conductor for the NTU Student Guitar group. Is there any connection between your love of science and music?

Chao Chen: I've never lost my aspiration towards science and music. This aspiration has only been strengthened by my leisure time. Playing the classical guitar seems to me another research object in my leisure time. I've found that science research and music performance share a lot in common. For example, in order to perfect your performance techniques, you need a scientific way of thinking, to study how to move your fingers accurately and efficiently. Correspondingly, just like a musician, a creative researcher also requires inspiration and imagination, without which innovative ideas would never emerge.

Describe any one event that has contributed to your progress in your study life or your research area?

Chao Chen: I was fortunate that I once won the third prize of National High School Competition of Physics in China, 1994. This honoured experience encouraged me to go further on my way of becoming a scientific researcher and engineering developer.

Do you feel that you have changed in any way since studying at NTU?

Chao Chen: The one year studying experience at NTU has brought me not only enhanced skills for cross-cultural communications, but also increased confidence for developing my future career internationally.
A Malaysian, you graduated from NTU, School ofEEE with first class honours as a MOE scholarship awardee and an A*Star Graduate Fellowship scholarship and began your doctoral study with NTU in July 2002. What have these scholarships meant to you?

Lai Wenn Jing: I have been the breadwinner of my family for six years after my polytechnic education. The award is simply because my parents have retired and I, being the eldest child in the family, have to take up this responsibility. I am very grateful to NTU, MOE and A*Star for granting me the "University Engineering Scholarship" during my undergraduate studies and an "A*Star Graduate Fellowship" for my postgraduate studies. As a matter of fact, these scholarships solved my financial problems. More importantly, they have given me peace of mind, which has allowed me to concentrate on my studies and research work. Despite the monetary award, the scholarships are also forms of recognition and motivation. I always want to strive more, not only to repay the kindness of the organizations that have granted me the scholarships, but also to fulfill my own sense of accomplishment.

You are a top female student working in what is still, even in the new millennium, a very male dominated discipline. What is it like to be a female student working in such a male dominated area?

Lai Wenn Jing: The engineering field is traditionally dominated by males, however, in this new millennium, as a new generation, we should be more open and brave to challenge the world positively, especially when equal opportunity is permitted. I may be a rose among the thorns, but I can perform the same as the rest, or even better (not physically though), because I am not only looking at the big picture of the problem (conventionally a male trait), but also at the details of the problem (conventionally a female trait). So I have an advantage!

Could you suggest ways in which the school could encourage more top female students into engineering?

Lai Wenn Jing: Create awareness about the new trend of the professions (e.g. female engineers, male secretaries, etc) and challenge conventional thinking. Get people to think out of the box instead of staying in their echo chamber. This is the main root to the matter: only when they dare! Secondary approaches would be, scholarships, recognizing awards, etc. just for female engineering students.

What is the focus of your doctoral research? Could you tell us about the achievements/research work that you have made to date in your area?

Lai Wenn Jing: My research is mainly focused on the optical communications systems, particularly in the ultra-high speed fibre laser systems. I chose this topic mainly due to the "feeling" developed during my final year undergraduate studies. My major then was photonics option. The more I researched, the more I liked it. Given that it is filled with unknowns, I find it very interesting and challenging. It is the sense of curiosity and the need to achieve that keeps me going.

So far, we have constructed a 10GHz ultra-fast regenerative fibre ring laser system. It is the foundation of our future work expansion. We are working towards the 40GHz operation. We also proposed to use the nonlinear control theory to study the stability of the laser constructed because of its inherent nonlinear effects. It is the first time that researchers have used the nonlinear control theory for such a study.

You have recently been awarded the DUO-Singapore Exchange Fellowship award, which is offered by the Ministry of Foreign Affairs, for the exchange program to Chalmers University of Technology, Gothenburg, Sweden. The award, based on merit, is for a pair of exchanges between a university in Singapore (NTU, NUS or SMU) and its respective partner university in Europe in any academic field. You have also recently returned from four months exchange at Monash University, Melbourne, where you received special commendations. Describe what these prestigious opportunities mean to you?

Lai Wenn Jing: After I knew that my paper was accepted by the COIN/ACOFT (Conference on the Optical Internet & Australian Conference on the Optical Fiber Technology), which will be held in Melbourne, Australia in 2003, I wanted to go there not just for the conference, but also to learn more from Dr. Birn, from Monash University, a very experienced and knowledgeable in optical communications domain. His brief visit to Network Technology Research Centre (NTRC) last year has in fact greatly inspired me in my research field. Hence, I discussed my thoughts to carry out a research project in Monash University with my supervisor. To my surprise, the suggestion was supported and approved by the School of EEE.

Exchange to Monash University is indeed an eye opener for me. First, the style of the researchers and students are quite different from us. Generally, they are open to new suggestions and quite daring in trying out new ideas. They are very systematic too. The system there is very flexible - not much red tape. The laboratory practice is very systematic and organized. We always had small discussions, which were quite stimulating: ideas triggered ideas. Through the discussions, we learnt how to tackle the problems from different perspectives. Of course, there is no hard rule on how to be an excellent and successful researcher: the medicine for one could be the poison for another. We can appreciate what we have and improve on our shortcomings.

In addition to the research experiences, my perception towards life has been influenced as well. "No worries, mate!" is the famous phrase that I learnt from my Aussie friends. They enjoy life even though they are very focused on what they are doing. They work hard and play hard too. Life is a journey, not a guided tour; and I am now enjoying the adventurous journey, taking the experience and knowledge as my souvenirs.

The exchange to Chalmers University of Technology, Sweden is arranged by International Relations Office (IRO) and sponsored by the DUO award. The photonics research group of the university are pioneers and very strong in the optical communications domain. It will be a golden opportunity for me to learn the pioneering technology from the leaders in this area. By joining the elite group, I am hoping to boost my research capacity due to the synergy generated from the great minds. I am also hoping to "bag" more life experiences in a different environment.

Describe any one event that has contributed to your progress in your study life or your research area?

Lai Wenn Jing: While I was in Scotland three years ago, I stayed with a local family, who are a 70 plus years old retired couple. Both of them are very kind people. They are also very keen in learning computer and new technologies. I admire and respect them very much, simply because of their talks and thoughts. They are just like my parents overseas. They advised me not to give up under any difficulties when pursuing my dreams. The progress in my study and research life is my promise to them.
Our Dream TV - Large Area Field Emission Displays

Assoc Prof Tay Beng Kang

In simple terms, could you explain how FED works?

In principle, a FED is similar to a conventional CRT. Electrons are liberated from a cathode and impinge on phosphors on a transparent faceplate to produce the image.

In a FED, each pixel is excited by thousands of tiny electron emitters where in CRT, only three electron guns are used to generate the image.

Why is it considered a superior technology to plasma? How does it overcome the limitations of other flat panel technologies?

FED is superior technology to plasma display in term of cost factor. The drive electronics in the plasma display is up to 40 to 70% of the panel cost, as high voltage is required to address the display. FED offers the similar visual quality as in CRT i.e. high contrast and brightness, wide viewing angle, fast response time etc. (it is because both FED and CRT are using the similar principles)

One of its features is that it offers superior brightness. Won’t this lead to burn-ins faster, something that Plasmas face? It’s also said to offer better viewing angles: what is the angle it can offer? 180 degrees (since plasma now offer up to 160 degrees)?

Bear in mind that, FED is using a very similar technology as in CRT. The phosphor in the CRT technology is very mature, which can offer long lifetime, wide viewing angles (180 degrees) and high-brightness display.

How big do you think FED screens can be, for optimal pictures? There are plasma now at 72".

In principle, FED can be made as big as you can imagine. Some company is developing this technology for sign board application. The size can be as large as 3 x 4 m².

Which OEMs have expressed interest in FED? If you can’t detail the manufacturers, perhaps I can get an idea if it’s Asian or European?

A UK based company called Printable Field Emitters is actively working toward a low-cost large screen wall TV based on FED technology.

Samsung is also very active in developing carbon nanotubes based FED display but they are targeting panel size of 20" or less.

What is the next step in your development of FED? Are you trying to improve resolution now, contrast, or size of displays?

We understand our constraint in developing a large FED at NTU. We have demonstrated the proof-of-concept FED prototype based on our patented process (see Fig.1 and 2). We feel that it should be much easier to work with industries to further develop this technology for large screen TV.

Our current focus is to make use of our emitters for miniature x-ray applications where the x-ray source is small enough to insert into a human body to kill cancer cells.

about the research team

Researchers from the School of Electrical and Electronic Engineering (EEE) have patented a technology that may be the key to cheaper and better flat-screen TVs. Recognising the superior properties of the FED, the team comprising of Assoc Prof Tay Beng Kang, Asst Prof Lau Shu Ping, and Dr Sun Zhuo from EEE worked on a technique to produce a key component of the FED - carbon nanotubes - more efficiently, robust and cheaply.
Stan Yong Zheng Shing

I feel that my greatest achievement in EEE was obtaining a First Class Honours Degree. This was made possible because NTU provided a conducive study environment. The lecturers were also friendly and willing to take time to guide students. NTU also promoted e-learning where interactive lecture materials were placed on the website for students’ access. This is a very useful tool for students. Most importantly, though, the greatest contribution to my achievement was probably my interest in my study. It was because of my interest, that I would explore my study in depth and as a result learn more. In addition, the effort put in to consistently revise what I learnt contributed to my achievement.

I'm currently working as an Information Systems Security Expert with the Centre for Strategic Infocomm Technologies (CSIT). In this position, I develop methodologies and software tools for Information Technology Security. My course at EEE provided me with all the necessary fundamental background knowledge to perform and to gain more advanced knowledge in my current position. My industrial attachment at DSO National Laboratories was also fruitful because I gained experience in project management and software development. This experience and study proved to be crucial in my present job. As such, I look forward to the challenges that lay ahead in my career.

This picture was taken with my project mate on the right and my FYP project supervisor.

Lee Song Yang

Mostly my university life revolved around two aspects: studies and taekwondo. On a typical day I would work through lectures, tutorials and labs until about 6 pm, from which time I would train in taekwondo until about 10 pm either at the gym or at the training centre. Thankfully, my efforts paid off: I graduated with a 1st, a variety awards, a couple of medals under my belt, and a handful of interesting experiences in overseas trips representing Singapore in taekwondo tournaments. What were my factors for success? I feel that each of us can do the same; it's only a matter of priorities and how badly you desire it.

More importantly, I enjoyed my brief four-year stay in NTU, EEE. Although the school schedule is hectic, there was still room for one to manage other pursuits, and at the same time, cultivate important friendships with fellow schoolmates. A million thanks to those who helped me with the lecture notes (and tips!!) when I occasionally had to miss lessons for one reason or another!
Currently, I am with Accenture, working as an analyst, and (heavily) involved in project work that revolves around, to put it in a nutshell, "adding value to the clients". I must say that all the vector analysis, triple integration and Fourier Series have helped build analytical skills that I guess would apply to most occupations.

As I leave NTU life behind and move forward to a new phase of my life, I look forward to bringing that same spirit of excellence I gained from my studies to all my future endeavors. Thank you EEE!

**Awards**
- NTU Sports Full Colours
- NTU EEE Colours Gold Medal
- NTU Alumni Award
- Rosie-Heng Ko Poh Choo Award
- Professional Engineer Board Gold Medal

**Taekwondo Tournaments**
- World University Games
- Asian Championships
- Asian Cities Gold Cup
- Vietnam Open

**Christina Ng Sock Mei**
The most significant experience that I have had during my four years in EEE, NTU was the opportunity to undertake an international student exchange to Sydney, Australia. Whilst there, I was exposed to a whole new dimension of life that I used to neglect. Coming into contact with people from all walks of life, from different cultures, and holding different perspectives and dreams, allowed me to better understand both myself, and my view of the world. It certainly broadened my horizon and deepened my understanding of my values and goals.

At this point, I would like to mention an article from the Harvard Business Review entitled "What makes a Leader", in which the author cites self-awareness as the first component of emotional intelligence. Self-awareness means having a deep sense of your strengths, weaknesses, emotions, needs and drives. It also extends to a person's understanding of his or her values and goals. A highly self-aware person knows the direction he or she is heading, and why. This, to me, is important, for the hardest part of the journey is often to determine the purpose of the journey. Once it is established, the realization and completion of the journey is only a matter of perseverance.

For me, moving on to a new chapter in life involves learning lessons from the past and redefining successes that helped bring out the best in oneself and others. I would hereby like to take this opportunity to thank Assoc Prof Yeo Kiat Seng for his guidance, as well as the people who have directly or indirectly contributed to my humble achievements so far. In this connection, I would like to share the following quote from the I Ching:

"He who knows others is smart; But he who knows himself is wise"
The EEE graduation dinner took place on 4 October 2003 at the Orchard Hotel. Graduates, alumni and staff started to arrive after 6 pm. All of them were chatting happily at the reception area, obviously elated to see one another again. Most had not met for months. People exchanged contacts and took photos while waiting to enter the ballroom. More than 500 people turned up for this event and it was indeed a lovely night as people were able to catch up on old times while enjoying a sumptuous dinner.

The Dean of EEE, Prof. Er was invited on stage to deliver a speech and the President of the alumni association, Mr Inderjit Singh also went up and thanked Prof. Er for his continual support in the alumni association.

The first performance of the night was a Mandarin song. The singer mesmerized the crowd and they applauded loudly. Despite some technical problems, he continued to sing and did not let the problem hinder him. There was also a dance performance presented by six undergraduates, which was equally entertaining.

Next, Prof. Er launched the third publication of the EEE year book. He also presented the 2003 EEE graduate employment survey. This was followed by the colour awards presentation. These awards were presented to those who were outstanding in both their studies and extra curricular activities.

The humorous emcee entertained the crowd with his jokes, making sure that the crowd was not bored. Throughout the dinner he played games with the audience. Gifts and vouchers were given away to reward the audience for their participation. People were called on stage to play games; even Prof. Er was not spared. It is not everyday that you will see Prof. Er doing a catwalk. He also entertained us with a song. Everyone who was called upon was sporting enough to go up on the stage, and not spoil the fun. The same goes to the professors who also played along with us. Everyone played their part to make this dinner a more meaningful and fulfilling one.

One of the more interesting games was one which required everyone on the same table to cooperate. Each table had to produce 10 items named by the emcee. The 10th item even required a member from each table to invite a foreign tourist onto the stage. Everyone played along enthusiastically and this game ensured that people interacted with each other, and this included people who sat at the same table but did not know each other. The food was served throughout the night while the emcee brought more joy and laughter to the audience. One of the highlights was the lucky draw as many attractive prizes were won.

Finally, the night ended with a toast proposed by lecturers and the alumni to all the graduates wishing them all the best. Everyone left in high spirits and this dinner was definitely a successful one as it served the purpose of reuniting the EEE graduates, and engendering a sense of belonging to NTU.
The presentation ceremony for the E³ Colour Awards 2003 was held, in conjunction with the 2003 EEE Graduates' Evening, on the 4 October 2003 (Saturday) at the Orchard Hotel. More than 550 staff and graduates have attended this special occasion.

The E³ Colour Award has been the brainchild of Professor Er Meng Hwa, Dean of Electrical and Electronic Engineering (EEE) and Deputy President, NTU. The E³ Colour Awards are given to students who have demonstrated outstanding leadership and entrepreneurship qualities in extra-curricular activities and achieved excellence in academic performance among EEE students during their study for the Bachelor of Engineering (Electrical and Electronic) Degree Programme. The Awards are given out annually to the graduating students from the EEE School's Education and Enhancement Donors' Fund, which is also known as the SEED Fund.

A total of 24 recipients from the 2003 batch of EEE graduates received their well-deserved E³ Colour Awards from the Dean, Professor Er Meng Hwa.

**GOLD AWARD**
Lai Chack Kuen
Lee Hui Mien
Lee Song Yang

**SILVER AWARD**
Ang Sze Theng
Aiyakt Kumar
Lim Pei San Olivia
Lim Wi-Leen
Low Kok Hong Daniel
Tay Boon Pin Esmond
Teoh Leong Yang
Victor Adrian

**BRONZE AWARD**
Badami Kais Kaizar
Lee Ting Kuan
Liu Rong
Ng Sock Mei Christina
Ng Wei Meng
Ngham Anshul
Preetha George
Rudy Kumiawan
Seah Kwang Hwee
Sohlin Jihata
Toh Hong Sim
Tom Tinu Mattappally
Yap Juin Yi

The application for the E³ Colour Award is open to all EEE graduating students in the beginning of the second semester. The forms can be obtained electronically or from the School Administration Office. The completed forms together with the supporting documents must be submitted to the Section for Academic Matters (Block S1 Administration Office) before 31st March.

For more information about the E³ Colour Award, please visit the EEE website at
Creating Fiction from Experience

Assistant Professor Joanne W. McClure

As coordinator of the general elective course GH10 Short Fiction, I have kept in mind that this course is regarded within the university as part of general education. As such, it prepares students more for life than for a specialisation in literature. With this fact in mind, I have designed a course that should help students to read fiction for the rest of their lives with greater insight and enjoyment. However, I am also aware that some students who take GH10 have a strong foundation in literary study. The method of analysis, interpretation, and understanding that students cultivate in the course will appeal to both students who are familiar with literature courses and the general engineering student. One of the aims of the course is to learn what it means to analyse a piece of fiction, and to understand that whenever we read stories we are always actively engaged in the making a fiction out of our own backgrounds, cultures, belief systems and psychological temperament.

I would like to share with you an engineering student’s creative writing assignment detailing the experience (and nervous energy) surrounding his first oral presentation in GH10. I might add that, despite his description, his presentation was both effective and successful.

Personal Evolution?

P. Ranganathan
Common Engineering (Year One)

My Short Fiction class begins in a short while and I must do my class presentation! Nerves tremble with anxiety as the hour approaches. Pacing to and fro along the corridor reciting the necessary lines from memory, sheer dread of what is about to come fills the mind with thoughts that lower morale. Doubts seem to echo from the very air around. At last, the teacher arrives. Waiting students surge through the doorway. After all, everyone wants to get this over with as soon as possible. Doomsday had seemed so far away when the subject had first commenced at the start of the semester. Impressions found on the experience of the first few classes seem so drastically different from what Chin Sien has to endure at this point in time.

An appreciation of literature at play was what it had seemed to be. The thrills and spills as heroes and villains slug it out in the world of print holds one enthralled for hours and makes doing work or research for the subject a pleasure was the ideal that had crossed his mind at the beginning. While lugging the thick book around for classes didn’t appeal much, it was well compensated by the steep learning curve often demonstrated during the lessons as every individual present comes up with his or her theories of a phrase, action, vocabulary and even the punctuations used in the works of literary art. The class may not be considered vibrant with its uneven mix of boys and girls and everyone being self-conscious, but the teacher overcame that mental barrier with just a mere look at each soul demanding an explanation for the topic in discussion.

Well, anyway things have changed and it's finally here. It is a class presentation in front of complete strangers in more ways than one. Considering the variety of students from different schools and different years present for the lesson, presentations were bound to vary drastically, depending on his or her experience level and skill. The majority of students enrolled were from communication studies where presentations are a form of daily bread for most of their subjects. Competing with them was definitely not an entertaining idea to behold. Compete with them he must, however for the grades are just as important for a secure future with a degree in hand.

Fortunately, unexpected help was in sight. Anxiously scanning the nominal roll, the realisation that his name was far down gave way to palpable relief as he settled in for a show from other students that would enrich him with the knowledge necessary to improve his own presentation. Having

continued on pg 15...
never been good at public speaking, all the help he could get was to be greatly appreciated after all. Chin Sien needed every trick known to man to be able to pull this off without a hitch. While he didn’t memorise the lines, he just took note of all the points. Memory loss of any of those crucial points would result in time being unduly wasted and having to refer back to the notes which would make the presentation seem unsmoothly resulting in a loss of marks. As things stand however, the additional time gained enabled him to rehearse his lines once again, (quietly of course) as other students occupied the limelight for the moment.

As time passed and his moment arrived, he had gained more confidence to make the attempt. Substantial enough for him to walk up to the centre of the room with a steady rhythm of his heart and a gleaming glint in his eyes, he surveyed the room before launching into his torrent of words. Oh no! He realised he was speaking too fast. "Slow down, slow down", he kept repeating to himself. This of course affected his thought patterns and his main points sank into the murky depths of his mind as he sought to get the presentation over with as soon as possible. His calm exterior vanished and his body started moving of its own accord. Legs moved up and down as he progressed with his speech. Hands started flying around in the air. Frantic thoughts hovered at the edge of his mind as he attempted to keep in control. The intense pressure build up was almost too difficult to bear. However, he managed to retain a semblance of order in his unruly organic body and concentrated on certain encouraging faces around the class to make it seem as if he was addressing the whole audience while recalling his speech. From the corner of his eye, he was aware of the teacher writing furiously away much to his dismay. Putting that thought aside, focusing on the points in his mind and with the help of several previous rehearsals, he was able to recapture a portion of his previous poise, state and elaborate the points he had come to make: hopefully, effectively. As he concluded to a scattered applause, a great burden lifted off his chest as he made his way to his seat. Another experience. Another memory. Survived to live another day. Oh yeh!

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**EEE Students Won the IES Publication Awards**

In October 2003, three research papers from EEE won the IES publication awards (student category). These papers were presented by five undergraduate students, Yu Jia, Chan Tuck Han, Chen Qing, Cai Huaning and Lee Chee Wei based on their final year projects (FYPs). These students had successfully created an impact and image as potential young scientists.

Yu Jia and Tuck Han presented a paper entitled “Design and Development of an Ultrasound Imaging Algorithm for Breast Cancer Detection”. Chen Qing and Huaning were involved in the project of “Adaptive Noise Cancellation Using Enhanced Dynamic Fuzzy Neural Network”. These two projects are led by A/P Er Meng Joo.

Chee Wei presented a paper entitled “Nano-scale Displacement Measurement of Microelectromechanical System (MEMS) Devices Using Fiber Optic Interferometry”. His supervisors are A/P Liu Ai Qun and A/P Tjin Swee Chuan from the Photonics Research Center (PRC). Chee Wei’s project was a study on fibre interferometry in the nano-scale displacement measurement of MEMS devices. After the FYP research training, Chee Wei has established deep understanding of “creating with inspiration and innovating with perspiration”. Besides winning the IES awards, the paper was also presented at the SPIE International Conference on Optical Methodology in June 2003 at Munich, Germany. Subsequently, this paper was invited for publication in the IES M & E Journal.
EEE Teaching Awards 2003 for Excellence in Teaching

New EEE Teaching Awards

The Teacher of the Year Award, which began in 1994, has received strong support and serves to encourage academic staff who excel in their teaching. Every year, the final year students are asked to vote for their favorite lectures. However, only one staff from each school can emerge as the winner to become the "Teacher of the Year". In order to further promote outstanding performance in teaching in the School of EEE, the school has decided to implement the EEE Teaching Awards at school level in addition to the Teacher of the Year Award, which is conducted at university level.

Winners for EEE Teaching Awards 2002/2003 walked away with a trophy, a certificate and a cash award of $300 during the EEE Annual staff lunch held on 23 July 2003.

IT CEOs Shared Wisdom on HR Development in New Startups

HR Development in New Startups! That was the theme of the fifth Entrepreneurship seminar organized by the NTU EEE Alumni Association in the evening of 28 November 2003 at the NTU Alumni Club House. In this focused event, about 30 NTU EEE Alumni learned about the stories, experience and challenges of two CEOs from the IT consulting industry.

"Smart people see many opportunities while not so smart people only see problems", exclaimed Mr Ng Boon Thong of FA Consulting Pte Ltd. He spoke about his first consulting company started ten years ago, how he selected and organized his first team of resources, how he grew his business, managed and motivated his expanded resources, and how he cashed out not through IPO.

Mr Ng changed his business strategy from a service- to product-oriented one and his human resource strategy from a technical- to leadership-oriented one as he formed and regionalized his present company across Asia Pacific. These enable his company to overcome increased pressure on profit margin and complex people management, especially in China.

Mr Irving Hu of iDimension Systems Pte Ltd, an NTU Alumni, spoke about how he started his business three years ago, recruitment strategy mainly through referral and recommendation, and on-the-job HR training strategy. He highlighted the increased cost of Singapore resources, their inflexibility and how he needs to overcome them by setting up an office in Malaysia to tap into their quality resources there.

This Entrepreneurship series of seminars, each with a different theme, is organized for the purpose of experience sharing and business networking for the NTU EEE Alumni and professionals from the business community. It has consistently attracted prominent speakers and varied participants in 2003.

The Association looks forward to organize more exciting social events in 2004. Merry Christmas and a Happy New Year to all in 2004!
On 5 September 2003, a new chapter in EEE club history was opened. The 21st management committee of EEE club handed their duties and responsibilities to the incoming committee members.

The event began at 6.45 pm with the grand entrance of the guest of honour, Prof Er Meng Hwa, the Dean of School of EEE, the Sub-Deans, Prof Yeo Kiat Seng and Prof Tay Beng Kang and all of the members of the 22nd management committee. Prof Er gave a welcome address in which he congratulated the 22nd committee and praised the 21st committee for their accomplishments during their term. These committees successfully introduced and managed several new projects such as an educational trip to China, EEE’s very own windbreaker, and the online lecture notes sale, just to name a few. The Dean stated that he hoped that the new committee would not only maintain the good work undertaken by their predecessors, but also implement improvements.

The procession continued with the opening ceremony when Prof. Er cut the ribbon, followed by two short video clips. The first was a parade of photographs showing a glimpse of the history of the EEE club, including sports, cultural events, and projects over the past years. The second showed several entertaining interviews with EEE students. This was followed by the prize presentation by Prof Er to the outgoing committee members. One by one, they entered the stage to receive their awards signifying their outstanding service and contribution to the club. There were also honorary awards given to several members for their long service and hard work with the EEE club. Prof Tay then gave awards to several deserving sub-committee members, as well as the sportsman and sportswoman of the year.

Finally, it was time for the handing over ceremony. The baton was passed to the 22nd committee members witnessed by the Dean. Dunlin gave her first speech as the new president of the EEE club. She congratulated the outgoing committee for their effort and accomplishments. She also touched on her expectations of the Club and promised that the new committee would continue with the excellent work undertaken by the 21st committee and improve the EEE club synergy. Tokens of appreciation were presented to the Dean and Sub Deans and the investiture ended with a sumptuous buffet dinner.
EEE Students Abroad

McMaster University in Canada

McMaster University in Canada has an environment very conducive for studying. There are about five libraries and they have rooms designated for quiet study and for group study. This is one aspect I really like because this means that people who study and discuss in groups do not disturb people who prefer studying in silence.

Many of the people were friendly and helpful, especially people from the OISA (Office of International Student Advisor – equivalent to IRO in NTU). The instructors were also very approachable and helpful.

The style and system of teaching is very different from that in NTU. A lot of things are not taught very directly. Instead, we were taught the general concepts and for the assignments, we had to do a lot of self-reading and some thinking. But of course, the instructors were very approachable and welcomed questions.

The grading system places less emphasis on exams by including the marks of assignments, lab sessions, and projects for calculation of the final grade. This way, consistent learning throughout the semester is more or less enforced instead of students studying only before exams in the case of exams contributing to almost 100% of the final grade.

Another difference is, because the total number of students taking a subject is not that many (most of the subjects only have about 20 to 40 students) the instructors can afford to spare time for the students and arrange for the lab sessions to correspond to aspects taught in class. For example, the lab sessions would be based on things taught the previous week. The university also employs masters students to be Teaching Assistants (TA) to help lighten the workload of the instructors (professors), although I found that not all the TAs were up to the mark.

It’s quite an experience although in some aspects I did not manage to learn as much as I had expected to. The heavy workload certainly is a pity because it left me with little time to experience in depth the cultural differences. I really would have like to mix around more by participating in ECAs or by volunteering at the OISA (Office of International Student Advisor). This would have left more time to mix with students and experience more deeply the different culture and environment.

However, I did benefit from the chance to be more independent and I also formed great friendships.
University of Waterloo in Canada

There is an old Chinese saying, “It is better to travel a thousand miles than to read a thousand books.” A balanced education includes study and exposure. Canada has a long tradition of immense cultural diversity: 60% of the people have English as their mother tongue and 24% of the people speak French. It is indeed a very beautiful place of mountains and lakes. I enjoyed myself very much when I was in Canada for my four months study.

The University of Waterloo is one of the top universities in Canada. It has close links with many leading engineering firms in the country. According to the 2002 reputation survey by MacLean’s magazine, it was rated the “best overall” university in Canada for 11 years in a row. I was amazed by the cutting-edge technology that the school offers.

It is because this university is one of the top universities in North America that I had many opportunities to meet up with smart people from all over the world. I made a lot of new friends in the school; local Canadians, Americans, Japanese, Korean, Germans, French, and English and I realized that different people from different countries have different cultures. I really enjoyed communicating and mixing with them. This cross-cultural international exposure greatly shaped my mind and sharpened my oral skills. At the same time, it also extended my horizon. I began to understand why we need foreign talent, because some of the foreigners are just so smart!

The University has a dedicated organization to take care of the overseas students like us. The “International Student Association” offered us various activities throughout the term. They organized a welcome BBQ on the second day that I reached the school, a Niagara Fall trip at the beginning of the term, a Montreal/Quebec tour, parties, movies etc. Also, all these activities are at student prices! Joining some of these activities provided me with another good chance to meet up with other exchange students from other parts of the world. I finally had a chance to understand what they mean by “globalization”. Based on today’s technology, different talents from different parts of the world can be drawn together easily. But to tell the truth, sadly some students from Europe had not even heard of Singapore!!

The biggest difference between studying in Canada and NTU is that there is no more spoon-feeding education. You, and you alone, determine how much you are going to learn. For instance, I was very amazed that all their students prepared fully before each and every lab session. When they reached the lab, they will just carry on and start on their own. However, at the first period of my lab session, I was the only one standing in front of my desk and waiting for the instructions. Unfortunately, there was no briefing and no instructions, the teaching assistant was walking around and even he realized that I was doing nothing, but he did not come near me until I asked! Another big difference is the style of the lectures. In Canada, all the lectures are very interactive. The lecturer will keep on asking us questions and when one question was asked; many students raise their hands and start getting involved in the discussions. A one-hour lecture will eventually become a one-hour tutor-to-students discussion.

Having the “just-need-to-pass” attitude will only hinder you. To be honest, that was what I thought when I first went into the school. However, after the first week of studying in Canada and constantly not understanding the lectures and tutorials, I began to change my attitude. Some nice Canadians spent a lot of time and effort to help me to adapt into the new environment as well as to cope with my academic problems. Some of them also taught me how to cook, how to use the washing machine, where to get cheap groceries, when to get a discounted-movie ticket in downtown, and so on...

There are also many rooms for us to enjoy in Canada. My friends and I joined the local tours to Ottawa, Montreal and Quebec; we spent our Christmas in New York, Washington; we went to the Casino and had some “fun”; we also went skiing! Oh, did I mention that there is a lot of snow in Canada? After November, at the beginning of winter, the sky will slowly turn white and almost every day from mid November, you will witness snow coming down from the sky! It is really very beautiful to see all the area being covered by a white layer. Anyway, Christmas should have some snow right? I am not sure if it were only my imagination, but I felt that when it was snowing, even the air smelt fresher!

Thomas Wai
New Teaching Staff
(from 1 April 2003 - 15 October 2003)

DIVISION OF POWER ENGINEERING

Dr. Zhang Daming
Assistant Professor
05 May 2003

Dr. Tan Meng Tong
Assistant Professor
29 September 2003

Dr. Du Chunling
Assistant Professor
20 August 2003

Dr. Li Chengming
Assistant Professor
21 August 2003

DIVISION OF CIRCUITS & SYSTEMS

Dr. Tan Meng Tong
Assistant Professor
29 September 2003

Dr. Du Chunling
Assistant Professor
20 August 2003

Dr. Rajesh Menon
Assistant Professor
16 July 2003

DIVISION OF INFORMATION ENGINEERING

Dr. Yang Jun
Assistant Professor
01 August 2003

Dr. Li Zhengguo
Assistant Professor
31 July 2003

Dr. Chan Chi Chiu, Julian
Assistant Professor
05 June 2003

DIVISION OF COMMUNICATION ENGINEERING

Dr. Sanjay Kumar Bose
Associate Professor
25 June 2003

Dr. Pablo Altam Portillo
 Overseas Attachment Programme Fellow
14 July 2003

DIVISION OF CONTROL & INSTRUMENTATION

Dr. Louis Shue
Assistant Professor
23 August 2003

Dr. Xiong Fulin
Senior Fellow
21 July 2003

DIVISION OF MICROELECTRONICS

Dr. Li Chengming
Assistant Professor
21 August 2003

Dr. Rajesh Menon
Assistant Professor
16 July 2003

DIVISION OF INFORMATION INSTITUTE OF SINGAPORE

Dr. Yi Xin
Assistant Professor
01 August 2003

Dr. Li Zhengguo
Assistant Professor
31 July 2003

Dr. Li Chengming
Assistant Professor
21 August 2003

Dr. Rajesh Menon
Assistant Professor
16 July 2003

Dr. Li Chengming
Assistant Professor
21 August 2003

Dr. Rajesh Menon
Assistant Professor
16 July 2003

Dr. Li Chengming
Assistant Professor
21 August 2003

Dr. Rajesh Menon
Assistant Professor
16 July 2003

Dr. Li Chengming
Assistant Professor
21 August 2003

Dr. Rajesh Menon
Assistant Professor
16 July 2003

Dr. Li Chengming
Assistant Professor
21 August 2003
# New Non-teaching Staff
(from 1 April 2003 - 15 October 2003)

## Dean's Office
1. Wu Hui Yun, Vivien
   Management Support Officer (Grade 6)
2. Tan Yin Kee, May
   Corporate Support Officer (Grade 4)

## Division of Power Engineering
1. Koh Yong Kwee, James
   Project Officer

## Division of Circuits & Systems
1. Tan Chee Yuen
   Research Associate
2. Boon Chirm Chye
   Project Officer
3. Lee Hui Ching
   Project Officer
4. Li Hua
   Project Officer

## Division of Information Engineering
1. Chen Jianping
   Research Fellow
2. Feng Aiqang
   Research Fellow
3. Gao Shao Shuai
   Research Fellow
4. Wu Jianming
   Research Fellow
5. Yang Xuebin
   Research Fellow
6. Xia Jianlao
   Research Fellow
7. Gan Lu
   Research Associate
8. Ye Hong
   Research Associate
9. Cao Hong
   Project Officer
10. Gao Yupeng
    Project Officer
11. Tan Ee Leng
    Project Officer
12. Tan Tien Peng, Cyril
    Project Officer

## Division of Control & Instrumentation
1. He Minghua
   Research Associate
2. Chai Hsien Chee, Norikhi Chai Yoon Shih
   Technical Executive (Grade 2)

## Division of Communication Engineering
1. Lu Yibin
   Research Fellow
2. Li Minghui
   Research Associate
3. Tai Ling Chiat
   Adjunct Research Associate
4. Chan Hian Lim
   Adjunct Research Associate
5. Seah Heong Wann
   Adjunct Research Associate
6. Chin Soon Hwa
   Project Officer
7. Lee Yak Wan
   Project Officer
8. Liew Yew Pheng
   Project Officer
9. Wang Jinmin
   Project Officer
10. Zhang Xinxin
    Project Officer

## Division of Microelectronics
1. Li Heping
   Research Fellow
2. Wu Sylong
   Research Fellow
3. Zhou Xiaodong
   Research Fellow
4. Muhammad Faezy Karim
   Research Associate
5. Tang Min
   Research Associate
6. Moh Ken-Jin, Jonathan
   Project Officer
7. Narayanan Varadharajan
   Teriizhandur
   Project Officer
8. Sun Yi
   Project Officer
9. Zhang Yankun
   Senior Officer (Lab) (Grade 4)
10. Chew Hock Leng, Andrew
    Technical Executive (Grade 1)
11. Chia Ai Lay, Irene
    Technical Executive (Grade 2)
12. Mak Foo Wah
    Technical Executive (Grade 3)
13. Teo Thiam Teng
    Technical Executive (Grade 3)

## Positioning and Wireless Technology Centre
1. Xu Changlong
   Research Fellow

## Network Technology Research Centre
1. Hu Gang
   Research Fellow
2. Sun Lipping
   Research Fellow
3. Lin Fei
   Research Associate
4. Qiu Liwei
   Project Officer
5. Sheng Jin
   Project Officer
6. Tan Thiam Teck
   Project Officer

## Satellite Engineering Centre
1. Zhou Keiliang
   Research Fellow
2. Jin Zhanli
   Research Associate
3. Xie Yue
   Research Associate
4. Li Ka Yin, Cary
   Project Officer

## Biomedical Engineering Research Centre
1. Samarendra Dandapat
   Research Fellow
2. Tan Ming, Adin
   Project Officer
3. Liu Ying
   Project Officer
4. Gao Yan
   Project Officer
5. Chang Siew Ee, Sherine
   Management Support Officer (Grade 6)
6. Teo Cheng Guan, Simon
   Technical Executive (Grade 3)

## Application Service Providers Centre
1. Ang Cheng Leong
   Senior Research Fellow
The school of EEE is involved in organizing the International Conference on Image Processing (ICIP) sponsored by the IEEE Signal Processing Society. The conference, co-chaired by Prof. Er Meng Hwa and Prof. Alex Kot, is the premier forum for the presentation of technological advances and research results in the fields of theoretical, experimental, and applied image and video processing.

ICIP 2004, the eleventh in the series of conferences, which have been held annually since 1994, will bring together leading engineers and scientists in image processing from around the world. Research frontiers in fields ranging from traditional image processing applications to evolving multimedia, image and video technologies are regularly advanced by results that are first reported in ICIP technical sessions.

Topics of interest for submissions include, but are not limited to:
1. Image/Video Coding and Transmission
2. Image/Video Processing and Analysis
3. Image Formation
4. Image Scanning, Printing, Display and Color
5. Image/Video Storage, Retrieval and Multimedia
6. Applications of Image Processing Technology

Paper submission will be accepted by electronic submission through the conference website.

Important Deadlines
- Submission of Extended Summaries: January 31, 2004
- Submission of Proposals for Tutorials: December 10, 2003
- Submission of Proposals for Special Sessions: December 10, 2003
- Notification of Acceptance: April 30, 2004
- Submission of Camera-ready Paper: May 31, 2004

For more information, please visit the conference website at www.icip2004.org.

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The 10th International Symposium on Integrated Circuits Devices and Systems (ISIC’04)

The 10th International Symposium on Integrated Circuits Devices and Systems, ISIC-2004, will be held in Singapore from 8 - 10 September 2004. This symposium provides a forum for integrated circuit designers, EDA developers, manufacturing engineers, and academics to present, share, and discuss new research developments, future trends and innovative ideas. The keynote sessions will be delivered by Dr Mark Pinto, CTO, Agere Systems and Dr Tom Saponas, Senior Vice President and CTO, Agilent Technologies.

A one-day tutorial will be organized on the first day of the Symposium. The committee is proud to announce that both Prof Jacob Savir, Professor of Electrical & Computer Engineering, New Jersey Institute Of Technology, USA and Prof Kaushik Roy, Professor of Electrical & Computer Engineering, Purdue University, USA have agreed to conduct tutorial sessions on “Design for Testability (DFT) and Built-in Self Test (BIST) for VLSI” and “Design and Test of Scaled CMOS Circuits” respectively. More tutorial sessions will be scheduled.

With the support of the School’s Management, the ISIC-2004 organizing committee will be working hard to make the 10th International Symposium on Integrated Circuits Devices and Systems, ISIC-2004 a successful event.
The 3rd Asian Meeting on Electroceramics (AMEC-3)

The 3rd Asian Meeting on Electroceramics (AMEC-3) was held at the Singapore International Convention and Exhibition Center from 7 to 12 December 2003. This international conference was co-organized by the School of EEE and Materials Research Society Singapore, and had been sponsored and supported by the Japanese, Chinese, and Korean Ceramic Societies, the Electronic Division of American Ceramic Society, IEEE UFFC, Singapore Tourism Board, Lee Foundation, The Tan Foundation, and DSO National Laboratories. A large number of distinguished colleagues and scholars around the world came to Singapore to present their very recent findings, advances and results and to exchange their experiences in all aspects of the science and engineering in various areas of electroceramics during the conference. AMEC-3 received 529 abstracts and scheduled 490 presentations with 246 registered participants, including 48 invited ones. The papers and participants came from 37 countries and regions in 5 continents: Bangladesh, China, Hong Kong, India, Indonesia, Iran, Israel, Japan, Korea, Malaysia, Oman, Pakistan, Philippines, Singapore, Taiwan, and Thailand (Asia); Belarus, Czech Republic, Denmark, France, Germany, Latvia, Italy, Netherlands, Norway, Russia, Slovakia, Slovenia, Switzerland, United Kingdom, and Ukraine (Europe); Cuba and Mexico, (Latin America); Canada and USA (North America); Australia and New Zealand (Oceania). It was widely considered that the scientific program and the social activities of AMEC-3 were very successful, and it gave a great momentum to AMEC for its substantial and sustainable progress. The above figures of AMEC-3 give not only a clear indication and testimony of the strong growth and active development of electronic ceramic research in Asia, but also manifest that AMEC has become an international forum for the electronic ceramic community around the world, not just for Asian community only. Many internationally prominent scientists attended the conference, including Professor E. L. Cross, American Academy of Engineering; Professor R. E. Newnham, American Academy of Engineering; Professor Yao Xi, the Chinese Academy of Sciences; Professor Li Longtu, the Chinese Academy of Engineering; Professor S. Lang, Foreign Member of the Russian Academy of Engineering; Professor J. Fousek, Czech Academy of Sciences; and Professor Wei Gao, Fellow of the New Zealand Royal Society. The Chairman of the Executive/Local Committee is Dr. W. Zhu with the team members of Dr. O. K. Tan (EEE), Dr. X. F. Chen (EEE), Dr. J. T. Oh (SME) and K. Yao (IMRE).

NTU Chess Champion 2003

EEE, winner of the Chess Competition for the 7th consecutive year! Since the first ISG Chess Championship in 1994, the EEE chess team (see photo above) has been winning the championship every year (except for 1996)! This year, EEE gets to keep the 10-year-old Chess Shield for good! Way to go EEE!
### Visitors to EEE (May 2003 - October 2003)

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution</th>
<th>Country</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Jeffrey E.H. Tan</td>
<td>President</td>
<td>Motorola Electronics Pte. Ltd.</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Ms. Charlene Tan</td>
<td>Human Resource Manager, Personal Communications Sector</td>
<td>Motorola Electronics Pte. Ltd.</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Chua Tei Ming</td>
<td>Director</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Tham Pui Hin</td>
<td>Infrastructure Manager</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Philip Wong Wei Chai</td>
<td>Director, Networks, Asia Pacific</td>
<td>Motorola Electronics Pte. Ltd.</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Lim Chee Siong</td>
<td>Director, Technology</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Lim Cheong Kam</td>
<td>Director, Infocomm Technology Research</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Lin Kian Long</td>
<td>Director, Corporate Affairs</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Syahri Nahim</td>
<td>Managing Director</td>
<td>V8 Europe Pte. Ltd.</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. William Lau</td>
<td>Director</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Philip Choo</td>
<td>Deputy Director</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. John Poon</td>
<td>Technical Manager</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Enrique Sabio</td>
<td>Support Engineer</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Dr. Hong Ming Hui</td>
<td>Manager</td>
<td>ST Electronics</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Tan Hong Peow</td>
<td>Chief Operating Officer</td>
<td>EDB</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Ms. Zoya Moh</td>
<td>Vice President</td>
<td>Nera Telecommunications</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Lu Victor Leong</td>
<td>Senior Manager, Technology</td>
<td>Nera Telecommunications</td>
<td>Singapore</td>
<td>May 2003</td>
</tr>
<tr>
<td>Mr. Jim Ng</td>
<td>Deputy Director, Enabling Technologies</td>
<td>Boeing Air Traffic Management</td>
<td>Singapore</td>
<td>Jun 2003</td>
</tr>
<tr>
<td>Mr. Chen Wei Liang</td>
<td>Senior Officer</td>
<td>Aviation Logistic and Traffic Cluster</td>
<td>Singapore</td>
<td>Jun 2003</td>
</tr>
<tr>
<td>Prof. Sun Yuan-Kung</td>
<td>Professor</td>
<td>Princeton University</td>
<td>USA</td>
<td>Jun 2003</td>
</tr>
<tr>
<td>Dr. Raja Manikong</td>
<td>Assistant Professor, Bioengineering Department</td>
<td>University of Washington</td>
<td>USA</td>
<td>Jun 2003</td>
</tr>
<tr>
<td>Mr. Raja Mathur</td>
<td>Joint Secretary</td>
<td>Ministry of Human Resource Development</td>
<td>India</td>
<td>Jun 2003</td>
</tr>
<tr>
<td>Mr. Vemulapalli</td>
<td>Technical Director</td>
<td>THALES TECHNOLOGY CENTRE</td>
<td>France</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Richard Yong</td>
<td>Chief Operating Officer</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Dr. Tan Sri</td>
<td>Senior Research Scientist</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Dr. Wu Guo</td>
<td>Professor</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Patrick Martin</td>
<td>Executive Director</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Apostolos Joseph</td>
<td>Chief Technical Officer</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Séverin Hahn</td>
<td>Activity Manager</td>
<td>Infocomm Singapore Design Centre</td>
<td>France</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Dr. Dominique Aymar De La Chevalier</td>
<td>Attaché for Science and Technology</td>
<td>Ambassade de France</td>
<td>France</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Ms. Yang Van Woon Lim</td>
<td>International Marketing Manager</td>
<td>Daffy University of Technology</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Stefan Landheil</td>
<td>Senior Engineer</td>
<td>Tat Corporation</td>
<td>New Zealand</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Dr. Ian McLoughlin</td>
<td>Member of Technical Staff</td>
<td>Tat Corporation</td>
<td>New Zealand</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Chan Soo Lin</td>
<td>Minister of State for Education</td>
<td>Ministry of Education</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Lim Chwee Poh</td>
<td>2nd Permanent Secretary</td>
<td>Ministry of Education</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Kevin Yoshida</td>
<td>Manager General Manager Electronic Materials Business Unit</td>
<td>Sumitomo Electric Industries Ltd.</td>
<td>Japan</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Poon Kin Yew</td>
<td>Electronic Production Manager</td>
<td>Sumitomo Electric Industries Ltd.</td>
<td>Japan</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Tong Chia</td>
<td>Chair Professor, Dept. of Engineering</td>
<td>Tsinghua University, Beijing</td>
<td>China</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Dr. Dong Zhaoyang</td>
<td>Vice-Chancellor, School of Information Science and Technology</td>
<td>Tsinghua University</td>
<td>China</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Lin Xiao Kang</td>
<td>Deputy Chairmen</td>
<td>Shenzhen Graduate School of Tsinghua Uni</td>
<td>China</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Quan Jing</td>
<td>Associate Professor, Education and Training</td>
<td>Shenzhen Graduate School of Tsinghua Uni</td>
<td>China</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Choo Kang Kang</td>
<td>Director, STMicroelectronics</td>
<td>Asia Pacific Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Solomon Ng</td>
<td>Director, SMT</td>
<td>Singapore Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Qi Cheng</td>
<td>President</td>
<td>Infocomm Electronic Group 4-H Technology Co Ltd</td>
<td>China</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Timothy Tang</td>
<td>Design Manager, STS Design Centre</td>
<td>Shenzhen STS Microelectronics Co. Ltd</td>
<td>China</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Prof. Werner Hein</td>
<td>Head of Department of Electrical and Computer Engineering Department</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
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<tr>
<td>Prof. Enom Brindley</td>
<td>Professor for Computer Technology</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
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<tr>
<td>Prof. Jang-Min</td>
<td>Professor</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Prof. Dr. Joseph Malocher Joller</td>
<td>Professor</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>Jul 2003</td>
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<tr>
<td>Mr. Leong Lip</td>
<td>Chief Executive Director</td>
<td>Hong Kong Department of Education and Training</td>
<td>Hong Kong</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Teo Hian</td>
<td>Vice-Principal</td>
<td>Hong Kong High School</td>
<td>Hong Kong</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Dr. Loh Lian</td>
<td>Principal</td>
<td>Hong Kong High School</td>
<td>Hong Kong</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Dr. Goh Sioi</td>
<td>Principal</td>
<td>Hong Kong High School</td>
<td>Hong Kong</td>
<td>Jul 2003</td>
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<tr>
<td>Mrs. Tan Yuet Nga</td>
<td>Principal</td>
<td>Hong Kong High School</td>
<td>Hong Kong</td>
<td>Jul 2003</td>
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<tr>
<td>Ms. Kwan Chi Kim Lan</td>
<td>Principal</td>
<td>Hong Kong High School</td>
<td>Hong Kong</td>
<td>Jul 2003</td>
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<tr>
<td>Mrs. Pang Yen Tong</td>
<td>Principal</td>
<td>Hong Kong High School</td>
<td>Hong Kong</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Dr. Nguen Thao Son</td>
<td>Principal</td>
<td>Hong Kong High School</td>
<td>Hong Kong</td>
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</tr>
<tr>
<td>Mr. Tassi Tam</td>
<td>Manager</td>
<td>Hong Kong High School</td>
<td>Hong Kong</td>
<td>Jul 2003</td>
</tr>
<tr>
<td>Mr. Loo Mui Wah</td>
<td>Director</td>
<td>Wei Pte Ltd</td>
<td>Singapore</td>
<td>Aug 2003</td>
</tr>
<tr>
<td>Mr. Shinta Driyono</td>
<td>Managing Director</td>
<td>V8 Electronics Pte Ltd</td>
<td>Singapore</td>
<td>Aug 2003</td>
</tr>
<tr>
<td>Ms. Patricia Ng</td>
<td>Senior Vice President</td>
<td>Artech Systems Pte Ltd</td>
<td>Singapore</td>
<td>Aug 2003</td>
</tr>
<tr>
<td>Mr. Tan Bee Yong</td>
<td>Application Manager</td>
<td>AGT Technology Pte Ltd</td>
<td>Singapore</td>
<td>Aug 2003</td>
</tr>
<tr>
<td>Mr. Tan Eng Kiong</td>
<td>Senior Consultant</td>
<td>AGT Technology Pte Ltd</td>
<td>Singapore</td>
<td>Aug 2003</td>
</tr>
<tr>
<td>Mr. Tan Jia</td>
<td>Manager</td>
<td>AGT Technology Pte Ltd</td>
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</tr>
<tr>
<td>Dr. Tan Leer Yong</td>
<td>Director, Network &amp; Computing Technologies</td>
<td>EDA</td>
<td>Singapore</td>
<td>Aug 2003</td>
</tr>
<tr>
<td>Dr. Stephen Michael</td>
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<td>Vertex RSI</td>
<td>USA</td>
<td>Aug 2003</td>
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<tr>
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<tr>
<td>Mr. Chan Soo Sen</td>
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<td>Singapore</td>
<td>Aug 2003</td>
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<tr>
<td>Mr. Chua Hwee Siong</td>
<td>Deputy Director for Enterprise</td>
<td>Ecosystem Development, EDB</td>
<td>Singapore</td>
<td>Aug 2003</td>
</tr>
<tr>
<td>Mr. Chang Wen Foo</td>
<td>Marketing Director</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
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<tr>
<td>Mr. Deme Higgens</td>
<td>Technical Leader</td>
<td>Infocomm Singapore Design Centre</td>
<td>Singapore</td>
<td>Aug 2003</td>
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<tr>
<td>Mr. Y.T. Tan</td>
<td>Applications Manager</td>
<td>Infocomm Singapore Design Centre</td>
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<td>Aug 2003</td>
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<tr>
<td>Mr. Zhao Ming</td>
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<td>Singapore</td>
<td>Aug 2003</td>
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<tr>
<td>Mr. K. S. Koh</td>
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<tr>
<td>Ms. Kooi Ling</td>
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<tr>
<td>Ms. Christine Ang</td>
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<tr>
<td>Mr. John Pearce</td>
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<td>Singapore</td>
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<tr>
<td>Dr. Chen Rong Jien</td>
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<td>National University of Singapore</td>
<td>Singapore</td>
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<tr>
<td>Dr. Goh Jing</td>
<td>Professor</td>
<td>National Taiwan University</td>
<td>Taiwan</td>
<td>Sep 2003</td>
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<tr>
<td>Mr. Pan Beng How</td>
<td>Product Manager</td>
<td>Singapore Pte Ltd</td>
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<tr>
<td>Mr. Jackie Quek Beng Wee</td>
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<td>Mr. Rudy Nunez</td>
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<tr>
<td>Mr. Lianhoff</td>
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<tr>
<td>Dr. Steven Yap</td>
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<td>Nanyang Polytechnic</td>
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<tr>
<td>Dr. David Singh</td>
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<td>Mr. James B K Kho</td>
<td>HOD of Diagnostic Imaging</td>
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<tr>
<td>Mr. James A. Sevcik</td>
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<tr>
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<tr>
<td>Mr. H.K. Lee</td>
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<tr>
<td>Dr. Kadas Arisull</td>
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<tr>
<td>Dr. Marcello Isacoff</td>
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<td>Prof. Herrmann Metzler</td>
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<tr>
<td>Mr. Albert Crusoe</td>
<td>Professor</td>
<td>University of Applied Sciences Hannover</td>
<td>Germany</td>
<td>Oct 2003</td>
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</table>
TOGETHER AGAIN!

It was a warm memorable night on 31st October 2003 for the 50 alumni from the EEE Classes of 1988, 1993 and 1998 who turned out to celebrate the anniversary occasion at Marina Mandarin. Partying through the night and enjoying the games and food specially planned for them, everyone was very thrilled to be back to meet old friends.

The evening started off with a welcome speech by Prof Er Meng Hwa, Dean of the School of EEE. This was followed by an update on the latest development in the teaching, research activities and professional services of the School by Assoc Prof Tay Beng Kang, Sub-Dean of Alumni Affairs. Sipping drinks and catching up with one another, many were seen rekindling ties and talking about the good old days.

At about 9.30 pm, Mr Inderjit Singh, President of NTU EEE Alumni Association introduced its 8th executive committee members to the alumni and urged all staff and association members to work hard to foster stronger alma mater and alumni bonding. As part of that continuing effort, the Association launched on its website the Jobs Channel, a new benefit initiative for its members who are exploring career options. The Channel also provides an effective, complimentary channel for potential local and overseas employers to search and hire the most talented engineering and professional executives who are members of the Association and graduates of the NTU School of Electrical & Electronic Engineering.

At about 9.30 pm, lucky draws sponsored by the Association and phototaking session were also conducted. For once, food appeared to have taken a second place. Everyone was intent on making the most of the occasion ‘to catch up’ after all these years. It was not until 11.00pm that with heavy hearts, we bid each other farewell and with good wishes. Indeed it was a memorable evening!

The EEE Alumni Association 8th Executive Committee

First row (from left to right):
- Mr Leon Chang
- Mr Heng Guan Teck
- Mr Charlie Heng
- Mr Richard Oh
- Mr Allan Ng
- Mr Goh Han Keat
- Mr Ng Kok Tong

Second row (from left to right):
- Ms Dawn Yeong
- Mr Terence Loh
- Mr Inderjit Singh
- Mr Chan Kim Teck

Visitors to EEE (continued from pg 28)

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
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<th>Country</th>
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<tr>
<td>Mr Pierre-Silver Chia</td>
<td>Professor</td>
<td>Science and Technology Park, Neuchatel</td>
<td>Switzerland</td>
<td>Oct 2003</td>
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<tr>
<td>Ms Teresa Muirger</td>
<td>Diplomatic Attaché</td>
<td>Embassy of Switzerland</td>
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<td>Oct 2003</td>
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<tr>
<td>Mr Rui Ding Chuan</td>
<td>Principal</td>
<td>Le Juy Don High School</td>
<td>Danang</td>
<td>Oct 2003</td>
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<tr>
<td>Mr Song Thamm</td>
<td>Principal</td>
<td>Hoog Le Thanh High School</td>
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<td>Oct 2003</td>
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<tr>
<td>Mr Le Phu Khu</td>
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<td>Danang</td>
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<tr>
<td>Mr Toh</td>
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<td>Oct 2003</td>
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<td>LTC Liu Mun Keung</td>
<td>Head Plans Branch</td>
<td>CET Technologies Pte Ltd</td>
<td>Singapore</td>
<td>Oct 2003</td>
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<tr>
<td>Mr Koh Bon Voh</td>
<td>Department Manager</td>
<td>Chartered Ammunition Industries Pte Ltd</td>
<td>Singapore</td>
<td>Oct 2003</td>
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<tr>
<td>Mr Han Meng Keung</td>
<td>Senior Principal Engineer</td>
<td>ISRO Satellite Centre</td>
<td>India</td>
<td>Oct 2003</td>
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<tr>
<td>Mr Lim Teck Wee</td>
<td>A/P Principal Engineer</td>
<td>ISRO Satellite Centre</td>
<td>India</td>
<td>Oct 2003</td>
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<tr>
<td>Dr P B Nair</td>
<td>Group Director, Structures Group</td>
<td>ISRO Satellite Centre</td>
<td>India</td>
<td>Oct 2003</td>
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<tr>
<td>Mr S R Aruna Murphy</td>
<td>Scientist/Engineer IF and Heat Fabrication Section, Structures</td>
<td>ISRO Satellite Centre</td>
<td>India</td>
<td>Oct 2003</td>
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<tr>
<td>Dr Hidayat Suleymoni</td>
<td>TTAC Groundation Engineering, freedet</td>
<td>ITR, University of South Australia</td>
<td>Australia</td>
<td>Oct 2003</td>
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<tr>
<td>Prof Yoichika</td>
<td>President</td>
<td>Waseda University</td>
<td>Japan</td>
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<tr>
<td>Dr Martha Piper</td>
<td>President, UBC</td>
<td>University of British Columbia</td>
<td>Canada</td>
<td>Oct 2003</td>
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<tr>
<td>Mr Peter Galler</td>
<td>Managing Director</td>
<td>Watch Allan International Ventures</td>
<td>USA</td>
<td>Oct 2003</td>
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<tr>
<td>Mr Chang Chie Foo</td>
<td>First Permanent Secretary (Education)</td>
<td>Ministry of Education</td>
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<td>Oct 2003</td>
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<tr>
<td>Prof Sang-Kyun Jung</td>
<td>Professor</td>
<td>Daegon Health Sciences College</td>
<td>Korea</td>
<td>Oct 2003</td>
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<tr>
<td>Dr R Koh Fung</td>
<td>Co-Founder and CEO of BuzzCity Pte Ltd</td>
<td>RACE Advisory Panel</td>
<td>Singapore</td>
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<td>Dr P Gopalakrishnan</td>
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<tr>
<td>Mr Kaminish Bishan</td>
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<td>Singapore</td>
<td>Oct 2003</td>
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<tr>
<td>Mr Tan Cheng Gey</td>
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<tr>
<td>Mr Tan Leong</td>
<td>Chairman of Walden International</td>
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<tr>
<td>Mr Thomas Ng</td>
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<tr>
<td>Dr James J. Taverner</td>
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<td>GENT FICA</td>
<td>Taiwan</td>
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<tr>
<td>Dr Henshaw</td>
<td>President and CEO</td>
<td>Multimedia University</td>
<td>Malaysia</td>
<td>Mar 2003</td>
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ALUMNI DAY 2003
29 NOVEMBER, 2003

Many NTU alumni members, staff and families gathered in the campus’s auditorium in a cheerful and relaxed mood to celebrate the University’s Alumni Day 2003. This event drew over 400 EEE alumni members, together with their families, 60 EEE staff members and their families as well as 70 students who are our future alumni. Smiles of welcome and recognition filled the air as the academic staff members greeted their former students who stood patiently in a queue with their spouses and toddlers waiting to register. A foldable chair was given to each alumni member and staff as a souvenir. The guests were then ushered to tables designated for specific Schools which were identified by huge colourful balloons looming in the air.

After a sumptuous lunch Dr. Su Guanier delivered an opening speech welcoming the 1000 members from engineering schools alone, the business school alumni, the teacher alumni as well as the 150 guests from Nantah who are the embodiment of the pioneering spirit of NTU. He then presented the Alumni Service Award 2003. One of the proud recipients is Dr Tay Beng Kang (EEE’85) from the School of EEE. Prior to being the Sub-Dean (Alumni Affairs), has been very involved in alumni activities. He was a member of NTU Alumni Town Club since its early days in Bukit Timah Campus. He was also one of the pioneer-graduating batch in the setting up of the EEE Alumni Association, which was officially registered on 3 December 1996. He plays a critical role in planning and supporting the activities of the NTU EEE Alumni Association. After the award presentation the engineering alumni took a short walk to the impressive-looking Research Technology Plaza (RTP) for School-specific events. In the School of EEE, the Dean, Professor Er Meng Hwa welcomed the alumni members and stressed the importance of strengthening the bonds between the School and the Alumni members. He spoke of the valuable contributions that the School’s 10,000 strong alumni have made to the economy and the country. He envisioned how the School can tap on the alumni network to foster the entrepreneurial spirit of the present group of students. He was happy to see the Alumni take time to visit their alma mater and hoped that they enjoy themselves at the carnival planned for them.

Mr. Inderjit Singh, President of NTU EEE Alumni Association and member of School Council Advisory Committee further emphasized the importance of the alumni. He represents both the significance and tradition of the alumni, being a graduate of the first cohort of NTU who later started and promoted the cause of the Alumni committee and also a past recipient of the Alumni service award. He spoke of the beautiful NTU Alumni clubhouse that is planned in One North, Buona Vista and which will be ready by the middle of 2005. He encouraged the alumni to join the NTU EEE Alumni Association and help build up the strength in numbers. He spoke with much enthusiasm outlining the Alumni’s events and offers. He was especially grateful to the School management for its strong support of Alumni activities. A logo contest to reflect the mission and vision values of the NTU EEE Alumni Association was organized recently. Miss Dawn Yeong submitted the winning entry. The logo is designed with 3Es placed within a pyramid structure. It represents the stability in the EEE alumni society, the industry and the Singapore society as well as the nation as a whole. Each of the three arms is structured closely to promote networking among the alumni members and its alma mater. The Dean, Professor Er Meng Hwa and Mr Inderjit Singh unveiled the winning logo design. A group photo of the EEE alumni members, staff and their families were then taken to commemorate the happy occasion.

At about 3.30pm, the other engineering alumni joined the EEE alumni for the College of Engineering (COE) Family carnival. Prof Er, who is also the Dean of COE, activated two confetti guns to declare open the carnival. The little ones were treated to a magic show on the stage while the rest of the older guests tried their hands at the 12 game stores. There were a lot of fun at the carnival and there were prizes for nearly all who took part. Some research centres within the RTP had an open house and alumni members were treated to demonstrations of some of the latest research work that are carried out in NTU.

It was certainly a pleasant occasion to remember that the University is one big family, so it was not surprising that the homecoming day ended at about 5.30 pm with everyone reluctantly bidding farewell. Till we meet again.
The 2003 EEE Annual Staff Lunch, held on 23 July 2003, was a day of food, fun, and games for more than 500 staff.

In addition to the usual scrumptious buffet and lucky draw, the Exhibition Hall at the Nanyang Auditorium was transformed into a fair ground as volunteers from the School set up 14 carnival games stalls for the enjoyment of their fellow colleagues. Staff turned up as early as 11.00 am to enjoy the various games, which tested their skills, accuracy and perseverance. Many lucky winners went home laden with assorted prizes ranging from Kit Kat Chocolates to Tupperware. It was a great day for all.
The Art of Networking Globally

The industries of the future are knowledge-based industries. And teachers, trainers and researchers are a key part of these developments. Effective change requires effective change agents. Teachers, trainers, researchers and all workers in the education and training industry need to have the skills to both lead and participate in the change dynamics.

The outstanding priorities in networking globally are generic and specific skills enhancement, professional development, and addressing potential student disadvantage. The most productive outcomes of global networking could be obtained through the following types of network:

- **Strategic networks** involve continuing contact among top leaders to discuss broad goals or changes in societies and communities. The more contacts they have, the more changes they will hear about, the more chances they will have to work things out, the more likely that their organisations and institutions will evolve in complementary rather than conflicting activities.

- **Tactical networks** bring mid-level managers and professionals together to develop plans for specific projects or joint activities to identify organizational or system changes that will link their organisations and institutions better or to transfer knowledge.

- **Operational networks** provide ways for people carrying out day-to-day work to securely access to information, resources or people they need to accomplish their tasks. For example, participation in each other’s conferences, seminars and training programs would help develop a common vocabulary, development standards and/or agenda for action.

- **Interpersonal networks** build a necessary foundation for creating future knowledge and values. As human relationships mature beyond the early days of scrabbling to create initial projects and erect structural frameworks to manage them, the network of interpersonal ties between members of separate organizations and institutions will grow in depth and density. Leaders of organizations and institutions will soon feel the need to bring their people together to share information. Strong interpersonal relationship could also help resolve small conflicts before they escalate.

- Cultural networks require people involved in the relationships to have the communication skills and cultural awareness to bridge their differences.

In Chinese philosophical thought, refers to a practical system of self-development that enables individuals to complete the harmonious evolution of their physical, mental and spiritual bodies. When applied to the perspective to the management of globalism, it means creating a solid foundation of knowledge capability and capacity in a person or community or country, that would provide the basis for the fullest development of their intellectual, human and spiritual potential.

By networking globally, a person tapped into and learned to leverage on the rich diversity of human and intellectual talents across nations and circumstances. The result is a learning person with the capacity to create impact and make a significant difference in the lives of the many around him/her by adding real value to enhance otherwise mundane and meaningless existence.