SOARING TO NEW HEIGHTS

A Commemorative Publication

1981~2011

Envision Enable Empower
Beyond the Third Decade

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FOREWORD

Thirty years may seem like a short time in the larger scale of things. But for a nation that is barely 46 years old, 30 years is almost epochal. And when a school has grown from a mere vision and idea into a recognised and respected brand name in that time, 30 years is worth celebrating indeed.

The following pages attest to the achievements that have sprung from a small group of people who had the courage and passion to realise a bold vision placed in their custody by no less than the nation's leaders. They worked to start the School of Electrical and Electronic Engineering (EEE) in Nanyang Technological Institute, and were joined by others infected with the same conviction to turn the School into a global institution.

But the successes of the last 30 years are not laurels to rest upon. Indeed, by all accounts, EEE can be likened to a youth yet to reach his prime, grooming himself for greater accomplishments that will come with the accumulation of age, experience and wisdom. The earlier triumphs are merely the foundation and the springboards to further achievements. They are proof that vision is a stepping stone to reality, and that big things start small and simple.

The concept of the paper crane reflects this. Making an origami crane requires dedication, perseverance and focus – the same qualities that drove EEE's growth and success. That a flat piece of paper can be transformed into something 3-dimensional, with fine form and fluid movement, mirrors how EEE grew from a spartan and simple school into a dynamic, cutting-edge, trailblazing institution. The paper crane captures the image of flight frozen in time. Similarly, this book captures the remarkable history of EEE so that these important highlights are not lost in time's long tunnel.

So take the time to uncover EEE's story. It will not be possible to absorb it all in one sitting. Thus, this makes for the perfect coffee-table book, drawing you back over and over again. And as you enjoy this book, remember that it is just the first volume of more exciting events in the making.

I WANT TO INCREASE
THE REPUTATION,
THE BRAND,
THE DESIRABILITY
OF AN NTU EEE DEGREE.
I TELL ALUMNI I WANT
TO MAKE THEIR DEGREE
MORE VALUABLE
THAN WHEN THEY
WERE HERE.

A VALUABLE ASSET

Professor Janie Fouke
Dean, College of Engineering (2011 – Present)

Professor Janie Fouke describes the School of Electrical and Electronic Engineering at Nanyang Technological University as "one of the most diverse schools of Electrical Engineering anywhere in the world – it is breathtakingly big and broad." Having served as Dean of the College of Engineering at Michigan State University, and provost and senior vice president for academic affairs at the University of Florida, US Professor Fouke arrived in early 2011 to helm NTU's College of Engineering.

Professor Fouke applauds the School of EEE on its 30th anniversary: "EEE has been really lucky in their leaders; they have the best interests of the students and faculty at the core of the understanding of their jobs. I want to congratulate and thank them for the roles they have played in building EEE through the years."

Professor Fouke shares that the School is continuing to revisit its curriculum – improving industry involvement and making new efforts to add courses. The School is ranked 36th in the world by London-based group Quacquarelli Symonds.

She finds EEE students today are more globally aware and have the ability to communicate well, far from the stereotype of the white shirt and bow-tie clad engineering student of yore.

"Today there is diversity in the composition of students who enrol and lots more diversity in the types of jobs they are trained for and qualified to take up. I find it exciting when engineering trained people choose to do something different from practising traditional engineering. I love the fact that people with analytical skills, who understand cause and effect and know how to use data, take those skill sets to some completely different place – Law School or financial analysis or public school teaching. It's very exciting because it spreads our way of thinking more broadly across society. That is so energising."

This agility in thought, attitude and aptitude makes the EEE student adaptable in today's complicated work environment, where people need to think broadly across multiple disciplines. "To be able to move from discipline to discipline is a hallmark of a modern engineer," says Professor Fouke, and that is largely due to the diversity in the engineering curriculum.

These qualities make a graduate of EEE a valuable asset in the marketplace and EEE alumni a strong force. Professor Fouke intends to cultivate alumni as "Alumni are our lifeblood; they hire our students and are our absolute best ambassadors," she explains.

"I want to increase the reputation, the brand, the desirability of an NTU EEE degree. I tell alumni I want to make their degree more valuable than when they were here. I want them to be proud of our students, our curriculum, and play an active role in helping us maintain that edge that attracted them here in the beginning." She is working towards the day when alumni "can't imagine anything more wonderful than one of their children choosing to come here."

THE FORMATIVE YEARS

EMERGING VISION, STRATEGIC FOCUS

The founding of the School of Electrical and Electronic Engineering (EEE) was a deliberate farsighted approach to nation building by Singapore's past leaders. Much thought and consideration had gone into the proposal to create the School of EEE in Nanyang Technological Institute, when an Engineering School already existed in the National University of Singapore. There would be no duplication, no waste of resources. Each institution would fulfil a particular role.

Thus, clear objectives were drawn and considered strategies formulated. The School would produce industry ready engineers to meet the demand for such professionals to do the jobs requiring their specific expertise.

Indeed, EEE was poised for growth right from the start, and the right people at the right time were there to help it take its pioneering steps.

A FRESH START

Professor Brian Lee Chang Leng
Founding Dean of the School of EEE (1981 – 1996)

I LIKE TO DO EVERYTHING FRESH AND START EVERYTHING FROM THE BEGINNING, TO SOLVE NEW PROBLEMS.

Professor Brian Lee was a seasoned industry practitioner with more than 18 years of experience when he joined the institution in 1981. Having acquired his Engineering education at the University of New South Wales, Professor Lee wholeheartedly immersed himself in the engineering profession he so loved.

I'VE ALWAYS BEEN KEEN ON START-UP PROJECTS.

The journey began when he was invited to join a new institution of higher learning that was in its birth throes – Nanyang Technological Institute (NTI). Despite the tempting thought, to start something afresh and anew, and at the same time, to further the government's vision to nurture engineers for Singapore's economy, he declined the offer. His love for the industry was stronger.

Six months later, Professor Lee received another call with the same offer. He still valued industry participation and NTI was quick to assure him: "That is what we want; people who are interested in the industry because that would be for the good of our students."

Thus, history was made and Professor Lee became the first Dean of the School of Electrical and Electronic Engineering, one of the three founding schools of the Nanyang Technological Institute, which was later renamed the Nanyang Technological University. Today, it is the only school to retain its original name.

Practice-oriented Curriculum

High on Professor Lee's priorities were to develop a new practice-oriented curriculum, to recruit good faculty with relevant industrial experience, to establish engineering laboratories and research centres, and to institute industrial attachments for the students. All these were geared to produce professionally trained engineering graduates who could play a key role in the economy, and to meet the high demand of a fast developing country for competent and qualified engineers.

Some aspects were sacred and crucial for Professor Lee. He convinced the School to train engineers for the power industry, and not just in areas of information technology and communications, which were becoming trendy courses then.

"Without these engineers, who will run the power stations?" stresses Professor Lee. "Countries like United Kingdom and some others are now crying out for such engineers because they had closed down their Power Engineering Departments."

Thus, with foresight, and learning from the best practices of other Engineering schools around the world, Professor Lee cultivated several strong engineer cohorts in the years from 1981 to 1996. When it was time to hand over the baton, he had no regrets.

"I had enjoyed it very much. I like to do everything fresh and start everything from the beginning, to solve new problems. That's where the challenge is, I've always been keen on start-up projects."

Professor Lee had taken the School of Electrical and Electronic Engineering from a vision and a dream into a tangible reality, with an impact not just felt in local education and industry, but also on a global platform.

PUTTING THE PIECES IN PLACE

In 1981, independent Singapore was just 16 years old. Yet, its economy was burgeoning at a remarkable pace. There was an urgent need for local expertise in several areas, including in the engineering field. It was time to educate and nurture practice-oriented engineers to help Singapore develop into a first world nation.

Thus, Nanyang Technological Institute (NTI) came to be, occupying the grounds of an erstwhile illustrious university, Nanyang University. It joined the incumbent National University of Singapore (NUS) in offering degree courses in Engineering.

The School of Electrical and Electronic Engineering (EEE) was one of the three founding schools of NTI.

1. During its inception year, the task at hand was to renovate and convert the Science Faculty buildings of the former Nanyang University into engineering workshops and laboratories.

EEE had humble beginnings. It was established in July 1981 with only 5 staff, comprising founding Dean Professor Brian Lee, his secretary, a corporate support officer and 2 lecturers.

By 1982, staff strength had grown to 15 lecturers and 3 administrative support staff. Also, the first batch of 10 laboratory technicians had been recruited. All this was in readiness for NTI's first student intake which would take place that year.

EEE recognised the need for continual feedback from the industry in order to nurture industry ready engineers. Such feedback would ascertain the effectiveness of its programmes and ensure they remain relevant to the industry's needs. Thus, in 1982, EEE formed its first School Advisory Committee. It gave feedback on the effectiveness of current courses, and advised on new courses due to the changing needs of the industry.

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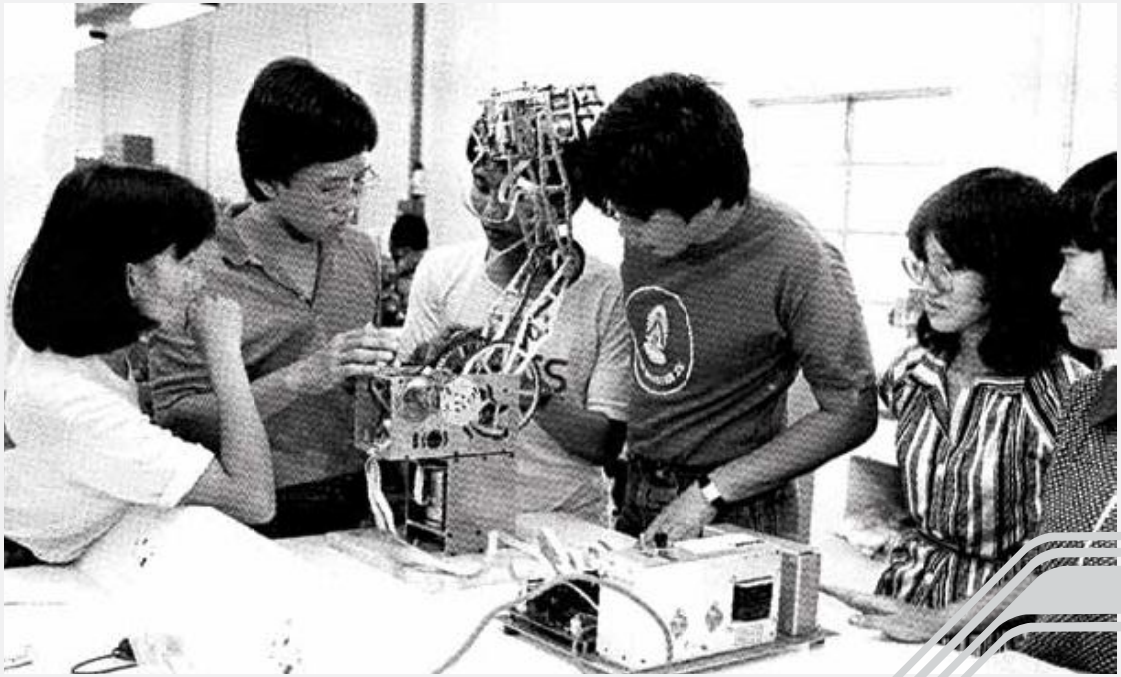
1. The EEE Council was focused on producing the first batch of industry ready engineers by 1985.
2. Professor Brian Lee warming up to his role at the helm of EEE as its first Dean.
3. Staff meetings were a regular feature as a new practice-oriented curriculum had to be planned and refined along the way.

OPENING OUR DOORS

In July 1982, EEE welcomed its pioneer batch of students – a modest 202 Bachelor of Engineering undergraduates, a contrast to an intake of over 2,000 engineering students in 2011. The degree programme would prepare them for effective roles in their profession upon graduation.
The curriculum integrated fundamental theories with current engineering practices, trained their analytical skills, and imbued a strong sense of professional ethics.
The students would undergo hands-on learning with laboratory experiments, design studies, industrial attachments and projects. These NTI students would eventually graduate with a degree from National University of Singapore.



1. Students plunged straight into the nitty-gritty of engineering with a Robotic Arm Project.
2. Future engineers from the pioneer EEE students.

The pioneer students could not boast of any luxuries in EEE. The teaching and learning environment was simple and almost spartan. All lecture notes were prepared with manual typewriters. Copies were made using carbon paper, stencils, duplicating and collating machines. Staff shared available computers and used dot matrix printers. Overhead projectors and slide projectors were the teaching aids for lectures, tutorials and briefings for experiments.

Simplicity was, nevertheless, the stepping stone to success.

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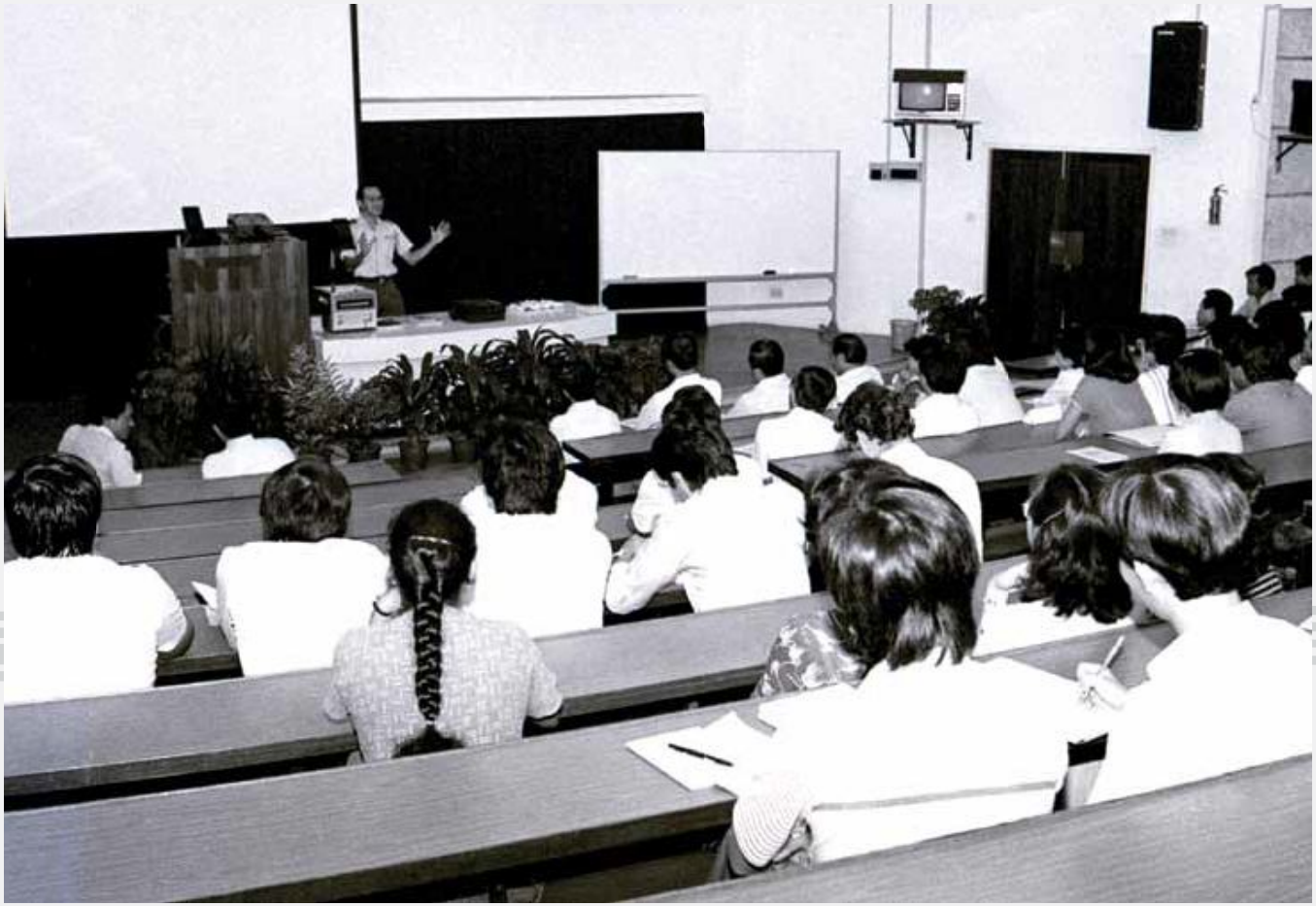
1. Teaching aids used were rustic overhead projectors.
2. The simple and spartan lecture hall meant students could not be lulled in comfort.

It was a testimony to EEE's industrial relevance when Hewlett-Packard awarded scholarships to 3 students based on how they performed during their industrial attachment in the multinational company in 1984.

Further cementing its support, Hewlett-Packard donated a computer and a microprocessor development system to EEE that same year.

1. Marking Hewlett-Packard's presentation of a computer and microprocessor development system to EEE.
2. From left to right: Kalwant Singh, Heng Aik Swan, LamYee Loy did EEE proud by receiving scholarships from Hewlett-Packard.



1983 saw a steep growth curve for EEE. In April, the Division of Electrical Engineering, Division of Electronic Engineering and Division of Computer Engineering were set up. Consequently, 3 Heads of Division were appointed.

As engineers are wont to seek solutions to problems, EEE was quick to form Work Improvement Teams (WITS) with the launch of the national WITS movement in 1984. Aptly named POWER, they immediately proved their mettle by clinching the Gold Award at the 1985 National QC Circle Convention III (Public Sector).

1. Who better than engineers to solve problems – EEE in the thick of the WITS movement in a 1984 WITS seminar.

PAVING THE WAY: THE FIRST BATCH OF GRADUATES

1985 gave much reason to rejoice as the pioneer batch of students graduated that year – 194 of them. EEE was truly coming into its own.

The numbers have swelled to 21,725 graduates by August 2011.

1. Professors in full regalia at NTI's first convocation in 1985.
2. A graduating class tossing their mortar boards in triumph at the historic Nanyang House.

Proving they had initiative and verve, the pioneering students founded the EEE Club in their very first year. Their first President, Mr Inderjit Singh, later became a Member of Parliament. The Club strove to provide excellent welfare and acquire academic excellence for EEE students by being a communication link between the school and students.

"We realised that having come to a new school, we needed to create an avenue to represent the views, the needs and wants of the students. It was up to us to get organised if we wanted our interests to be taken care of, and to be a significant force in helping to shape the future of the school and the university," said Mr Singh. "It was really up to us to take the lead and we did."

In the initial years, the EEE Club and the student leaders made a big difference in helping shape the future curriculum for the school. Mr Singh would organise a "meet the dean" session every 3 months where all students from the school had a chance to meet the dean without any other staff present so that they could give frank and unrestricted feedback. These sessions, facilitated by Mr Singh, were very useful in identifying areas of improvement.

Mr Singh, who is President, CEO and Director of Infiniti Solutions Pte Ltd, believes that the pioneering experiences at the school helped to shape his entrepreneurial spirit as an employee as well as an entrepreneur. "The uncertainties faced by an entrepreneur and how we plan and overcome these uncertainties by innovative ways and by applying our own initiatives and being self-starters are things I also experienced as a pioneer," he said. "I can attribute much of what I have achieved as an entrepreneur to my pioneering experience at NTU."

I CAN ATTRIBUTE MUCH OF WHAT I HAVE ACHIEVED AS AN ENTREPRENEUR TO MY PIONEERING EXPERIENCE AT NTU.

1. Member of Parliament Mr Inderjit Singh (centre) receiving the Nanyang Distinguished Alumni Award from NTU President Professor Bertil Andersson (left) with Minister of Education Mr Heng Swee Keat gracing the ceremony. Mr Singh was one of the four award recipients in 2011.

As a pioneer graduate, Mr Heng Guan Teck remembers the heavy responsibility of representing a new institute then. "In fact, it started with the 6-month industrial attachment, which was unprecedented at that time, and we were prepared to go out there, with a 'can-do spirit' and 'get our hands dirty'," he said. "The employers then were very impressed and looking back, I think we have done very well."

10 years later, when the idea of an Alumni Association was suggested by then Dean of the School of EEE, Professor Brian Lee, Mr Heng, who was a lecturer at the School of EEE, got together with some of the graduates to form the association.

"We were also at a point in our careers when we realised the importance of networking and had the desire 'to give something back' to our alma mater," said Mr Heng, who is currently Deputy Principal (Student Services & Planning) at Republic Polytechnic, Singapore. He could recall the first association event vividly – a Family Day at the NTUC Pasir Ris Resort where there was a big turnout and a great opportunity to get together for the first time in 10 years after graduation. The alumni association also published a EEE Alumni Namecard Directory.

Mr Heng is glad to see that the students at NTU today have many more opportunities for overseas exchange programmes and other holistic developmental programmes, and that the graduates continue to be well-recognised by industry, enjoy high employment rates and starting salaries.

Another pioneer EEE graduate Mr Anthony Ho Boon Kiat feels credit goes to the pioneer and successive management and staff at NTU for the university's meteoric rise in rankings, to stand among the finest universities in the world, especially for such a young university.

"It is not just limited to EEE, though I noticed that most of the EEE graduates are doing very well in their careers today. The decision for the practice-oriented course to give the graduates a headstart in our engineering career is really commendable. It did give me a good headstart in my first job as a product engineer in an electronics factory," shared Mr Ho, who is now CEO of NanoBright Technologies Pte Ltd, a company that commercialises fluorescent technologies developed in a laboratory.

Mr Heng Guan Teck

1. First EEE Alumni Association Executive Committee 1997 comprising (L-R):
Mr Kan Siew Leong (Honorary Assistant Secretary); Mr Tang Kim Seng (Honorary Assistant Treasurer); Mr Chong Yong Kim (Honorary Treasurer);
Dr Low Kay Soon (Committee Member); Mr Heng Guan Teck (President);
Dr Lam Yee Loy (Vice-President); Mr Jeff Goh (Honorary Secretary);
Mr Inderjit Singh (Committee Member); Mr Tay Beng Kang (Committee Member); and an elected internal auditor Mr Lee Peng Hin.

10 years on, EEE's pioneer graduates returned to recall the good old days. It was an opportune time to rekindle old friendships, exchange contacts and keep in touch after the gathering.

1. One for the album: A happy 10th Anniversary reunion of the pioneering EEE graduates.

The anniversary celebrations soon became an iconic event for EEE graduates to reconnect with one another. The overwhelming response to these events reflected the strong spirit of EEE.

1. The EEE class of 1988 enjoyed a successful gathering at their 10th-year reunion.
2. All smiles for this group of graduates as they relaxed with fellow schoolmates.
3. A regular feature at alumni gatherings is reminiscing the good old days at EEE.

For the 25th Anniversary of NTU Class of 1985, a reunion dinner was held on 29 October 2010 at Sheraton Towers for NTU's pioneer cohort. EEE's alumni, Mr Inderjit Singh, was the Chairman of the Class of 1985 25th Anniversary Reunion Fundraising Sub-committee. An endowment fund which was created by a group of alumni five years ago at the 20th Anniversary Reunion 2005 had exceeded its target of $2.5 million for the 25th Anniversary event. The fund, chaired by Mr Inderjit Singh, had accumulated over $3 million from kind alumni donors and included matching government funds.

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1. At the VIP table (seated from left to right): MP Er Lee Bee Wah (CEE), Chairman, Class of 1985 25th Anniversary Reunion Dinner Sub-committee; Guest-of-Honour Dr Ng Eng Hen, then Minister for Education and Second Minister for Defence; MP Mr Inderjit Singh, Chairman, Class of 1985 25th Anniversary Reunion Fundraising Sub-committee; and Professor Cham Tao Soon, Professor Emeritus, NTU, with Ms Josephine Chua, EEE alumni, standing. *(Source: NTU Alumni Affairs Office)*
2. The pioneer cohort of NTU in their 25th Anniversary Reunion in 2010 at Sheration Towers. *(Source: NTU Alumni Affairs Office)*

PURSUIT OF EXCELLENCE

ENRICHING MINDS, ACHEVING RESULTS

Remarkably, EEE overcame its fledgling phase within just a few short years. By 1985, it was entering a period of accelerated development, symbolised by its move from spartan quarters to more sophisticated premises. Mirroring that, EEE's curriculum was also strengthened and refined, to make it comparable to international standards. Research facilities were stepped up at the same time. EEE also began to make a name for itself in international circles by organising conferences and participating in international competitions.

In this period, every successful endeavour, every achievement was a step to something greater and higher. EEE was beginning to test its wings; it was ready to take flight.

STEPPING UP THE PACE

1985 continued to be a good year for EEE. Crowning its achievements for the year, the B.Eng. (Electrical and Electronic Engineering) programme was accredited by the United Kingdom's internationally reputed and respected Institution of Electrical Engineers.

Such was the drive that in the same year, NTI was named "one of the best engineering institutions in the world" by the Commonwealth Engineering Council.

THE STRAITS TIMES, SATURDAY, NOVEMBER 30, 1985.

NTI named as one of best in world

A model which C'wealth council will recommend to engineering institutions

THE Nanyang Technological Institute (NTI) has been singled out as one of the best engineering institutions in the world by a distinguished gathering of engineers.

The Commonwealth Engineering Council came to this conclusion after four years of study of similar institutions all over the world.

Its members, which met in Sri Lanka this month for a biennial conference, commended the NTI for its practical courses as well as staff training and recruitment.

The Council is made up of 25 heads of national engineering institutes in Commonwealth countries.

Current chairman of the Council, Professor Emeritus Chin Fung Kee, 65, said that it is unusual for an institution to be mentioned by name at a council meeting. He was speaking at a press interview yesterday.

Prof Chin, a Malaysian, is in Singapore for a geotechnical conference.

He said that the NTI is the model which the council will recommend to other engineering institutions in the Commonwealth.

PROF CHIN
...NTI's practical courses and quality of staff praised.

He added: "The NTI received unanimous approval of the council on two points. First, in connection with staff appointments. It places great stress and importance on the need of staff members having not only higher degrees but also relevant and long experience.

"And where courses are concerned, the students not only learn theory but also engineering practice."

NTI students have 10 weeks of practical training after their second year and six months of practical placement after their third year.

Prof Chin said that the NTI puts into practice the principle that an engineer must be involved in the problems of the society in which he serves.

Overseas degrees for specialisation

He said that it trains graduates whose skills are relevant and of immediate use to the country.

Prof Chin, who is now a practising engineer, feels that NTI training is the best choice for a first degree and that engineering studies at overseas universities are only necessary for further specialised degrees.

The four-year-study, which was carried out by a standing committee headed by a Canadian engineering professor, was the first to be appointed by the council. It was in the final report of this study that NTI was commended to the council.

1. NTI named as one of best in world, *The Straits Times*, 30 November 1985.
Source: The Straits Times © Singapore Press Holdings Limited. Reproduced with permission

Sophistication replaced simplicity in 1986 as EEE shifted to the new North Academic Complex. With such modern premises, the school could acquire more advanced equipment, and even set up a CAD/CAM Centre. One year later, EEE set up the Data Communication Training Centre.

1. EEE's new home in the North Academic Complex gave more room to grow.
2. Cementing a partnership with an MOU between NTI, Racal and NCB for a Data Communications Training Centre.
3. EEE all geared up for a new phase with the new CAD/CAM Centre.

In 1985, EEE widened its industry engagement with the first conference organised, not only by the School but by NTU – the International Symposium on IC Technology, Systems and Applications. The conference was renamed the International Symposium on Integrated Circuits, Devices and Systems in 1999, and yet again rechristened in 2007 as the International Symposium on Integrated Circuits. However, it has always borne the acronym, ISIC.

In 1990, the School inaugurated the International Conference on Control Automation, Robotics & Vision (ICARV). It has become a biennial forum for researchers, professionals and engineers from all over the world to exchange findings on the subject.

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1. The International Symposium on Integrated Circuits brings academics and industry together to explore new growth areas.
2. The International Conference on Control Automation, Robotics & Vision is a biennial event of presentations, interactive sessions and tutorials.

Establishing a better global standing for EEE, the International Power Engineering Conference (IPEC), which has since been renamed International Power and Energy Conference, was inaugurated in 1993. It was a forum for international participants to share and discuss R&D and test-bedding in clean and renewable energy systems, intelligent energy distribution, energy storage systems, and various other issues.

From the first International Conference on Information, Communications and Signal Processing (ICICS) in 1997, which attracted more than 330 participants from 40 countries, the biennial ICICS has grown from strength to strength for academia and industry engineers to network and review professional papers.

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1. International delegates viewing exhibits during the International Power Engineering Conference 2010.
2. A distinguished panel of speakers share their research at the International Conference on Information, Communications and Signal Processing 2011.

In July 1989, the School of EEE made headlines when they won the International Micromouse Race, a global competition organised by the Institution of Electrical Engineers, United Kingdom (UK). With only 18 months preparatory work, the team of Mr Kevin Gomez and Miss Fiona Woon designed and took their computer-controlled robot to London, which ran through the maze to beat the defending champion by 1.37 seconds.

A few months later, in October, the NTI mouse also emerged the champion of the international micromouse competition, organised locally by the Institution of Engineers, Singapore, which had competitors from the United States, Japan, UK, Australia and Taiwan.

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1. Ms Fiona Woon and Mr Kevin Gomez, deserving champions for their demonstration of innovative robotics at the International Micromouse Race, 1989.
2. See how fast the EEE mouse went.

1. Prime Minister Goh Chok Tong marking the birth of NTU in 1991.
2. A momentous occasion as NTI embraced its future as NTU.

EVOLVING FROM "I" TO "U"

On its path to offering higher degree studies, EEE admitted the first 2 Master of Engineering (M.Eng.) aspirants in 1987. They conducted independent but supervised research in an approved field of advanced study, and submitted a thesis at the end of their M.Eng. candidature, subsequently graduating in 1989. The same year saw EEE raising the bar further by accepting the first Ph.D. candidate.

By 1990, EEE had grown its research capabilities enough to require research staff, thereby recruiting its first Research Fellow in November that year.

On 1 July 1991, by an Act of Parliament, NTI became Nanyang Technological University (NTU).

As the School continued to grow, EEE saw the appointment of its first Vice-Dean and Sub-Dean in 1991 to support the Dean in his responsibilities.

The same year also saw the Division of Electrical Engineering reorganised into two divisions for better focus. The Division of Electrical Engineering and the Division of Control and Instrumentation Engineering came into being.

The rest of the 1990s truly saw EEE coming into its own. From 1992, NTU began awarding its own degrees and its graduates entered industry in hordes, bringing their skills to the growing economy.

EEE was expanding rapidly, so by 1994, it moved into bigger premises in the South Academic Complex. This also allowed its laboratories to be housed in one place.

1. View of South Spine in the South Academic Complex, where EEE moved to in 1994 and enjoyed better facilities.
2. Portion of the facade of School of EEE in the South Spine.
3. Aerial view of EEE's Blocks S1 and S2.

In 1991, the first postgraduate programme by coursework and dissertation, M.Sc. (Communications & Computer Networking), was launched with the initial batch of 50 students. The programme allowed working engineers to upgrade and stay abreast of new industry developments, as well as specialise in specific areas.

In 1993, 3 pioneer M.Sc. candidates of the M.Sc. (Communications & Computer Networking) programme and EEE's first Ph.D. candidate graduated successfully. The same year, EEE launched another postgraduate programme, the M.Sc. (Computer Control & Automation) programme with 35 pioneering students. 1994 saw yet another postgraduate programme launched – M.Sc. (Consumer Electronics) comprising 24 students.

As of October 2011, School of EEE has seen 5,015 higher degree graduates pass through its doors, comprising 3,184 M.Sc. graduates, 33 M.Phil. graduates, 1,016 M.Eng. graduates and 782 Ph.D. graduates.

1. Site visits are one of the highlights of M.Sc. programmes.
2. M.Sc. students in the lab.

The school was reorganised into 6 divisions towards the end of 1995, thereby rationalising its research and teaching focus. The divisions comprised Power Engineering, Circuits & Systems, Information Engineering, Control & Instrumentation, Communication Engineering, and Microelectronics.

At the start of 1996, the school welcomed a new division when it absorbed the Information Communication Institute of Singapore (ICIS), which had been established by the National Computer Board.

1. Minister Teo Chee Hean graced the occasion when ICIS was absorbed into EEE.

MOVING IN TANDEM WITH INDUSTRY

In 1987, EEE made further inroads in industry partnership with a joint NTI-Telecoms project on computerised model to predict signal strength. The two organisations also signed an MOU on NTI/Telecoms R&D Cooperation.

Expanding its ties with the industry, EEE also held the NTI/PUB seminar on Energy Conservation and Load Management.

The role of research was augmented in 1991 with the establishment of the Network Technology Research Centre (NTRC) jointly with Digital Equipment Singapore Pte Ltd. Its role was to spearhead R&D activities in Networking Technology to benefit the industry. This would help to further propel the explosive growth in Internet, high speed communications and computer network.

1. Exploring the capabilities of the NTRC.
2. Exchanging input on the NTRC.

EXTENDING A WARM WELCOME

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1. On a visit to EEE in 1983, Ministers Dr Tay Eng Soon (left) and Dr Tony Tan (centre) were briefed by Professor Brian Lee (right) about students' projects.
2. Minister George Yeo (right) visited EEE in 1991.
3. In 1990, Deputy Prime Minister Lee Hsien Long visited EEE.

1. EEE welcomed several distinguished visitors from overseas universities and institutions to view its latest research facilities and laboratories.

SALUTING TEACHING EXCELLENCE

In recognition of the efforts of teaching staff, EEE inaugurated the Teacher of the Year Award in 1994, allowing the work of outstanding teachers to shine through. Through the years, several EEE teachers have been successfully identified and lauded for their excellent contributions. In 2004, the Award was renamed the Nanyang Award for Excellence in Teaching.

Teacher of the Year

1994 Associate Professor Teoh Eam Khwang
1995 Associate Professor Leonard Chin
1996 Associate Professor Alex Kot
1997 Associate Professor Lalit Goel
1998 Associate Professor Chua Hock Chuan
1999 Associate Professor Er Meng Joo
2000 Associate Professor Zhou Yan
2001 Associate Professor Zhang Liren
2002 Associate Professor Lalit Goel
2003 Associate Professor Chua Hock Chuan

Excellence in Teaching

2004 Associate Professor Rusli
2005 Associate Professor Teh Kah Chan
2006 Associate Professor Koh Tong San
2007 Associate Professor Goh Wang Ling
2008 Associate Professor Tan Soon Yim
2009 Associate Professor Mohammed Yakoob Sival
2010 Associate Professor Chong Han Joo Peter
2011 Associate Professor Siek Liter

1. Associate Professor Teoh Eam Khwang (second from left) was a recipient of the inaugural Teacher of the Year Award 1994.

OUTREACH: BUILDING ON THE FUTURE

Giving Junior College (JC) students a taste of the exciting world of engineering in NTU, EEE organised the Junior College Students Tech Camp. It was an eye-opener to the students, as well as a welcome initiation to those harbouring hopes of becoming engineers one day. In some respect, it also helped to convert some students into engineering aspirants.

NTU also participated in the Higher 3 programme, which prepared JC students who wish to study science and engineering at tertiary level. In 2008, EEE offered to teach the subject "Semiconductor Physics and Devices". It was open to students from all JCs, and was conducted at Hwa Chong Institution.

The annual Open House organised by the university was also another opportunity for the public, and especially for the JC and polytechnic students to visit the campus and tour the laboratory facilities at EEE.

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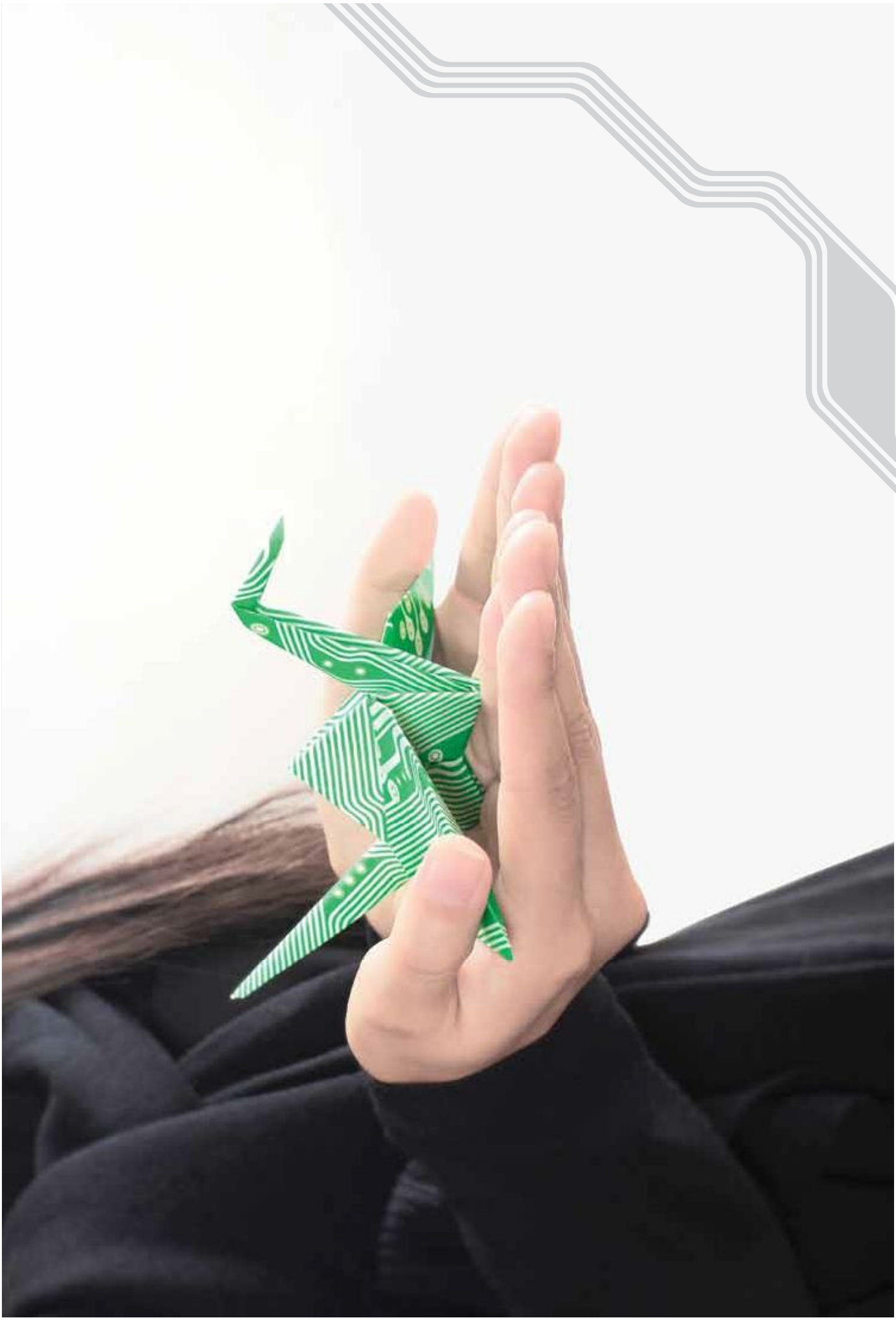
1. Explaining the marvels of engineering to JC students.
2. JC students commemorating a productive experience in EEE.
3. Giving laymen a peek into the world of engineering during the Open House.
4. The public had a glimpse of what EEE had been working on during the Open House.



MENTORING TALENTS

EMPOWERING IDEAS, GEARING CAREERS

Within the first 15 years, EEE had quickly established a reputation as the little school that could. No vision was too farfetched, no challenge too daunting. Yet, from 1996 onwards, it went on to demonstrate that past achievements were mere suggestions of what it could accomplish; just a taste of things to come. Under a new Dean, research and technopreneurship came to the fore, making EEE a hotbed of ideas and a hub for industry to flourish. It became more than just an academic institution. It was pushing the envelope for technology and proving to be a valuable partner for business.

A NEW THRUST

Professor Er Meng Hwa
Dean of the School of EEE (1996 – 2005)

THE STUDENTS MUST ENRICH THEIR SOFT SKILLS, GET OVERSEAS EXPOSURE AND CULTIVATE LEADERSHIP SKILLS.

WELL, WITH GREATER EMPHASIS ON RESEARCH, WE WERE FORTUNATE TO BE ABLE TO GET THEM (FACULTY WITH GOOD RESEARCH CREDENTIALS) TO COME HERE AND THAT HAS HELPED THE SCHOOL.

He graduated from the National University of Singapore with First Class Honours in Electrical Engineering the very year that NTI was formed, 1981. And by the time NTI's pioneering batch graduated in 1985, he had decided to join NTI as a lecturer.

Professor Er Meng Hwa came into NTI with a strong bent for research, having pursued a Ph.D. in Electrical and Computer Engineering under the University of Newcastle's postgraduate research scholarship in 1982. One of the key results for his research thesis had been patented by the University of Newcastle and the Commonwealth Government of Australia.

Though NTI was in its humble beginnings, Professor Er effectively established a strong research culture at NTI, and later NTU. Through the years as Vice-Dean from 1991, and as Dean from 1996 to 2005, he led the research programme to more intensive levels with higher degree programmes. The establishment of several Research Centres of Excellence was testimony to this drive. In 2003, 6 new Research Centres were established, truly entrenching research as a major component of NTU's work.

Getting the Best

To truly build the School of EEE's research capabilities, Professor Er knew he had to attract faculty with good research credentials. "The challenge was to get top faculty. How do we attract them? They would have so many offers from reputable universities worldwide, so why come here? Well, with greater emphasis on research, we were fortunate to be able to get them to come here and that has helped the School," Professor Er recalls.

With such a varied community from all over the world, it was also Professor Er's task to pull everyone together to work in the best interests of the School. "I had to build a strong culture in the School. Fortunately, I had collegial staff and a strong support team. I really have to thank them for that," he says.

But Professor Er's agenda was not all about the hard brass tacks of EEE. He also had very sound advice for the students under his wing. "I always said that besides studying hard, they should also enjoy themselves. They must enrich their soft skills, get overseas exposure and cultivate leadership skills. So we have put in place opportunities for these," Professor Er explains.

Thus, from 1994, the School has been encouraging its students to venture globally on exchange programmes and holiday schemes for study, work and play. All these were to promote cross-cultural exchanges and broaden horizons. Professor Er also envisioned more advantages arising out of such exchanges. He was wont to tell students, "You must meet and mingle with your peers from abroad. Who knows, one of your overseas classmates could become the future Prime Minister of his country."

Professor Er is currently the Vice President (International Affairs) in NTU.

ENHANCING STUDENT EXPERIENCES

In 1996, part-time students joined the EEE student cohort pursuing the B.Eng. (Electrical and Electronic Engineering) degree programme. This allows working adults with the requisite polytechnic diplomas to upgrade their skills while still working. They have five years to finish their course.

True to course, in 2001, 75 part-time students graduated. The occasion was made more significant as four of them had obtained First Class honours.

Yong Yiam Tong, who had graduated with First Class honours, said, "A degree course leads one to think more analytically, after the practical and hands-on oriented background of the polytechnic."

Yong Teck Seng, his fellow First Class achiever added, "I am now more confident in my work. Technically, I try to look further to the future to see the impact of my actions."

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1. Outstanding graduate Yong Teck Seng encourages other part-time students to stay committed and disciplined when pursuing their course.
2. First Class Honours graduate Yong Yiam Tong shares that his perseverance and the support of his wife helped him to focus on completing the course.

1. Inking the agreement between EEE and Mentor Graphics.

It was another proud achievement for EEE in 1996 when it launched the Centre for Signal Processing (CSP). It quickly became a significant player with over 20 companies, including MNCs, contracting with it for joint industry projects.

The school grew further as the M.Sc. (Signal Processing) programme was launched in 1999 with 41 students, and later in 2000 when 37 pioneering students enrolled for the newly launched M.Sc. (Microelectronics) programme. This was to meet the increasing demand in the industry to nurture skilled professionals in semiconductors. All M.Sc. programmes may be undertaken both on a full-time and part-time basis.

EEE's graduate programmes continued to grow over the years. In 2001, M.Sc. (Communications Engineering) expanded to include a third stream in Wireless Communications. Then in 2003, the school launched the M.Sc. (Photonics) programme, starting with 21 students.

At the same time, in 2002, it launched a part-time Graduate Diploma in Information-Communication Technology programme, with an initial intake of 71 students.

EEE marked a significant collaborative effort in 2002 when it signed an agreement with Mentor Graphics Asia Pte Ltd (MGA) for the M.Sc. (Integrated Circuit Design) programme. MGA agreed to donate 100 sets of Electronic Design Automation Software Tools to NTU for the M.Sc. students to use in their research.