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STRETCHING OURSELVES FOR GLOBAL EXCELLENCE

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NANYANG TECHNOLOGICAL UNIVERSITY ANNUAL REPORT 2010

# VISION & MISSION

**A great global university founded on science and technology, nurturing creative and entrepreneurial leaders through a broad education in diverse disciplines**

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**The NTU 2015 strategy envisions the building of five Peaks of Excellence in the University: Sustainable Earth, Future Healthcare, New Media, New Silk Road and Innovation Asia. With this roadmap, we aim to establish benchmarks in teaching and research, building on our strengths in the sciences, engineering and business.**

# AT A GLANCE

**23,043**

UNDERGRADUATES AND

**10,044**

GRADUATE STUDENTS

STUDENTS FROM

**73**

COUNTRIES INVOLVED  
IN 113 CLUBS ON CAMPUS

**16**

HALLS OF RESIDENCE  
SPREAD OVER 200 HECTARES  
IN YUNNAN GARDEN CAMPUS

**63**

RESEARCH INSTITUTES  
AND CENTRES

OVER

**\$\$53,094,000<sup>1</sup>**

FROM 9,631 DONORS IN FY09

**71%**

OF CLASS OF 2010 MADE  
A GRADUATION GIFT

**2013**

YEAR THE LEE KONG CHIAN  
SCHOOL OF MEDICINE  
ADMITS FIRST INTAKE

STUDENT ATTACHMENT  
PROGRAMMES WITH

**149**

INSTITUTIONS IN 27 COUNTRIES

**3,288**

FACULTY AND RESEARCH  
STAFF FROM 72 COUNTRIES

**144,045**

ALUMNI SPREAD ACROSS  
107 COUNTRIES

IN EXCESS OF

**\$\$359,000,000**

IN COMPETITIVE RESEARCH GRANTS  
WON IN FY09

<sup>1</sup> Including government matching

# CHAIRMAN'S MESSAGE



**With the wind at our back, it is crucial that the momentum of change be sustained. We have come far, but the road ahead is filled with challenges... As we move ahead, we need to stay focused.**

Singapore's economy has emerged from the recession and is now on a firm footing. Despite the uncertain economic outlook in 2009, GDP in the first half of 2010 grew by 18% year-on-year. In the same period, total employment rose by 63,000, with wages rising between 3.7% and 5.8%. The strong economic recovery and regional growth momentum mean better job prospects for our graduating students.

Today, an NTU degree is one that is recognised and highly sought after by employers. The External Review Panel of the Quality Assurance Framework for Universities, established by the Ministry of Education to oversee the development of higher education institutions, has noted the remarkable progress at NTU since its corporatisation in 2006. NTU continues to make great strides.

Student enrolment has increased, significantly expanding accessibility to higher education in Singapore from 20% to 25% participation of the cohort. We are on track to meet the national target of 30% by 2015. Our undergraduate population has jumped from 16,000 to

23,000 within the space of seven years. The Interdisciplinary Graduate School and the implementation of the Blue Ribbon Commission (BRC) plan were approved by the Board of Trustees in May 2010. The BRC plan, which builds on efforts of the New Undergraduate Education initiative mooted in 2003, covers all areas of undergraduate education, including a comprehensive review of the curriculum structure, expanded opportunities for student life and an enriched student experience.

The restructuring of our colleges and the introduction of new undergraduate programmes offer more choices for a broad-based, liberal education. Just as the Singapore Government has shifted its focus from crisis relief measures during the economic downturn towards restructuring the Singapore economy to enhance productivity, NTU is taking steps to implement a strategic plan to support the University's growth in the next phase of its development.

The NTU 2015 strategy envisions the building of five Peaks of Excellence in the University: Sustainable Earth, Future Healthcare, New

Media, New Silk Road and Innovation Asia. With this roadmap, we aim to establish benchmarks in teaching and research, building on our strengths in the sciences, engineering and business. New programmes will be launched that will fundamentally change NTU.

The new Medical School, in collaboration with Imperial College London, is set to take in its first batch of students in AY2013. Our Renaissance Engineering Programme, a premier fully-residential Engineering and Business direct Master's programme, will launch in AY2011. The two Research Centres of Excellence at NTU, our Earth Observatory of Singapore and Singapore Centre on Environmental Life Sciences Engineering, are significant pillars in the University's efforts in sustainability research.

Our innovation and entrepreneurship ecosystem is maturing, as seen from an increasing number of education programmes in entrepreneurship and a growing number of patents and innovation. Students starting small businesses have added to the vibrancy and entrepreneurial culture on campus. New Associate Provosts have been appointed to oversee developments in research and innovation.

These are exciting times for NTU. Our faculty has put out a record number of publications and won the majority of external competitive research grants on offer. The success of our

appointment, promotion and tenure process and an influx of top academic talent have laid strong foundations on which we can intensify our efforts to become a leading global, research-intensive University. New and ongoing collaborations with research institutes and industry partners provide us with innovative research opportunities in emerging fields.

The Singapore Government has committed S\$1.1 billion a year over the next five years in the form of tax benefits, grants and training subsidies to help companies and workers to innovate and deepen their skills and expertise. Measures have also been put in place to enable companies to develop growth capabilities, commercialise their research and development, and expand abroad. The Government aims to build a society where everyone has the best opportunity to stretch their potential and enjoy a better quality of life.

Education is a national priority. Government funding for higher education is set to increase, with the establishment of a Singapore Universities Trust. Gifts to NTU will receive one-and-a-half dollar for every dollar raised by the University, provided they go towards undergraduate education. The Government is providing the fuel, but it is up to the University to be the engine of growth and change.

Rapid growth and extensive changes create extra pressures on the University's leadership

and administrative support. NTU has responded by strengthening its governance and administrative processes. Since March 2010, the Administration has embarked on a Business Process Reengineering plan to revamp its key processes and restructure its organisation to better support the academic agenda. We also need to ensure a smooth leadership transition to take on the new challenges ahead. NTU President Dr Su Guaning has announced he will not be seeking a new term upon the completion of his tenure on 30 June 2011. He will be succeeded by a strong leadership team, headed by Professor Bertil Andersson, who has been Provost of the University since 2007.

With the wind at our back, it is crucial that the momentum of change be sustained. We have come far, but the road ahead is filled with challenges. Much of our aspirations and planned initiatives are works in process. If we allow ourselves to become complacent, we risk losing the considerable gains NTU has made in recent years. As we move ahead, we need to stay focused. Every faculty and staff must be on board; every student and alumnus is an ambassador for NTU. The NTU community has to come together, and stake its future in this noble institution.

I am pleased to note that the Class of 2010 has set the tone. A record-breaking 71% of this year's graduating class made a gift to future generations of NTU students. This

gesture helps ensure that deserving students receive a quality education, regardless of their financial status. The culture of giving is a strong testament to the student-centred education at NTU, where we connect faculty, students, alumni and the community.

As NTU embarks on the journey to implement its NTU 2015 strategic plan, with its Peaks of Excellence, it is this spirit of community that will ensure our continued progress.

I would like to thank NTU President Su Guaning for his nine years of distinguished leadership that has transformed NTU. He has firmly established NTU as a major driver of education and research in Singapore, and put NTU on the world map. His transformational leadership from 2002 has led the University through its years of most rapid expansion. Having built a strong foundation, President Su has assembled a stellar succession team to continue the good work. My thanks also go to my fellow board members for their guidance and commitment, and to our faculty and staff for their dedication and effort.

**MR KOH BOON HWEE**

Chairman, Board of Trustees  
Nanyang Technological University

# PRESIDENT'S MESSAGE



**NTU is now one of the fastest-growing research universities in the world, distinguished by our multicultural and multidisciplinary character and premium residential education with enriching global experiences.**

Academic Year 2009 represented the close of an exciting first chapter in NTU's journey as an autonomous university. Nearly five years have passed since we were corporatised in April 2006. NTU is now one of the fastest-growing research universities in the world, distinguished by our multicultural and multidisciplinary character and premium residential education with enriching global experiences.

The NTU 2015 strategic plan, formulated through a consultative process involving the NTU Board of Trustees, senior management, faculty and students, was approved by the Board in May 2010. NTU aims to be renowned for five Peaks of Excellence: Sustainable Earth, Future Healthcare, New Media, New Silk Road, and Innovation Asia. The five thrusts leverage our multidisciplinary expertise and build on our strengths in research and education. These pan-university efforts will give us new momentum as we count down to our 60th anniversary in 2015.

AY2009 was a banner year for the University's sustainability drive, which aims to meet the

challenges of urbanisation and sustainable development. We were awarded S\$120 million in government funding to lead the development of the Singapore Centre on Environmental Life Sciences Engineering (SCELSE). Led by Professors Staffan Kjelleberg and Yehuda Cohen, both world experts on biofilms, SCELSE is NTU's second government-funded Research Centre of Excellence after the Earth Observatory of Singapore.

We also started a new Division of Earth Sciences, unveiled one of the world's fastest and greenest supercomputers, established the first multidisciplinary research institute of its kind in Asia for catastrophe risk management, and officially opened the S\$200 million Energy Research Institute @ NTU (ERI@N) and Advanced Environmental Biotechnology Centre.

Building on our strengths in the sciences, engineering and business, we will launch Singapore's newest medical school in partnership with Imperial College London by 2013. The school expects to attract the cream of Singapore's students and will address the

critical need in Singapore for more doctors in the future. For students, there is the added allure of getting a joint Imperial-NTU medical degree right here in Singapore.

In the year under review, NTU continued to make remarkable progress in research, registering record competitive grants that have quadrupled over the last three years. Our success in these highly competitive grant submissions reflects the quality of our faculty and provides the conditions for other outstanding scientists to join NTU. In AY2009, we welcomed a record number of world-renowned academics including Professors Dorrit Vibeke Sorensen, Paul Tapponnier, Nadia Magnenat-Thalmann, James Barber and Wolfgang Knoll. This influx of top-tier talent has been matched by an equally impressive number of bright young international scientists choosing NTU. Since the launch of our Nanyang Assistant Professorship in 2007, we have recruited 16 aspiring young scientists from a pool of over 1,400 international applicants.

NTU students know the immediate benefits of being taught by outstanding faculty and of learning in an environment with world-class facilities. More undergraduates than ever are taking part in research activities, mainly through the Undergraduate Research Experience on Campus (URECA) and the CN Yang Scholars programmes. It is heartening that about 22% of all URECA students have gone

on to postgraduate studies in NTU. In AY2009, we had 2,700 PhD students representing 43 countries. To enhance our suite of high-profile China-focused Master's programmes for senior government officials, we established the Nanyang Centre for Public Administration.

We also formed new alliances with world-leading institutions and multinational corporations, reaffirming NTU as a research partner of choice. In AY2009, we inked agreements with the University of Warwick, Rice University, Rolls-Royce, IBM, Fraunhofer-Gesellschaft, Centre National de la Recherche Scientifique International and Thales, among others. We also launched new joint and dual PhD programmes with institutions like Carnegie Mellon University, Karolinska Institutet, Technical University of Munich and Technion-Israel Institute of Technology.

NTU graduates have remained highly employable, despite the slowdown in hiring by companies in 2009. About 97% received one or more job offers within four months of graduating. We continue to see as our mission the cultivation of creative, innovative team players and ethical leaders who can help shape the future of Singapore and the world. Plans to transform the undergraduate experience are being implemented, while a new graduate school will be developed to raise NTU's capacity for innovative, interdisciplinary research that addresses real-world challenges.

Newly-built IT infrastructure for students, including state-of-the-art learning facilities, has put NTU on the path of becoming a "Cool Campus". A new campus masterplan has been unveiled to guide our investments in infrastructure for the next 25 years. The realisation of this blueprint will boost NTU's reputation as "a university in a park" and a thriving academic and entrepreneurial hub. Fittingly, our Yunnan Garden campus was the Games Village for the inaugural Youth Olympic Games in August 2010. More than 2,500 NTU staff and students were sporting volunteers, hosting the young international athletes during their time in Singapore.

AY2009 saw us launching our 55th anniversary celebrations in style. At our 218 km cross-island fundraiser, Run Round Singapore, we set three new local marathon records. NTU is clearly on the ascent and we are now ready for the next lap. Our endowments grew in the year under review. Significantly, more than 4,000 alumni made donations in support of students affected by the financial crisis. And at this year's Convocation, a benchmark 71% of graduating students contributed to the graduation class gift campaign, which supports bursaries for needy students.

On a personal note, I shall be completing my current term as President of NTU on 30 June 2011. By the end of AY2010, I would have served nine fruitful years at the helm

of this wonderful University. It has been a fulfilling journey for me and I am happy to pass the baton over to a great succession team that I have helped assemble. Provost Bertil Andersson, who has been my close working partner for the last four years, will assume the post of President of NTU. Professor Freddy Boey, currently the Chair of the School of Materials Science and Engineering, shall assume the position of Provost, vacated by Prof Andersson.

Succession and renewal are vital stages in the cycle of universities. I am happy that during my term as President, I was able to ensure that teaching, research, governance, administration and the sense of community in our University received utmost priority. Today, NTU is at an entirely different level from when I first assumed the position of President of the University in 2003. As I relinquish this exalted position, I leave secure in the knowledge that NTU will continue on its upward momentum.

**DR SU GUANING**

President

Nanyang Technological University

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## **NURTURING LEADERS FOR THE FUTURE**

**The face of education in NTU is changing. The changes proposed by the Blue Ribbon Commission on undergraduate education and the proposed Interdisciplinary Graduate School support the NTU 2015 strategy and its five Peaks of Excellence: Sustainable Earth, Future Healthcare, New Media, New Silk Road and Innovation Asia.**

# EDUCATION

## NTU 2015 Strategic Plan

The face of education in NTU is changing. In May 2010, the NTU Board of Trustees approved a new five-year plan for the University. The NTU 2015 strategy and its implementation spell out in great detail the initiatives and milestones NTU will pursue.

A dynamic roadmap, NTU 2015 will continue to evolve as NTU develops. Through this, the University has recommitted to its vision and mission, to be: A Great Global University Founded on Science and Technology, Nurturing Creative and Entrepreneurial Leaders through a Broad Education in Diverse Disciplines.

NTU will nurture five interdisciplinary Peaks of Excellence: Sustainable Earth, Future Healthcare, New Media, New Silk Road and Innovation Asia. These are underpinned by the strong fundamentals of Education and Research and a firm foundation in Governance and Administration.

The Peaks of Excellence serve as platforms for interdisciplinary development, and focal points for collaboration within the University, to take NTU to new heights. A Governance Coordination Committee for each of the Peaks will be set up to oversee these developments.

## Undergraduate Education

### Singapore's Newest Medical School

NTU is setting up a new *Medical School*, which will start classes for its first batch of students in AY2013. This will be run jointly with Imperial College London, and with Tan Tock Seng Hospital as its clinical base. The Medical School opens up new vistas in education and research, and opportunities for interdisciplinary learning. It will tap NTU's existing strengths in engineering, science and business.

The partnership will see Imperial leading curriculum development and running the Medical School together with NTU. The National Healthcare Group will be the primary clinical training partner. The five-year undergraduate programme will be taught by faculty from both NTU and Imperial.

Singapore's newest Medical School will adopt a holistic approach to medical education. Apart from lessons in laboratories and classrooms, students will be exposed to clinical settings, such as community hospitals, early in their education. They will also learn to work in multidisciplinary teams consisting of nurses, allied healthcare professionals and administrators.

Such an approach will ensure that graduates develop teamwork, communication and

## The Peaks of Excellence serve as platforms for interdisciplinary development, and focal points for collaboration within the University, to take NTU to new heights.

leadership skills. They will not only be providers of patient-centric care, but skilled managers in hospitals. The interface between engineering and medicine is one of the most exciting areas in future healthcare. NTU seeks to pioneer innovations in medical devices and the healthcare system as a whole.

### Blue Ribbon Commission

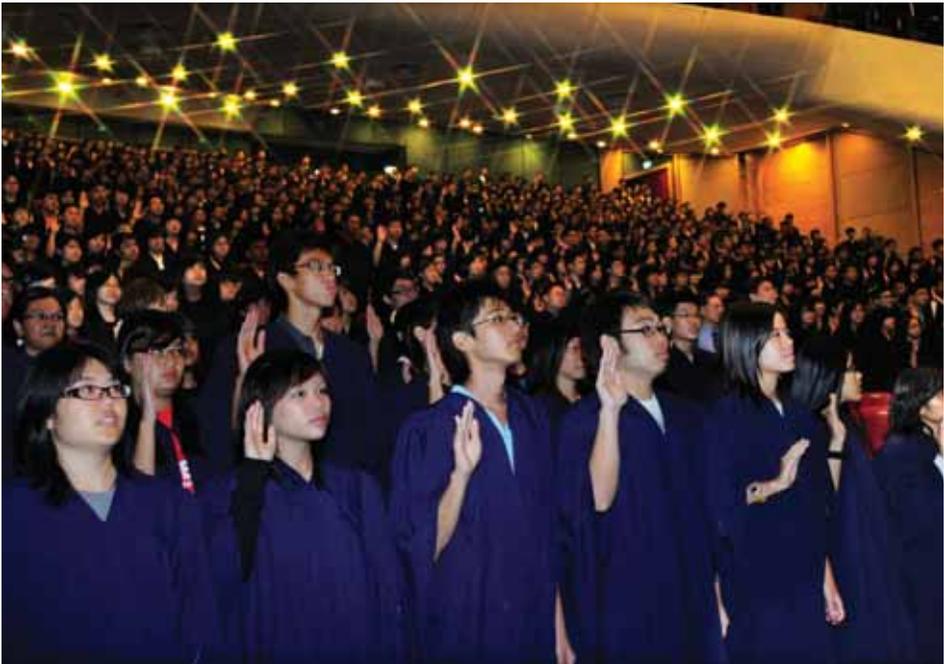
Significant changes will come from the *Blue Ribbon Commission (BRC) Implementation Plan* on undergraduate education – a key component of NTU 2015. Building on the 2003 New Undergraduate Education initiative, the BRC plan encompasses changes in curriculum structure, academic culture, student experience on and off campus, as well as new pedagogical approaches, tools and infrastructure. Progress has been swift, with the curriculum review completed. New interdisciplinary courses in Environmental Sustainability and Liberal Studies have been introduced, and new information technology and learning infrastructure have been put in place across campus. Key changes in the conduct of classes will start in AY2011.

The *Renaissance Engineering Programme*, approved by the Board of Trustees in August 2010, will spearhead the implementation of the BRC plan. The latest pedagogical tools and practice will be implemented in a fully-

residential environment. Interdisciplinary education in Engineering and Business aimed at grooming future CEOs and CTOs will culminate in the award of a Bachelor of Engineering Science degree and Master of Science in Technology Management degree. Students will study and work overseas with institutions like the University of California, Berkeley. To be launched in AY2011, this programme is expected to attract the top two percent of students and strengthen NTU's profile as the leading university in Singapore for Engineering and Business.

### Interdisciplinary Programmes

New interdisciplinary programmes have been mounted to address the growing demand among top students for more challenging and innovative offerings, and to meet the need for new skills in our evolving economy. The Bachelor of Education (Early Childhood) and Bachelor of Science in Sports Science and Management degree programmes, which were launched in AY2009, were well-received by students, with the latter heavily over-subscribed. Other newer programmes include the Physics with a second major in Mathematical Sciences degree programme, started in AY2010, and the Business & Computer Engineering Double Degree and Integrated Programme (B Eng MSc Computer Engineering), slated to start in AY2011.



**Top & Bottom:** The Class of 2010 was NTU's largest graduating cohort

### Improving Student Quality

The academic quality of students admitted to NTU is steadily improving. In AY2009, the mean U-score for students from the Polytechnic cohort increased to 81.3 from 75.6, while the score from the 'A' level cohort increased to 79.8 from 77.7.<sup>1</sup> During the same period, the number of students who hold the Polytechnic Diploma with Merit Award also increased by 16.1% to 756.

Changes in the national higher education landscape will heighten competition for good students. We continue to strive to bring in the top students to challenge and inspire their cohort. Students benefit from intellectual discourse and strong competition, even more so as NTU's new curriculum will place added emphasis on group projects and class discussions. We established a College Scholarship this year, to draw bright students to NTU.

Efforts in the admissions campaign were redoubled, to reach out to Junior College and Polytechnic students and their parents. We organised flagship events such as Experience NTU, Let's Talk NTU, and LIFE@ NTU Open House. Targeted programmes, such as the Nanyang Concept Tests by the School of Physical and Mathematical Sciences, reach out to top students from schools in Singapore and in the region.

### Excellence in Teaching and Learning

NTU seeks to provide its students with the best quality of teaching possible. An important indicator for us is the annual Student Feedback on Teaching survey. This provides useful feedback. At the same time, we continue to evolve the way we assess teaching. In future years, the teaching evaluation will comprise

components for peer review, teaching innovation, course development, academic advising and student mentorship. In addition, the Student Feedback on Teaching surveys will be updated to recognise intrinsic differences between courses.

NTU is continually upgrading the teaching skills of its faculty and teaching assistants. A focus on improving the communication skills of our teaching staff resulted in the introduction of targeted courses for faculty and more stringent recruitment criteria. To provide institutional support for these initiatives, the Centre for Educational Development was restructured as the **Centre of Excellence in Learning and Teaching** (CELT) in August 2009. A new Division of Pedagogical Practice strengthens institutional support for teaching standards and innovation. CELT will continue to conduct professional development courses related to teaching and learning. A total of 254 edUtorium courses involving 3,506 participants were conducted in AY2009.

Our PhD students, many of whom are involved in undergraduate teaching, can also avail themselves of the specialised courses. The emphasis on communication skills is not only for the teachers. Students are already taking communications courses as part of their core breadth requirements. This will continue to be an important component of the new BRC curriculum. Adding to this, NTU is exploring the possibility of conducting freshmen seminars in small groups, to provide yet another platform for students to hone their communication skills.

### Enriching Student Experience

More undergraduate students are taking part in research activities, mainly through the **Undergraduate Research Experience on**

<sup>1</sup> The two scales are not comparable

**Campus** (URECA) and the *CN Yang Scholarship* projects. Approximately 10% of URECA students continued their projects at overseas institutions through the Global Immersion Programme and International Student Exchange Programme. Many students under the URECA programme have been inspired to pursue further research work. Almost one out of four URECA students goes on to postgraduate education in NTU.

An increasing number of students are taking advantage of NTU's global network of institutional partners. The proportion of students participating in overseas attachment programmes has almost doubled in AY2009 from the previous year. In addition, close to a quarter of our students took part in overseas exposure programmes.

Opportunities for active participation on campus have expanded. NTU encourages student ownership and accountability through increased engagement. The BRC Implementation Committee actively involved student leaders in deliberations on undergraduate education. Student leaders visited their counterparts in Australian universities to learn about student union organisations there. In March 2010, the NTU Students' Union (NTUSU) organised a bazaar at the Nanyang Auditorium in collaboration with BHG retail chain. Some 400 wagons of merchandise were brought in, with proceeds going to the NTUSU Students' Fund.

### Graduates Remain Highly Employable

NTU's graduates have remained highly employable despite the slowdown in hiring by companies in 2009. Some 85.7% of 2009 graduates were able to secure full-time permanent employment and 97.2% received one or more job offers, within four months after graduation. The results for 2010 are expected to be even higher.

## Graduate Education

### Focus on Research

The proposed Interdisciplinary Graduate School and the 15% increase in PhD enrolment this year will be a significant boost to NTU's efforts to intensify and increase research activity. A record number of high-impact publications, combined with an increased share of external competitive research grants have attracted many leading academics to NTU. In AY2009, we established collaborations with many of the world's top research institutes and industry partners, further broadening research opportunities.

NTU is becoming more research-intensive. We continue to increase our intake of PhD students. PhD enrolment in AY2009 was over 2,400<sup>2</sup> and is expected to reach 3,500 by AY2015. A host of new joint and dual PhD programmes with our partner universities has been established to attract the best post-doctoral students to NTU.

### New Joint Programmes

A number of joint programmes with leading universities were established in AY2009. These were the Dual Masters in Systems and Project Management with Stevens Institute of Technology, the Joint NTU-TUM (Technical University of Munich) Master of Science in Aerospace Engineering and the Joint NTU-IITB (Indian Institute of Technology, Bombay) Master of Science in Infrastructure Engineering and Management. A Master of Teaching programme was also started this year.

More new programmes are being planned. In AY2010, NTU's first dual PhD degree programme will be launched with Carnegie Mellon University in Robotics and Intelligent Systems. In AY2011, the NTU-Technion

<sup>2</sup> Full-time equivalent



**Top:** Singapore's newest medical school, a partnership between NTU and Imperial College London, will tap Tan Tock Seng Hospital as its clinical base. This iconic preservation building at the new Novena campus will be its administrative centre **Bottom:** NTU undergraduates take part in Global Immersion Programmes in China



**From left to right:** Assoc Prof Hooi Den Huan, Director of Nanyang Technopreneurship Centre, NTU; Dr Su Guanng, President of NTU; Guest-of-Honour Mr Chua Thian Poh, Chairman and CEO of Ho Bee Group; Prof Jean-Pierre Jeannot, F W Olin Distinguished Professor of Global Business, Babson College, and Professor of Global Strategy & Marketing, IMD, at the inaugural Chua Thian Poh Public Lecture

Joint PhD degree programme, the Joint Master of Arts in Interactive Design with Italy's Domus Academy and the Master of Science in Applied Economics programme will accept their first students.

NTU has inked Memoranda of Understanding with four leading universities in Turkey. Istanbul Technical University, Istanbul University, Middle East Technical University and Yildiz Technical University will collaborate with NTU in joint research activities, including the supervision of PhD students and organisation of joint workshops. The inaugural partnership is expected to open up a new dimension of academic and research collaboration between Singapore and Turkey.

A new *Division of Earth Sciences* was established within the School of Physical and Mathematical Sciences in February 2010. The division will interface with the Earth Observatory of Singapore to conduct academic programmes and courses, starting with a doctoral programme in AY2010. It will play a key role in training graduates in Earth Sciences, with a view to make an impact on society. The doctoral programme paves the way for possible Master's and undergraduate programmes in the future.

Plans are in place to establish a thematic *Interdisciplinary Graduate School*. Post-doctoral students will be exposed to the increasingly interdisciplinary nature of research frontiers.

Implementing the NTU 2015 strategy, the new graduate school will apply thematic research programmes connected to the Peaks of Excellence. Starting with a focus on Sustainable Earth and New Media in AY2011, and Future Healthcare in AY2012, the aim is for 30% of all PhD students at NTU to be trained at the Interdisciplinary Graduate School by AY2015. The remaining 70% will be educated through the traditional School and College system.

### Innovation and Entrepreneurship

To develop the innovation and entrepreneurship ecosystem in NTU, the University has created more opportunities for students to apply innovation and entrepreneurship in their research projects. A *PhD Entrepreneur-in-Training* (PET) programme was launched in October 2009. The aim is to encourage young post-doctoral students to conduct market feasibility studies and develop business plans to commercialise technologies from their areas of research. Students will receive funding and support to develop the commercial and business potential of their PhD research. The intention of the PET programme is to create a pool of highly-qualified entrepreneurs who can create successful ventures in Singapore.

We have developed courses on entrepreneurship for our Master's and undergraduate students. Over 300 undergraduates and Master's students participated in the Minor in Entrepreneurship programme. Students from the School of Biological Sciences had the opportunity to take part in an intensive, week-long module in Bio-Entrepreneurship as part of their core prescribed elective. A total of 65 Master's students participated, including five Kauffman Foundation Scholars. From AY2010, the programme will be open to all undergraduates as a general elective.

A campus-wide online programme on an Introduction to Entrepreneurship will target undergraduates on NTU's Edventure platform. Plans to extend similar programmes on Entrepreneurship to researchers and academics are underway. Other initiatives, such as the inaugural Chua Thian Poh Public Lecture on Entrepreneurship, held on 11 March 2010, and the first Junior World Entrepreneurship Forum, met with significant success.

In AY2009, the Nanyang Technopreneurship Centre organised the inaugural *ideas.inc Business Challenge* for schools and institutions of higher learning. Supported by Spring Singapore, the event attracted strong interest. A total of 200 teams registered for the competition, including all the institutes of higher learning in Singapore. Some 15 semi-finalist and six finalist teams received funding to develop prototypes and their business models.

Students have taken entrepreneurship out of the classroom. A "push-cart" scheme was introduced on campus, making use of the common spaces for students' entrepreneurial activities. These activities form part of NTU's plan to create a rich and vibrant environment for students to live and work in.

### Service to Society

#### Economic Strategies Committee

Last year, the Government of Singapore formed the Economic Strategies Committee (ESC). Tasked to identify opportunities in a new global environment, the Committee was formed to develop strategies to achieve sustained and inclusive growth. Chaired by Minister for Finance Tharman Shanmugaratnam, the ESC comprised members drawn from Government, the labour movement and private sector. NTU



**Top, from left to right:** Mr Anthony Teo, Chairman of the NTU Youth Olympic Games Steering Committee, and Dr Jacques Rogge, President of the International Olympic Committee, looking on as Mr Ng Ser Miang, Chairman of Singapore Youth Olympic Games 2010 Organising Committee, leaves his imprint at the Youth Olympic Village at NTU **Bottom:** Youth Olympic Games Singapore 2010 official mascots Lyo and Merly make a guest appearance at NTU Convocation 2010 ceremonies

was invited, together with other local academic institutions, to participate in the ESC process by providing inputs and suggestions.

NTU tapped the whole range of expertise from its Colleges and Schools. In October 2009, we submitted our recommendations, based on the Five Peaks of Excellence identified in the NTU 2015 strategic plan. The Ministry of Finance noted that NTU's proposals were not just focused on Economics; in particular, our recommendations concerning land value maximisation via underwater structures were singled out for mention. The ESC announced its key recommendations on 1 February 2010.

### Contributing with our Expertise

The ongoing Nanyang Business School-Business Times Roundtable is another example of how NTU's faculty continue to play a key role in transforming and informing society. Many faculty members take part in studies initiated by Government Ministries and social help groups.

In AY2009, NTU contributed to the Singapore Mental Health Study, a collaborative research project led by the Institute of Mental Health and involving the Ministry of Health, US-based RAND Health and other local and international research partners. Other projects with the Ministry of Community Development, Youth and Sports included Social Attitudes of Singapore Residents and Longitudinal Study of Families placed on Longer Term Assistance under the Work Support Programme.

Our faculty also take up leadership positions in society. A sterling example is Professor Gillian Yeo, Interim Dean of Nanyang Business School, who was appointed a member of the Committee to Develop the Accountancy Sector. NTU's Nanyang Technopreneurship

Centre's Senior Assistant Director Mr Koh Hock Tee is a Director on the Board of the Technology Transfer Network. Others in NTU have contributed their expertise at official events and initiatives such as the second Citi-NIE Financial Education Conference: Giving our Youth a Head\$tart in Financial Literacy, held in November 2009. The UNESCO-NIE Centre for Arts Research in Education, launched in March 2010, also tapped NTU's expertise.

### Youth Olympic Games

Prime Minister Lee Hsien Loong, in his National Day Rally Speech in August 2010, commented that the Youth Olympic Village at NTU was "vibrant and full of life". This was a fitting tribute to the efforts of the Youth Olympic Games Organising Committee and NTU.

In preparation to host the 5,000 young athletes and officials for the Youth Olympic Games from 10 to 26 August 2010, facilities at NTU's Graduate Hall and Halls of Residence were refurbished and upgraded. NTU's Sports & Recreation Centre and National Institute of Education also received a make-over. Renovations were completed ahead of schedule and below budget, and the Games Village was handed over to the organising committee in June 2010.

In a commitment to sustainability, green technologies were implemented for the longer term. Singapore's first eco-bus, GreenLite, was jointly developed by NTU and China's Tsinghua University. It was launched as part of the transportation fleet servicing the international athletes and officials. Over 2,500 NTU staff and students signed up as volunteers and officials. NTU students put up cultural performances at the Youth Olympic Village and produced a daily newspaper for circulation to the athletes and guests.



LIFE@NTU Open House, organised by the NTU Students' Union and Office of Admissions and Financial Aid

## **Governance and Administration**

### **Key Appointments**

Two newly-appointed Associate Provosts, Prof Michael Khor Khiam Aik and Mr Jeffrey Nadison have reinforced the leadership team in Research and Innovation respectively.

Leadership renewal is ongoing for the Colleges. Dean Searches for the Colleges of Business, Science and Engineering in NTU are ongoing, to prepare the way for leadership transitions in these key appointments.

### **Quality Assurance**

As part of the arrangement to grant universities autonomy, the Ministry of Education introduced the Quality Assurance Framework for Universities (QAFU) to enhance the quality of the higher education sector. The first onsite evaluation by the QAFU External Review Panel was conducted

five years ago in 2005. NTU submitted its University Self Assessment Report in June 2010, involving extensive discussions and self-reflection among the University leadership and faculty members.

At the College level, the College of Engineering welcomed its inaugural 13-member Visiting Committee in March 2010. Chaired by Professor Shankar Sastry, Dean of Engineering, University of California, Berkeley, the Committee comprised distinguished academics and practitioners in Engineering from around the world. In its report, the Visiting Committee remarked that the College was performing very well and consistent with the performance level, aspirations and expectations of a top-tier world-class university. It provided recommendations which will help the College of Engineering increase its effectiveness and success in the long term.

### Human Resources Management

The third and fourth Promotion and Tenure (PT3 and PT4) exercises were conducted in AY2009. This is the bedrock for strengthening our faculty. We continue to make improvements to the framework which was first introduced in 2006, to bring the criteria in line with the strategic directions of the University.

The evaluation methodology was adjusted to place equal weight on research and teaching. Teaching was assessed more broadly, to recognise faculty contribution to teaching innovation, course and curriculum development, and other areas. In PT4, emphasis was also placed on involvement in interdisciplinary work and innovation. A total of 52 nominations were considered in PT3, with the success rate for grant of tenure being 58%, consistent with the results of PT1 and PT2.

### Administrative Excellence

Under the Administrative Excellence Programme, the University has embarked on a Business Process Reengineering (BPR) study since March 2010. The scope of the BPR study covers a review of the existing administrative structure and proposals on how the administrative departments can be better organised to support the academic agenda. This study is scheduled for completion by the end of 2010 and will set the course for the next two phases of process design/redesign and implementation.

### Campus Infrastructure and Facilities

In August 2010, the Board of Trustees approved the Campus Masterplan, which outlines the strategic vision for our campus, to guide our investments in infrastructure over the coming decades. The Masterplan is based on the concept of a “campus in a garden” with

natural green corridors and water courses that flow through the different precincts of the campus. Key projects to be implemented in the next few years include the development of a residential campus where the boundaries between study and play, work and leisure, are blurred. NTU seeks to fully meet the chronic demand for housing on campus, and establish a vibrant campus centre to integrate NTU with its neighbouring communities.

The Campus Masterplan also envisions close integration between NTU and the adjacent CleanTech Park, starting with the re-location of the Nanyang Environment and Water Research Institute and Energy Research Institute @ NTU ecosystem there. NTU is making plans to establish the new Medical School facilities at Novena, the Centre for Biomedical Structural Biology at Biopolis, one-north, and have a presence in the Campus for Research Excellence and Technological Enterprise through our collaboration with the Technical University of Munich. We will continue to work with Singapore’s Land Transport Authority on improving accessibility to NTU through a future light rail system that links our Yunnan Garden campus to the public rail network.

Efforts to improve campus facilities for students are ongoing. To enrich the student experience, more common spaces for student interaction are being added. For instance, Learning Commons and Instructional Commons incorporate more comfortable seating, improved lighting, fans and power socket points to make it more conducive for students to gather on campus. The common spaces are designed to encourage group studies and collaborative learning activities.





## **FINDING SOLUTIONS FOR GLOBAL PROBLEMS**

**NTU has stepped up its research intensity across all areas. Our focus on Innovation and Research has sharpened, with a resulting increase in successful translational research projects – especially in the Earth Sciences and Environmental Life Sciences Engineering.**

# RESEARCH

## World-Class Research

NTU has intensified its research effort and substantially increased its research competitiveness. With one of the most highly-cited Engineering colleges in the world, and a globally-acclaimed Business School, NTU has built on its complementary strengths in the Sciences and Humanities to develop exciting, multidisciplinary research with high international impact.

The University is moving rapidly towards worldwide prominence in several emerging fields. It has positioned itself at the forefront of strategic research across multiple disciplines, particularly in the areas of water and environment technologies, clean energy, biomedical structural biology, interactive digital media and earth science. The growing number of our research partnerships and networks are testament to this escalating success.

## Research Centres of Excellence

External competitive research awards to NTU through open grant calls amounted to S\$318.8 million in FY2009. This compares with S\$169.9 million received in FY2008 and S\$273 million in FY2007. The Government grants for the *Earth Observatory of Singapore* in FY2007 and the *Singapore Centre on Environmental Life Sciences Engineering*

(SCELSE) in FY2009 were the most significant milestones of NTU's success in external competitive research grants. SCELSE reaffirms NTU's leadership in the earth sciences and environmental life sciences engineering.

NTU's success in winning key competitive grants stems from the implementation of various initiatives to cultivate research excellence in the University. These include implementing strategic research direction, building up leading research groups and funding research activities in the core strategic areas, introducing research quality drivers in the schools' annual budget process, as well as strengthening the research-innovation nexus.

Other noteworthy successes include our winning three out of six awards in the *Competitive Research Programme* (CRP)'s fourth call for proposals in July 2009. We also won four out of five awards in the scenario-based CRP on Sustainable Urban Solutions worth S\$40 million in the CRP's fifth call for proposals in January 2010. Since the inaugural CRP awards in November 2007, NTU has successfully won 13 CRP grants out of a total of 25 CRP grants awarded nationally. This achievement represents the highest number of CRP grants secured by any single university in Singapore.

**With one of the most-highly cited Engineering colleges in the world, and a globally-acclaimed Business School, NTU has built on its complementary strengths in the Sciences and Humanities to develop exciting, multidisciplinary research with high international impact.**

NTU has also been successful in capturing the lion's share of research funds from the Environmental and Water Industry Development Council (EWI), where researchers from NTU secured two out of three EWI's second Challenge Call for Request-for-Proposals in the area of rapid microbial detection. In January 2010, NTU also won three out of five inaugural Environment Technology and Research Programme grants awarded by the National Environment Agency.

NTU won four out of five grants under the National Research Foundation's third call for proposals for the Research and Development programme on Interactive Digital Media. NTU has also clinched nine out of 17 grants in the Agency for Science, Technology and Research's Public Sector Funding 2009 grant call, demonstrating NTU's firm standing in competing for research grants, especially in the fields of physical sciences and engineering.

#### **Recruitment of Outstanding Scientists**

The University has successfully attracted eminent professors in research areas that place NTU firmly on the world map. NTU has also been doing well in attracting the world's best young scientists from leading universities such as Stanford, Cambridge, Harvard, Oxford and MIT through the *National Research Foundation Fellowship* and its own

*Nanyang Assistant Professorship* programmes.

In 2009 and 2010, 11 National Research Foundation (NRF) Fellows chose NTU as their host institution. This brings the total to 15 out of 28 Fellows since the scheme started in 2007, making NTU the institution with the most NRF Fellows in Singapore.

The prestigious Nanyang Assistant Professorship programme, also introduced in 2007, received more than 500 applications in the 2009-2010 call and six outstanding young researchers received the award. Currently, there are 15 Nanyang Assistant Professors working at NTU.

#### **Scientific Discoveries and Breakthroughs**

NTU's researchers conduct high impact research in a wide range of subjects, including sustainability, water and environmental life sciences and engineering, clean energy, healthcare, neuroscience, bioengineering, structural biology, research relevant to Asian culture and economics, cultural intelligence, and interactive digital media.

NTU's notable research achievements in 2009/2010 include the following:

*Singapore's first hydrogen-electric bus* was launched in July 2010. Jointly developed by researchers from NTU and China's Tsinghua



From state-of-the-art laboratories to world-renowned professors, NTU has a vibrant research culture





GreenLite, the first eco-bus in Singapore, jointly developed by NTU and China's Tsinghua University

University, GreenLite is Singapore's first fuel cell bus which runs on electricity converted from hydrogen and oxygen. GreenLite ferried participants of the Youth Olympic Games within the NTU campus, the site of the Youth Olympic Village in August 2010.

A research team led by Assistant Professor Zbynek Bozdech from the School of Biological Sciences has developed the world's **first in-depth study of the malaria parasite genome**. The team successfully used transcriptional profiling to uncover hitherto unknown gene expression (activity) patterns in malaria, paving the way for future development of more potent drugs and vaccines for malaria.

Assistant Professor Brendan Orner led a research group from the School of Physical &

Mathematical Sciences in discovering **significant findings about protein architecture**. The group gained key insights into the architecture of a protein that controls iron levels in almost all organisms. This breakthrough may aid in drug design and generation of unique nanomaterials with applications beyond medicine. The study was named Paper of the Week in the 9 April 2010 issue of the Journal of Biological Chemistry, putting it in the top one percent of papers reviewed by the editorial board in terms of significance and overall importance.

NTU's eco-car, Nanyang Venture III, clinched the Solar Grand Prize which made it the **best solar-powered car** at the inaugural Shell Eco-Marathon in Asia 2010. NTU's entry was ranked 14th out of 29 entries in the Prototype category at the event held in July 2010 at the



**Left:** Nanyang Venture III, NTU's solar-powered car which won the Solar Grand Prize at the first Shell Eco-Marathon in Asia **Right:** Something to smile about – Singapore's fastest satellite Internet connection through this Very Small Aperture Terminal (VSAT)

Sepang International Circuit in Kuala Lumpur, Malaysia. Improved aerodynamic features and solar power-capturing ability, together with its lightweight carbon fibre honeycomb composite shell, helped Nanyang Venture III achieve a maximum energy efficiency of 316.1 km per kilowatt hour at the competition, a marked improvement from the 108 km per kilowatt hour achieved by Nanyang Venture I at the Shell Eco-Marathon Europe, held in Germany in May 2009.

A team led by Assistant Professor Lee Yee Hui from the School of Electrical and Electronic Engineering is collaborating with the Japan Aerospace eXploration Agency and the National Institute of Information and Communications Technology to predict and improve the robustness of high speed satellite communication links. Using a Very Small

Aperture Terminal (VSAT), which is a portable two-way satellite ground station with a dish antenna measuring only 1.2 metres in diameter, the research team was able to leverage what is possibly the **fastest satellite Internet connection** in Singapore, and possibly in the world. This was delivered through a Wideband Inter Networking engineering test and Demonstration Satellite (WINDS), giving connectivity of up to 155Mbps (megabits per second).

#### **NTU's Five Peaks of Excellence**

Under the NTU 2015 Strategy, NTU characterises its key strengths into five interdisciplinary Peaks of Excellence: Sustainable Earth, Future Healthcare, New Media, New Silk Road and Innovation Asia. To ensure our research reinforces the national and regional strategic thrusts, the University is prioritising and

galvanising its resources in areas in which we have particular strengths, and which are in alignment with the national strategic thrusts. As a start, we have focused our research efforts on sustainability initiatives, future healthcare and new media developments.

### New Pan-University Research Institutes

New pan-university research institutes have been established to drive these research directions:

Officially opened in February 2009, the **Earth Observatory of Singapore** (EOS) is NTU's first Research Centre of Excellence for earth sciences. Led by the world's foremost expert in earthquake geology Professor Kerry Sieh, EOS represents the flagship of NTU's interdisciplinary approach, and a major step forward in securing NTU's position as a world-class research-intensive university. EOS was funded S\$150 million over 10 years by the National Research Foundation (NRF) and Ministry of Education (MOE).

The **Singapore Centre on Environmental Life Sciences Engineering** (SCElse) at NTU is designed as a catalytic platform to synergise research on environmental life sciences and engineering. A joint research effort by NTU and National University of Singapore, SCElse is supported by S\$120 million funding from NRF and MOE. The Research Centre of Excellence aims to be one of the world's leading centres in biofilm research. SCElse will be helmed by Professor Staffan Kjelleberg, founder of the Centre for Marine Bio-Innovation at the University of New South Wales, and a research leader at NTU since late 2008.

The **Nanyang Environment and Water Research Institute** (NEWRI) provides an ecosystem sustaining a diverse range of environmental and water technology research, including work

on membrane technology, reclamation and remediation, bioreactors, sensor technology and photocatalysis. The NEWRI ecosystem offers a contiguous value chain presenting a multidisciplinary system of research, translation, development and application that enables close collaborations between academia and industry.

NEWRI's key research domains in environmental science and engineering are represented by the core interests and activities of its members which include five core centres: Residues and Resource Reclamation Centre, Singapore Membrane Technology Centre, DHI-NTU Water and Environment Research Centre, LIEN Institute for the Environment and Institute of Environmental Science and Engineering. A Master's programme in Environmental Science and Engineering is part of the ecosystem.

The **Institute of Catastrophe Risk Management** (ICRM) was launched in January 2010 to help the international community better understand the characteristics of risks related to natural disasters such as earthquakes, tsunamis, typhoons, volcanic eruptions, floods, droughts, as well as non-traditional risks including infectious diseases and terrorism. It is the first multidisciplinary catastrophe risk management research institute of its kind in Asia. The ICRM contributes towards an open worldwide standard for calculating and communicating risks associated with earthquakes, typhoons, and floods as well as possible amplification of such risks through climate change.

The **Energy Research Institute at NTU** (ERI@N) was officially launched in June 2009. It builds and develops core capabilities in clean and sustainable energy technologies and provides technical leadership to industry through collaborative R&D efforts. NTU has cemented important tie-ups with several leading industry



**From left to right:** Prof Anthony Fane, Director of Singapore Membrane Technology Centre; Dr Ole Larsen, Co-Director of the DHI-NTU Centre; Dr Su Guanng, President of NTU; Guest-of-Honour Mr Tan Yong Soon, Permanent Secretary of Ministry of the Environment and Water Resources (now Permanent Secretary, National Climate Change, Prime Minister's Office); Prof Ng Wun Jern, Executive Director of Nanyang Environment and Water Research Institute (NEWRI); Prof Tan Soon Keat, Deputy Executive Director of NEWRI; and Prof Wang Jing Yuan, Co-Director, Residues and Resource Reclamation Centre; at the official launch of NEWRI research centres

players such as Rolls-Royce, Bosch, and Vestas in addition to collaborating with renowned universities such as the University of California, Berkeley, Swiss Federal Institute of Technology Zürich, Imperial College London, University of New South Wales, Technical University of München, and institutes in Saudi Arabia.

NTU consolidates its research excellence in the area of biosciences through the establishment of the **Biomedical Structural Biology Laboratory**. The Laboratory, which is affiliated with NTU's School of Biological Sciences, is located at the Institute of Molecular and Cell Biology at the Biopolis, one-north. It is led by Professor Pär Nordlund, one of Europe's leading experts in this field, from the Karolinska Institutet. The

laboratory includes state-of-the-art Protein Production Platform to facilitate high throughput protein production, biophysical and biochemical characterisation, as well as crystallisation.

NTU's **Nanyang Institute of Technology in Healthcare and Medicine** (NITHM) synergises the various biomedical and bioengineering-related research and development activities within NTU. A joint PhD agreement between NTU and Imperial College London will be a core element to facilitate the collaboration in biomedical and bioengineering research both within NTU and between the two universities. NITHM will also coordinate the international collaborations in this area between NTU and University of California, San Diego, University



Prof Bertil Andersson (left), NTU Provost, and Guest-of-Honour Mr S Iswaran (right), Senior Minister of State, Ministry of Trade and Industry and Ministry of Education, at the official launch of the Energy Research Institute at NTU (ERI@N)

of California, Berkeley, Stanford University and Karolinska Institutet.

NTU, through the creation of its *Institute for Media Innovation* (IMI), has developed an interactive platform to bring together the various interactive digital media-related research activities within NTU. The interdisciplinary approach is at the core of the IMI philosophy, maximising opportunities for research and education at the disciplinary interfaces. The institute is led by Professor Nadia Thalmann, an internationally recognised authority on virtual reality research who founded the renowned MIRALab in University of Geneva.

### Enhancing Research Quality and Integrity

The University is committed to employing the best international practices to achieve research standards that are comparable to leading universities. NTU continues to emphasise the highest standard of research integrity among its research community. Among the measures taken to raise the standards of NTU's research quality and integrity are the establishment of the NTU Research Council, a comprehensive review of inter-school research centres and the use of research-quality drivers for budget allocations.

### Raising the Bar

The NTU Research Council, an external peer review panel chaired by Professor Bengt Nordén from Chalmers University of Technology, Sweden, continues to play a key role in helping NTU evaluate and shortlist the research proposals to maximise success. The rigorous process is effective in identifying proposals with the highest research quality. The panel also acts as the selection body for the finalists of the Nanyang Assistant Professorship scheme.

A comprehensive review of NTU's inter-school research centres by renowned international experts commenced in mid-2009 and was completed in March 2010. The objective of the review was to ascertain the international competitiveness and viability of the centres. Based on feedback from the experts, the research centres will re-align their research areas and activities with NTU's current strategic research presence.

NTU will also employ the points recorded in the review exercise in allocating funds to research centres. The University continuously encourages its faculty to produce high quality research by employing research-quality drivers for annual Core Budget allocation to schools.

NTU is committed to inculcating the responsible conduct of research across the University. A new set of policies and procedures on the conduct of research has been placed on the University's website. NTU has also continuously raised research integrity through the setting up of a new Institutional Review Board in April 2009. The Board is chaired by Professor Lee Sing Kong, Director of the National Institute of Education, who also holds the appointment of Chairperson of the Genetic Modification Advisory Committee.

NTU successfully led a consortium in Singapore which included the National University of Singapore, Singapore Management University and Agency for Science, Technology and Research, to host the *Second World Conference on Research Integrity* in Singapore in July 2010. More than 340 participants from 51 countries attended this important event. The key outcome is the Singapore Statement on Research Integrity, which establishes uniform agreement on the fundamental principles that should inform all research.



Technion  
Live





## **BUILDING BRIDGES FOR INTERNATIONAL COOPERATION**

**NTU has strengthened its global network by establishing new strategic alliances with local and international partners. These collaborations enable the University to explore and develop new research and academic initiatives to implement its NTU 2015 strategy.**

# STRATEGIC ALLIANCES

## International Partnerships

In the year under review, NTU has strengthened its global network by establishing new strategic alliances with local and international partners. These partnerships enable the University to explore and develop new research and academic initiatives to support its multidisciplinary thrust enshrined in its NTU 2015 strategy. We are proud to contribute to global developments in research and education through our extensive international network of partners.

The *Global Alliance of Technological Universities* (GlobalTech) held its Steering Committee Meeting and First Workshop on Sustainable Urban Solutions in May 2010. Dr Su Guaning, President of NTU, was re-elected as Chairman of GlobalTech for a second tenure.

Formed in Singapore in April 2009, GlobalTech brings together leading engineering-based universities to address global issues through joint development of technological solutions. Members of GlobalTech include the California Institute of Technology and Georgia Institute of Technology in the United States, Imperial College London and Eidgenössische Technische Hochschule Zürich (The Swiss Federal Institute of Technology Zurich, or Zurich ETH) in Europe,

and the Indian Institute of Technology Bombay (IITB), Nanyang Technological University (NTU), and Shanghai Jiao Tong University (SJTU) in Asia.

## Europe

NTU and *Imperial College London* took their long-standing partnership in education a step further, with the signing of an implementation agreement in November 2009. A series of landmark joint doctoral programmes in engineering and science was launched.

The academic alliance was first announced in April 2009, marking the first time both Imperial College and NTU were offering a joint PhD programme with a partner university. NTU and Imperial College will offer PhD degrees initially in the subjects of Bioengineering, Chemical Engineering and Chemical Technology, and Chemical and Biomolecular Engineering.

Conducted on a full-time basis over four years, the Joint PhD Programme will eventually be extended to other engineering and science disciplines. Successful candidates will receive a PhD degree awarded under the seals of both NTU and Imperial College, after spending two years at each institution. Up to 10 students will be accepted from each university every academic year.

## These partnerships enable the University to explore and develop new research and academic initiatives to support its multidisciplinary thrust enshrined in its NTU 2015 strategy.

NTU signed a new agreement with **Technical University of Munich (TUM)**, Germany in August 2009, which will enable both institutions to jointly offer PhD programmes. As a start, NTU and TUM have initiated a joint PhD programme in Electrical and Electronic Engineering with a focus on Integrated Circuit Design, Microelectronics and Nanoelectronics. Successful candidates of the four-year programme will receive a joint PhD degree issued by TUM and NTU. Candidates will benefit from the strong support that TUM has with the German industry and the scholarships and internships offered by leading German companies. NTU and TUM have three existing joint Master of Science programmes in Integrated Circuit Design (July 2005), Microelectronics (July 2007) and Aerospace (August 2009). Faculty members at both universities have also held joint research workshops in Singapore (September 2008) and Munich (April 2009).

On the research front, NTU has partnered with TUM in the TUM-Campus for Research Excellence and Technological Enterprise (CREATE) in Singapore to drive research on electric cars. CREATE is a programme by Singapore's National Research Foundation that attracts prestigious international research universities to set up world-class research centres in Singapore in collaboration with

Singapore-based universities and research institutions. The TUM-CREATE Centre on Electromobility in Megacities will lead research in electric vehicle solutions for tropical climates.

In August 2009, NTU and British engineering firm **Rolls-Royce** signed a five-year engineering-research agreement. Under the partnership, Rolls-Royce and NTU researchers will jointly conduct research in areas such as process technology, computational engineering and power electronics. Apart from research and development, the collaboration will also help to develop a pool of researchers for the industry. Students involved in the joint research projects stand to benefit from employment opportunities with Rolls-Royce.

In September 2009, NTU launched a joint PhD programme in Biomedical Science with Sweden's **Karolinska Institutet (KI)**, one of Europe's largest medical universities. The collaboration is a milestone, as it is NTU's first joint PhD programme in Biomedical Science. The agreement with KI will see up to four places offered to students from both universities at the start of each academic year, for the next five years. Successful candidates of the four-year programme will receive separate PhD degrees issued under the seal of KI and NTU. The degree certificates will state that the degrees



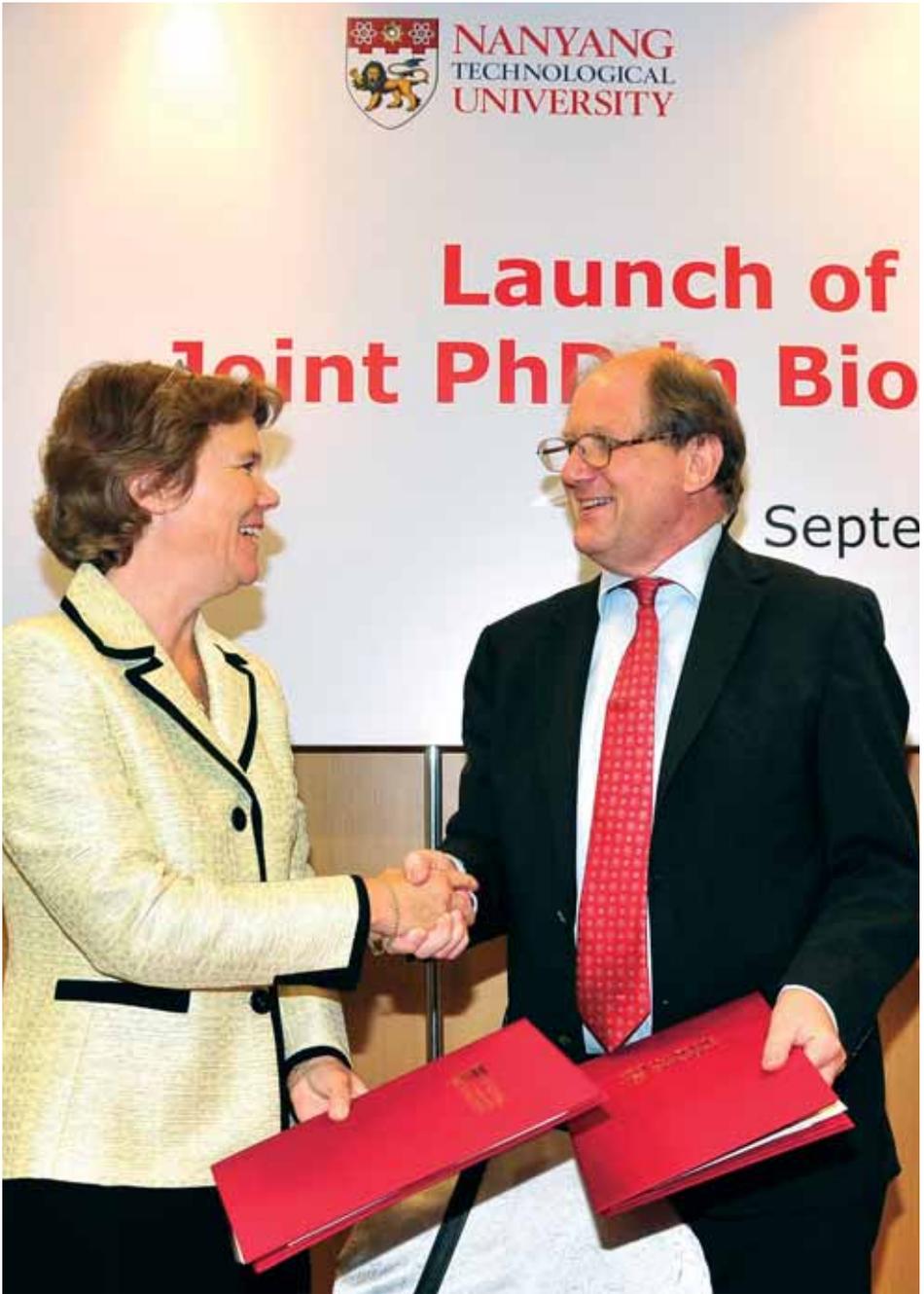
Dr Su Guaning (left), President of NTU and Dr Wolfgang Herrmann (right), President of Technical University of Munich, seal an agreement to offer joint PhD programmes

were awarded within a joint PhD programme between KI and NTU. The collaboration will build on and strengthen existing research projects between KI and NTU professors, foster collaborations that capitalise on KI's strength in translational research, and expose students to cutting-edge bioscience investigations aimed at improving the health of people.

NTU sealed an alliance with the *Centre National de la Recherche Scientifique* (CNRS or National Center for Scientific Research), the largest government-funded research organisation in France, and *Thales*, the France-based technology group which specialises in aerospace, defence, security and transportation industries. The tripartite collaboration, CNRS International-NTU-Thales Research Alliance (CINTRA), across different sectors is designed

to harness the combined strengths of the organisations. The partnership of academic research, fundamental research and applied research provides a strong support network to engineer breakthroughs in innovation and transfer these innovations to the market.

A state-of-the-art nanotechnology laboratory has been set up at the Research TechnoPlaza located at NTU's Yunnan Garden Campus. The CINTRA Laboratory, which opened in October 2009, seeks to tap the latest developments in science and technology to develop nanotechnology innovation for defence and commercial applications. For a start, researchers at CINTRA will attempt to develop solutions to ease bottlenecks faced by existing technologies in microelectronic and photonic industries. The collaboration will



Prof Harriet Wallberg-Henriksson (left), President of Karolinska Institutet, and Prof Bertil Andersson (right), Provost of NTU, seal the partnership to offer a joint PhD programme in Biomedical Sciences

offer opportunities for postgraduate students and research staff to take part in exchange programmes in France and Singapore.

NTU joined forces with Sweden's *Linköping University* and the *Austrian Institute of Technology* in September 2009 to establish the Centre for Biomimetic Sensor Science, dedicated to research on biosensing technology. The aim is to help with the diagnostics and identification of diseases and toxic agents in the environment, through the development of systems that mimic cells. The creation of "artificial noses" or "artificial tongues" has potential applications in biomedical research, food production and homeland safety. Plans to forge strategic partnerships with biomedical companies and medical institutions to develop commercially viable biosensing applications are in the works.

In October 2009, NTU forged a new agreement with *University of Warwick*, UK, to set up a collaborative programme of neuroscience research. The programme aims to accelerate the development of neuroscience research at both universities, promote joint ventures and access to mutual resources, establish collaborative links to other neuroscience research programmes based at Biopolis, Singapore, and enhance opportunities to participate in and benefit from the expanding neuroscience research partnership in Singapore.

On the education front, NTU has also launched a new Double Masters Programme in International Studies with the University of Warwick which will capitalise on the strengths of the S Rajaratnam School of International Studies at NTU and the Department of Politics and International Studies at Warwick to address the importance of multiple and cross-disciplinary approaches to global issues.

The programme will equip professionals from both private sector and public office with the knowledge to understand and appreciate the dynamics and trajectory of contemporary political developments.

The *European Aeronautic Defence and Space Company* (EADS) and Singapore's *Economic Development Board* (EDB) committed to sponsoring six PhD students under the new EDB Joint Industry Postgraduate Programme agreement, signed in October 2009 with NTU and National University of Singapore (NUS). The agreement extends EADS's existing research partnerships with NTU and NUS, and seeks to develop talent for the aerospace industry. The six students will be employed by EADS Innovation Works, the company's research centre in Singapore, for three years. Jointly supervised by university professors and researchers from EADS, students will focus on topics such as electro-magnetics, signal processing, data stream mining and reconfigurable real-time embedded systems.

In March 2010, NTU formalised a partnership with Norway's *Det Norske Veritas* (DNV) to collaborate in joint research and development in clean energy and environmental technologies. The agreement was inked between NTU's Energy Research Institute (ERI@N) and DNV, a global risk management and sustainability service provider with over 40 years' presence in Singapore. Under the agreement, NTU will work with DNV in innovation and incubation activities to test-bed, benchmark, develop rules and standards, and recommend best practices in the clean energy domain. In addition, ERI@N and DNV will explore the setting up of joint laboratory facilities.

NTU is the first Asian partner of Europe's largest research institution for applied research in computer graphics, *Fraunhofer-Gesellschaft*,

Germany. In May 2010, NTU and the Germany-based company jointly established the Fraunhofer Interactive Digital Media (IDM) Institute @ NTU. The Fraunhofer Institute for Computer Graphics Research will work directly with the new institute to focus on computer graphics, computer vision, virtual reality and augmented reality. The institute will also collaborate with German industry partners, such as Lufthansa, Siemens and Daimler, which are directly involved in the Board of Fraunhofer. Fraunhofer IDM @ NTU is part of the international network of interactive digital media institutions established with the support of the Singapore Government. Other organisations in this network include the Singapore-MIT GAMBIT Game Lab, the China-Singapore Institute of Digital Media and Keio-NUS Connective Ubiquitous Technology for Embodiments Centre.

In June 2010, NTU's ERI@N signed partnership agreements with six leading universities in Europe to conduct joint research in clean technology and environmental sustainability. NTU will work with the *University of Cambridge*, UK; *Imperial College London*, UK; *Technical University of Munich*, Germany; *Norwegian University of Science and Technology*, Norway; *Austrian Institute of Technology*, Austria, and *Swiss Federal Institute of Technology* in Lausanne, Switzerland, to seek resource capabilities for the clean energy industry. In addition, ERI@N has forged partnerships with leading industry players, including *Robert Bosch* and *Vestas*.

The Singapore Government has committed close to S\$700 million to build a clean technology ecosystem over five years, as part of the national strategic plan to become a global research and development hub. By 2015, the cleantech industry is expected to contribute

S\$3.4 billion to Singapore's gross domestic product and create up to 18,000 jobs. ERI@N has secured S\$200 million in funding to advance research aimed at improving the efficiency of current energy systems and developing alternative energy sources. The official launch of ERI@N in June 2010 was supported by Singapore's Economic Development Board, National Research Foundation, Agency for Science, Technology and Research, Maritime and Port Authority of Singapore, and other national agencies.

NTU's Nanyang Business School and Ireland's *University College Cork* (UCC) established the Farnleigh Fellowship programme in June 2010. The programme aims to groom future generations of Irish business leaders for leadership positions in Asia. It seeks to provide Irish graduates with a better understanding of the dynamic Asian region, both in terms of learning the culture and doing business in Asia. UCC's School of Asian Studies and Faculty of Commerce will run the programme, in collaboration with Nanyang Business School and supported by over 70 Irish-owned businesses operating in Singapore. Participants will have the opportunity to study in Singapore and work in Asia over 12 months.

NTU and Finland's *Kemira Oyj* kick-started a two-year project on water treatment and purification technologies in June 2010, through NTU's Singapore Membrane Technology Centre. Kemira Oyj is a global water chemicals company with operations in 40 countries and track record in water technology and management. The key focus of the project is to design more efficient and cost-effective water production processes with higher recovery rates, lower energy consumption and less waste volume. More than 70 international water companies base their regional



**From left to right:** Prof Eugene Levy, Provost of Rice University; Dr Su Guanng, President of NTU; and Prof Bertil Andersson, Provost of NTU, agree to jointly establish the Institute of Sustainable and Applied Infodynamics in Singapore

headquarters, manufacturing and research and development activities in Singapore.

**Americas**

In collaboration with *Rice University*, USA, NTU set up the Institute of Sustainable and Applied Infodynamics in January 2010. The institute will work to create new systems and technologies that will transform, transmit and communicate information in pioneering ways. Following the successful partnership between NTU and Rice University in the joint Institute for Sustainable Nanoelectronics established in 2007, the focus on information and communication technologies has expanded into new opportunities for research and development. Researchers will draw upon a multidisciplinary range of expertise in nanochemistry,

neuroscience, signal processing, logic, probability, complexity and dynamical systems.

In a first for NTU's College of Engineering, a dual PhD degree programme was established between NTU and *Carnegie Mellon University* (CMU), USA. The NTU-CMU Dual PhD Degree Programme in Engineering will enable successful candidates to earn two PhD degrees, one from each university. Students enrolled in the programme will spend two years at NTU and another two years at CMU, immersed in Robotics and Intelligent Systems research and engineering. The programme is designed to tap on CMU's established reputation for developing innovative technologies in machine intelligence, and encourage entrepreneurial learning outcomes in NTU's academic landscape.

Robotics solutions have revolutionised manufacturing processes and will improve productivity across sectors such as healthcare, transportation and logistics. The dual PhD programme with CMU was inked in March 2010, following the success of the joint doctoral degree programmes with Imperial College London, Technical University of Munich and Karolinska Institutet. NTU also offers, in collaboration with CMU, the Nanyang Master of Science in Financial Engineering programme, which was started in 1999. This programme combines technical and conceptual advances in Computer Science, Mathematics and Finance, and has graduated more than 200 executives from around the world.

In March 2010, NTU and US-based **National Instruments** (NI) jointly launched the NTU-NI Wireless Research Programme. The programme aims to develop future wireless communication technologies which are not only faster and cheaper, but also more reliable and pervasive than current technologies. Under the agreement, NI will provide S\$2.07 million of equipment to be installed at the Positioning and Wireless Technology Centre at NTU's School of Electrical and Electronic Engineering. Researchers will use the equipment to study the practicality and performance of various wireless techniques to relay radio signals and scan for available gaps in airwaves without interfering with incumbent users.

In April 2010, NTU jointly launched a programme in Leadership and Innovation in Science and Technology with the Rady School of Management at the **University of California, San Diego**, USA. Offered by the Nanyang Business School, the executive programme seeks to equip scientists and technological innovators with the management and leadership skills to enable them to

commercialise their innovations. Participants are trained to identify and qualify a scalable and sustainable business opportunity using a business presentation plan to be evaluated by venture capitalists based in San Diego.

Leveraging its High Performance Computing Centre, NTU will collaborate with US-based technology group **IBM** on developing a platform for the convergence of cloud computing and high performance computing. In an agreement signed in May 2010, NTU and IBM reaffirmed their commitment to work together in seeking solutions for commercial adoption. NTU's High Performance Computing Centre houses one of the fastest supercomputers in the region. As a start, the collaboration will focus on the areas of Interactive Digital Media and Business Analytics.

NTU and IBM also extended their partnership in the Service Science, Management and Engineering (SSME) programme. The multidisciplinary academic curriculum is designed to nurture specialised human resource personnel with the combined business, technology and social science expertise for the services industry, and was first introduced in 2007. Under the new agreement, industry partners will offer jobs and internships to SSME graduates and students, and provide case studies for projects. NTU offers two Master's programmes related to SSME – the Master of Science in Systems and Project Management, offered by the School of Mechanical and Aerospace Engineering, and the Master of Science in Information Systems, jointly offered by the Wee Kim Wee School of Communication and Information and the School of Computer Engineering.

#### Asia and Oceania

NTU has teamed up with the **Indian Institute of Technology Bombay**, India to launch a joint



Prof Ng Wun Jern (left), Executive Director of Nanyang Environment and Water Research Institute (NEWRI) at NTU, and Prof Peter Steinberg (right), Director, Centre for Marine Bio-Innovation at University of New South Wales, at the official launch of the Advanced Environmental Biotechnology Centre at NTU

Master's degree programme in Infrastructure Engineering and Management in October 2009. The multidisciplinary programme includes modules on all modes of transport infrastructure systems (land, air and sea), urban infrastructure system planning, as well as design of industrial parks and residential estates, water supply and wastewater systems. Telecommunications and power supply networks will also be covered. Industry professionals will be invited to present and discuss case studies of actual infrastructure projects with students. Offered by NTU's School of Civil and Environmental Engineering, the programme will commence in August 2010. It is targeted to meet the growing need for engineers with technical expertise and management skills in the fast-expanding infrastructure sector.

In January 2010, NTU sealed a partnership with **Vietnam-Singapore Industrial Park (VSIP) Hai Phong** to collaborate in research, education and feasibility studies. VSIP Hai Phong is a commercial joint venture headed by Becamex IDC Corporation, a state-owned enterprise in Binh Duong, Vietnam; and a Singapore consortium led by Sembcorp Industries' industrial parks business unit. The collaborative research will be located at a 1,600-hectare industrial park located in Hai Phong, Vietnam. The strategic partnership will be spearheaded by NTU's Nanyang Environment and Water Research Institute (NEWRI) and VSIP. Areas of possible collaboration include Environmental Impact Assessment and the development of the VSIP, scenario analysis, water supply, wastewater

management, solid waste management, and education and training.

NTU collaborated with Australia's **University of New South Wales** (UNSW) to set up the Advanced Environmental Biotechnology Centre (AEBC) in May 2010. Supported by Singapore's Economic Development Board and the Environment & Water Industry Programme Office, the Centre will conduct research in environmental biotechnology, bioprocess development and engineering, and marine processes and health. Drawing on technology-based bioprocess expertise at NTU and UNSW's strength in microbial and marine ecology, AEBC aims to tackle issues related to water production, purification and reclamation, and to reduce the cost, time and energy used in these processes. AEBC will also develop monitoring capabilities, sensor systems and management programmes to safeguard Singapore's coastal waters, as these have an impact on desalination, shipping, recreation and food resources.

AEBC is the latest facility to be launched under Nanyang Environment and Water Research Institute (NEWRI) which was established by NTU in 2007. Besides research activities, AEBC will develop collaborative programmes with other NEWRI centres and industry partners, and participate in NTU's postgraduate education. The Centre plans to train 26 graduate students for the water industry by 2015.

### Middle East

In November 2009, four universities from Turkey signed agreements to cooperate with NTU on research and education. **Istanbul Technical University, Istanbul University, Middle East Technical University** and **Yildiz Technical University** were part of the visiting delegation by Turkey's Council of Higher Education. The agreements are aimed at

promoting collaboration in joint research activities, including the supervision of PhD students and the organisation of joint workshops. To enhance learning and research opportunities, the universities will work to improve information exchange through research publications and library materials.

NTU and **Technion-Israel Institute of Technology**, Israel, agreed to launch a joint PhD programme in Materials Science and Bioengineering, commencing in January 2011. The agreement, inked in June 2010, extends to projects related to the NTU-Technion research programme funded by Singapore's National Research Foundation, under the Regenerative Medicine Initiative in Cardiac Restoration Therapy, as part of the Campus for Research Excellence and Technological Enterprise. The initiative aims to address the clinical need for cardiac restoration therapy using a tissue-engineering based approach.

NTU and Technion have also forged an agreement to increase the level of exchanges between the two universities that will see each University taking in and funding up to two post-doctoral fellows and up to five PhD students a year. Students will be co-supervised by faculty members from both institutions and have the opportunity to spend time at the host institution. Successful PhD candidates will be jointly issued a PhD degree under the seals of Technion and NTU.

### Local partnerships

NTU teamed up with **Temasek Foundation** to bring seismic-resistant construction technologies to earthquake-prone regions in China. The project, launched in August 2009, aims to promote safer construction practices and enhance the skills of those involved in the construction industry in China. The

programme is implemented by NTU's *Lien Institute for the Environment* (LIFE) in Sichuan, Hebei, Liaoning, Jiangsu, Sha'anxi and Yunnan. In particular, the joint initiative will target school buildings which will be strengthened and used as training facilities to showcase good construction practices. The team from Singapore will also work with local universities and authorities to train and equip local masons with cost-effective techniques to strengthen buildings. This collaboration follows on the success of a similar training programme in Indonesia in 2008.

The *Land Transport Authority* (LTA) signed a cooperation pact with NTU in August 2009, as part of the LTA's Singapore Urban Transport Solution programme. Under the agreement, NTU and China's *Tsinghua University* successfully developed Singapore's first fuel-cell bus, GreenLite, which was launched in July 2010. The eco-friendly bus runs on electricity converted from hydrogen. The project also involved SBS Transit and China's Higer Bus Company. In line with NTU's key thrust on sustainability research and development, NTU is also developing an advanced traffic-driving simulator to provide real-time traffic information to drivers. The simulator will enable LTA to test the responses of drivers in different scenarios, such as lane-changing, fire emergency evacuation and traffic congestion.

The *Ministry of Defence* (MINDEF) extended its long-standing partnership with NTU in October 2009, with the launch of the Temasek Research Fellowship and Nanyang-DSO Post-Doctoral Fellowship. Aimed at attracting outstanding young graduate researchers to the defence industry, the three-year Temasek Research Fellowship will enable candidates to conduct defence science and technology research as principal investigators at the Temasek

Laboratories @ NTU and other research centres at NTU. The Nanyang-DSO Post-Doctoral Fellowship is an exclusive two-year scheme between NTU and MINDEF's DSO National Laboratories.

In December 2009, NTU and Singapore's *Economic Development Board* launched the new Integrated Circuit Design Centre of Excellence, VIRTUS ("excellence" in Latin). The S\$50 million facility will develop key technologies required to design integrated circuits and systems for applications in medical technology, clean technology and consumer electronics. Apart from its primary focus in design, innovation and enterprise, VIRTUS is committed to train more than 100 postgraduate students and researchers over the next five years. VIRTUS will collaborate with other universities, research institutions and corporations in research and development. Among its key partners is *Agilent Technologies*, which specialises in communications, electronics, life sciences and chemical analysis. Agilent will contribute S\$28 million of simulation software to VIRTUS.

In collaboration with the *Maritime and Port Authority of Singapore* (MPA), NTU launched the new Maritime Clean Energy Research Programme in February 2010. The programme will focus on research platforms that promote green, carbon-neutral, energy management solutions. The research will be conducted through NTU's Centre for Maritime Energy Research and leverage activities within other research centres in the Energy Research Institute at NTU (ERI@N). Funding will come from MPA's Maritime Innovation and Technology Fund and NTU, with research grants of up to S\$10 million committed over a five-year period. Industry partners American Bureau of Shipping, APL, DNV, Keppel Offshore

and Marine Technology Centre and Sembcorp Marine have expressed intent to explore collaborations with NTU.

The Singapore Centre on Environmental Life Sciences Engineering (SCELSE), established in February 2010, is the latest collaboration between NTU and the **National University of Singapore** (NUS). Located at NTU, the fifth Research Centre of Excellence supported by Singapore's National Research Foundation and Ministry of Education, will receive S\$120 million in state funding over 10 years to conduct micro-organism research. NTU and NUS will also provide contributions of S\$62 million and S\$24 million respectively to the Centre. Researchers, led by NTU's Professor Staffan Kjelleberg, will focus on microbial biofilm communities, with the purpose of harnessing their powers for water and environmental sustainability. As a start, the centre will study biofilms for cleaning up pollutants or contaminants, as well as for use in wastewater treatment and in getting rid of unwanted bacterial growth on water-treatment membranes. SCELSE aims to train some 100 graduate students and 40 post-doctoral fellows within the first 10 years.

NTU is working together with **DPS Engineering (Singapore)**, an engineering consultancy firm, to jointly develop an innovative online learning platform for the biomedical manufacturing industry. Under an agreement signed in March 2010, DPS will develop the interactive online learning programmes and convert them into the Chinese language. The training modules will be presented on an innovative technology platform developed by NTU's Centre for Excellence in Learning and Teaching. For a more engaging and interactive experience, DPS will also collaborate with NTU's Centre for Advanced Media Technology-Fraunhofer to embed the

programmes with technology innovations that will enhance learning outcomes.

The public-private collaboration is set to transform the continuing education and training of biomedical and pharmaceutical professionals and skilled workers in Singapore and Asia. By converting the training programmes into Chinese, Singapore-based biomedical companies stand to gain a competitive advantage, enabling them to expand into the fast-growing healthcare markets in China and the rest of Asia.

In June 2010, **Singapore Table Tennis Association** (STTA) formalised a partnership with NTU to provide more educational opportunities for promising sports talent in table tennis. To support excellence in the sporting arena, STTA will identify talented sports men and women who have made significant contributions at the national level. Under the agreement, earmarked candidates will have their admissions applications assessed with a degree of flexibility and discretion. To be considered for admission to NTU, applicants must have a recognised polytechnic diploma or Singapore Sports School certificate. Student athletes who meet the prerequisites will be able to select from a wide range of courses at NTU.





## REACHING OUT FOR THE STARS

NTU is proud of its strong sporting culture and vibrant student life. Many of our students live, work and play within the lush, sprawling grounds of our Yunnan Garden Campus – the largest residential campus in Singapore. Enriching the student experience is a key thrust of the NTU 2015 plan.

# STUDENT & FACULTY ACHIEVEMENTS

## Student Highlights

In line with the recommendations of the Blue Ribbon Commission on undergraduate education, NTU aims to provide a broad learning experience for its students. With the largest residential campus in Singapore, many of our students live, study and play within the lush, sprawling grounds of our Yunnan Garden Campus. Undergraduates and graduates are spoilt for choice. Some 113 student clubs cater to the sporting and recreation needs of the student community.

## Sporting Achievements

At the *Institute-Varsity-Polytechnic Games* held in January 2010, NTU emerged victorious. NTU students won five of the 17 available championship titles. Our athletes in table tennis, badminton, floorball and netball won gold. More than just trophies and medals, students' active participation is testament to the University's robust sporting culture. With over 300 students participating in the Games, NTU fielded representatives in all the sporting events. All the teams, except two, finished within the top four places. Through sports,

participants and supporters forge lasting relationships that are an integral part of their student experience.

NTU's cheerleading group, ACES, continues to shine. At the inaugural *National Cheerleading Competition* in March 2010, NTU ACES Team Gold took the championship title jointly with the Ulu Pandan Wildcards. This marks the fifth consecutive year that NTU has clinched the top spot in the national cheerleading competition, which until 2009, had been known as National Cheerobics Championships. Giving more reason to cheer was the fact that the second runners-up were NTU ACES Team Blue. With their stunning performance, NTU ACES Team Gold was given the honour to represent Singapore in an international cheerleading competition held in Japan in May 2010, where it was placed fourth.

First-year undergraduates Cheryl Lim and Crystal Wee were awarded the *Adam Scott Foundation Asia Scholarships*. The two student athletes were part of the pioneer class in NTU's new Bachelor of Science in Sport Science



NTU supporters have much to cheer about – the spirit of sportsmanship is nurtured in over a hundred clubs on campus that cater to students' sporting and recreation activities

and Management programme conducted by the National Institute of Education. The direct-honours degree programme is the first of its kind to be offered by a publicly-funded university in Singapore.

NTU student debaters staked their place among the region's best, putting in admirable performances in two major debating championships. The NTU team of debaters emerged as first runners-up for the second consecutive year. As well, NTU undergraduate Satya Venugopal was named Best Speaker among 276 debaters at the *United Asian Debating Championship 2010*, the largest inter-varsity parliamentary debate tournament in Asia. The panel of judges also selected Satya as Deputy Chief Adjudicator for the following year's tournament.

### Student-led Initiatives

NTU's eco-car, Nanyang Venture III, won the Solar Grand Prize at the inaugural *Shell Eco-Marathon Asia*. Designed and built by students from the School of Mechanical and Aerospace Engineering and School of Electrical and Electronic Engineering, the car draws power from the sun, a renewable energy source. An earlier prototype, Nanyang Venture II, had scored at the World Solar Challenge in Australia in 2009, which saw cars travelling 3,000 km through difficult terrain. NTU's entry was the sole representative from Singapore.

NTU students participated in numerous student-led initiatives to help the less fortunate around the world. A few highlights from this year included the Students' Union and the NTU Red Cross Society jointly-organised



**Top:** NTU men's basketball team playing against Ngee Ann Polytechnic **Bottom:** NTU women's touch football team in action, against Temasek Polytechnic



**Top:** NTU's Cheerleading group ACES has dazzled the crowds with its performances since 2003. At the inaugural Singapore National Cheerleading Championships in 2010, ACES teams claimed top spots **Bottom:** Institute-Varsity-Polytechnic football match between NTU and SMU

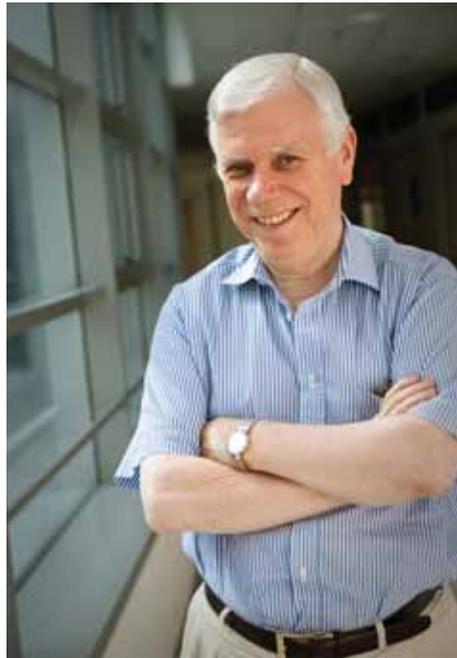
**Operation Moving Hearts – Haiti**, a three-day donation drive in February 2010. Student volunteers raised a total of S\$8,584.49 for the International Federation Red Cross Red Crescent Societies to help the earthquake victims in Haiti. Another was **NBS Busking for Charity 2010** on 23 May 2010 which saw 100 student volunteers performing to promote awareness and raise funds for an adopted charity, the Singapore Red Cross.

The NTU Students in Free Enterprise (SIFE) organised a humanitarian trip, **Project Waterloo**, to Cambodia in December 2009. The students sought to improve sanitary conditions there. The Hall 4 Touch of the Hearts Committee organised a **TOTS '4' Milk** project in September 2009. It aimed to raise funds for MILK, a charity organisation established to help disadvantaged children and youth. NTU continues to support student participation in these activities, which have the power to transform lives and change perspectives.

### Academic Accolades

**Chiam Yee Hong**, **Zhou Yan** and **Yos Virin**, from NTU's School of Humanities and Social Sciences were awarded the Best Thesis Prize in the Ministry of Trade and Industry (MTI) Economist Service Awards. The three graduates from the Class of 2009 received recognition for their work "Double-Index Value at Risk Model and Skewed Distribution of Indices" which uses statistical and mathematical methods to measure portfolio risk in financial risk management. Honours-year student **Christabelle Soh Ning En** also received the MTI Economist Service Prize which is awarded to the best Economics student.

Computer Science student **Pan Zhengxiang** received the Singapore Computer Society's IT Youth Award. The accolade recognises young people who have made significant contributions



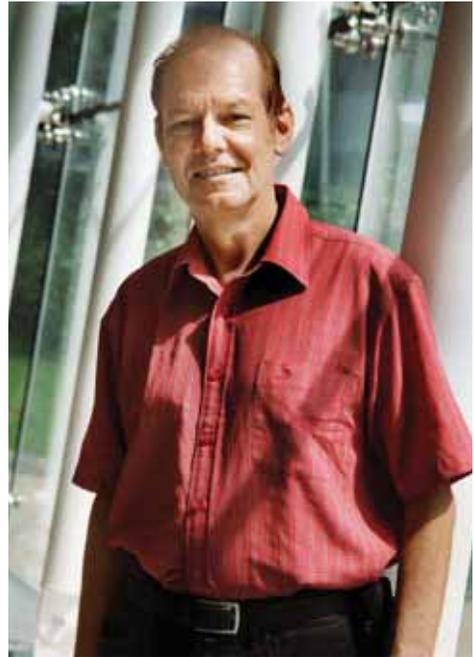
Prof Francois Raymond Mathey receives China's Friendship Award

to the advancement of information technology in Singapore. Zhengxiang developed iChat with Frasia, an interactive system that harnesses artificial intelligence to connect youth around the world. He also contributed to national security and counter-terrorism efforts with his invention of the Innovative Pass Verification System to protect sensitive military installations.

### Faculty Highlights

The University has enjoyed considerable success in external research funding, a testimony to the quality of our faculty at NTU. Among the highlights of the past year were international awards bestowed on our faculty.

NTU Provost **Prof Bertil Andersson** was singled out to receive the Wilhelm Exner Medal awarded to scientists and inventors whose work has opened new possibilities in industrial



Prof Nadia Magnenat-Thalmann (left) and Prof Daniel Thalmann (right) receive the Eurographics Distinguished Career Award

applications. Prof Andersson, a Trustee of the Nobel Foundation and member of the Royal Swedish Academy of Sciences, joins the ranks of an illustrious list of laureates which includes 15 Nobel Prize winners.

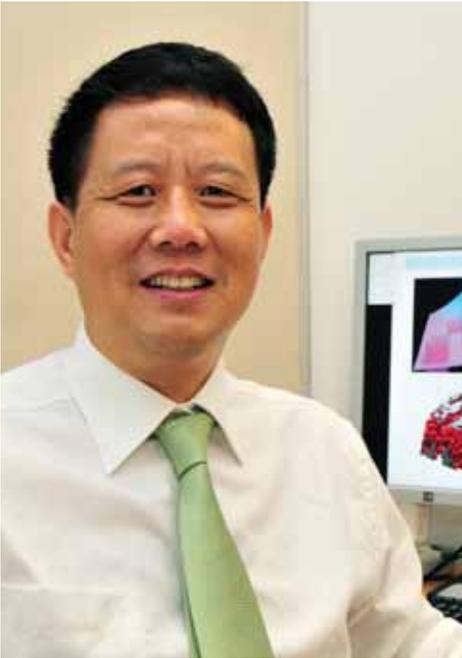
**Prof Francois Raymond Mathey**, a Nanyang Professor at NTU's School of Physical and Mathematical Sciences, was awarded China's highest award for foreign experts, the Friendship Award. Prof Mathey is a world-renowned chemist with strong links to China. He helped set up the International Phosphorus Laboratory in Zhengzhou University in Henan province, which collaborates with France's National Centre for Scientific Research (CNRS) and Rennes University.

**Prof Nadia Magnenat-Thalmann**, Director of NTU's Institute for Media Innovation, and **Prof Daniel Thalmann**, Visiting Professor at the

School of Computer Engineering, each received the Eurographics Distinguished Career Award at the 31st Annual Conference of the European Association for Computer Graphics. The Awards recognise individuals who have significantly advanced the field of computer graphics.

**Assoc Prof Lam Yeng Ming**, a lecturer with the School of Materials Science and Engineering, was awarded one of three inaugural L'Oreal Singapore for Women in Science National Fellowships. Assoc Prof Lam, an NTU alumna, will undertake research on the self-assembly of peptides for sensing applications. The fellowships recognise the contributions of women scientists to the advancement of science and research in Singapore.

**Assoc Prof Tai Xue-Cheng** from NTU's School of Physical and Mathematical Sciences was



Assoc Prof Tai Xue-Cheng (left) wins the Feng Kang Prize in Scientific Computing and Asst Prof Yu Ting (right) is named Young Scientist of the Year

awarded the Feng Kang Prize in Scientific Computing. The prize honours Chinese scientists in China and abroad for significant contributions in scientific computing. Assoc Prof Tai uses mathematical modelling to restore images that have been degraded due to wear and tear. He has also developed new models for magnetic resource imaging, medical image processing and other medical and industrial applications.

**Asst Prof Yu Ting** received the Young Scientist Award for his research on metal oxide nanostructures and graphene, used to develop nanodevices and harvest energy. A faculty member of the School of Physical and Mathematical Sciences, he has received close to S\$3.5 million of research grants over the past three years. In 2008, his team won the Nanyang

Award for Research and Innovation. Organised by the Singapore National Academy of Science and supported by the Agency for Science, Technology and Research, the Young Scientist Award is presented to researchers aged 35 years and below who are actively engaged in research and development in Singapore, and who show great potential to be world-class researchers in their fields of expertise.

**Assoc Prof Luo Fang Lin** and his former PhD students **Dr Zhu Miao** and **Dr He Yi** were the recipients of the Power Electronics Society Prize Letter Award by the Institute of Electrical and Electronics Engineers. Their award recognises the team's outstanding contributions in the multidisciplinary field of power electronics. Assoc Prof Luo is from NTU's School of Electrical and Electronic Engineering, and his doctoral



Assoc Prof Lam Yeng Ming is awarded a L'Oreal Singapore for Women in Science National Fellowship

students have since graduated to work in the local industry.

**Prof Wen Changyun** and **Assoc Prof Zhang Yue Ping** were selected as Fellows of the Institute of Electrical and Electronics Engineers. Prof Wen, from NTU's Division of Control and Instrumentation at the School of Electrical and Electronic Engineering, was cited for his contributions to adaptive control, switching and impulsive systems. Assoc Prof Zhang, from NTU's Division of Circuits and Systems at the School of Electrical and Electronic Engineering, was cited for his contributions to integrated antennas and subsurface radio.

**Prof Phua Kok Khoo**, Director of NTU's Institute of Advanced Studies and Adjunct Professor, was named Fellow of the American Physical

Society. Prof Phua is a theoretical high energy physicist and has done research in the field of phenomenology in high energy collisions. He was cited for his tireless efforts to strengthen scientific research throughout Asia and promote international education and scholarly exchanges, and for enriching science and education through the World Scientific Publishing Company he founded.





## **STAYING** **CONNECTED** **FOR NANYANG**

**Spread across 107 countries, the Nanyang alumni family has grown to a record 144,045 members. The bedrock of the University community, the Nanyang alumni network spans generations, embracing graduates from the Class of 1960 to our latest graduating Class of 2010.**

# ALUMNI

## Going the distance

The Class of 2010 was NTU's largest graduating cohort. In the year under review, 8,526 new graduates joined the ranks of our alumni, who include graduates from as early as the Class of 1960. Spread across 107 countries worldwide, the University's Nanyang alumni family grew to a record-breaking 144,045 at the close of AY2009.

NTU kick-started its 55th Anniversary celebrations in 2010. Events to mark the University's founding will continue into the next academic year. NTU has renewed its efforts to connect with its large alumni base, going the distance to enhance alumni engagement. Highlights of the year include Run Round Singapore, Nanyang Alumni Awards, Alumni Homecoming, NTU Alumni Family Day and outreach programmes to extend our Global Alumni Network.

## Run Round Singapore

To commemorate the University's 55 years of history and achievement, NTU initiated a 218 km ultra-marathon around the island. The equivalent of five full marathons, *Run Round Singapore* brought together more than 9,000 participants. With NTU's Alumni Affairs Office at the helm, the NTU community of faculty, staff, students and alumni was mobilised. A group of nine alumni stepped up to the challenge

and attempted the entire course, setting three national records:

- Longest Ultra-Marathon: **218 km**
- Fastest 218 km Ultra-Marathon Runner (Male): **31hr 28min 51sec**
- Longest Ultra-Marathon Runner (Female): **129.3 km**

Along the route, families, friends and supporters cheered on the participants. At 68 relay stations across Singapore, 16 Members of Parliament and dozens of senior grassroots leaders flagged off runners in their constituencies. Some 47 Constituency Sports Clubs of People's Association and 1,600 volunteers turned out in force. The scene harked back to the days of the University's founding, with the coming together of people from all walks of life. The sense of community bonding and camaraderie at Run Round Singapore invoked the Nantah Spirit, making it a truly memorable occasion. The event raised S\$300,000 (with government matching) for student bursaries.

## Nanyang Alumni Awards

The Nanyang Alumni Awards honour outstanding alumni who have made significant contributions to the University, community or society. Now in its fifth year, the annual awards ceremony paid tribute to 26 alumni



Alumnus Yong Yuen Cheng was the first to cross the finish line in the 218 km Run Round Singapore Ultra-Marathon, with a record-breaking time of 31hr 28min 51sec

with exemplary achievements. The awards are presented in four categories:

#### **Nanyang Distinguished Alumni Award**

This is the highest honour bestowed upon alumni of the University, to recognise the remarkable accomplishments of alumni who have gained national, regional or international distinction as outstanding exponents in their chosen fields or professions. Their endeavours and successes bring honour to the University.

**Mr Chia Ban Seng** (Chemistry, Class of 1961) is a passionate proponent of education and Chinese language and culture. A member of NTU's Board of Trustees, he led the establishment of the Tan Lark Sye Professorship in Chinese Language and Culture. Mr Chia helms the school management committees of Nanyang Junior College and Chung Cheng High School. He was Chair of

the Advisory Committee of Deyi Secondary School for 26 years. As Chairman of the Sun Yat Sen Nanyang Memorial Hall, he oversaw the painstaking refurbishment of the 120 year-old bungalow where Dr Sun Yat Sen resided for a brief period of time. He has served on the boards of the Singapore Chinese Chamber of Commerce and Industry, Singapore Chinese Orchestra, Chinese Development Assistance Council, Chinese Heritage Centre and Singapore Hokkien Huay Kuan. In recognition of his dedication to public service, the Public Service Star (2002) and the Public Service Medal (1990) were conferred on Mr Chia by the Singapore Government.

**Dato' Er Kok Leong** (Chemistry, Class of 1966) is a pioneer industrialist and innovation leader in the palm oil industry. He joined the Lam Soon Group in 1971 as Chief Chemist, and spent the

subsequent 39 years improving processes and quality control. Since stepping down as CEO of Lam Soon subsidiary Intercontinental Specialty Fats, Dato' Er continues to serve as Corporate Advisor to the company. He remains actively involved in advancing the palm oil industry through his membership on the boards of the Palm Oil Refiners Association of Malaysia, the Malaysian Palm Oil Board and Malaysian Palm Oil Council, and in the Malaysian Oil Scientists' and Technologists' Association. Dato' Er also maintains strong ties with his alma mater. He serves as a member of the Research Committee of Nantah Education and Research Foundation, and has shared his work experience with students as part of NTU's Technopreneurship and Innovation Programme.

**Dr William Tan Kian Meng** (Science, Class of 1980) has established a reputation as an outstanding humanitarian. A neuroscientist, avid sportsman and inspirational speaker, Dr Tan has been described as a role model with "a will of iron and a heart of gold". Paralysed by polio from the waist down since the age of two, Dr Tan is a dedicated fundraiser for worthy causes. He has raised more than S\$18 million over the past 22 years. Beneficiaries include the Universities Endowment Fund, Nanyang Technological University Students' Union Students' Fund, National University of Singapore, ITE Needy Students' Fund, Children's Hospital in Boston, Global Flying Hospitals, Free Wheelchair Mission in California and St George Hospital in Sydney. In mid-2009, Dr Tan was diagnosed with cancer. Despite being weakened by chemotherapy treatment, he has continued to campaign for projects ranging from the National Cancer Centre to The Straits Times School Pocket Money Fund. In 2007, Dr Tan became the first man to complete the North Pole marathon on a wheelchair, covering 17 marathons across seven continents.

### Nanyang Alumni Achievement Award

This category recognises alumni who have gained national standing due to significant contributions made in their chosen fields or professions that are worthy of recognition and have brought honour to the University. Recipients are alumni who have demonstrated extraordinary service, commitment and dedication to the community.

- Mr Ang Mong Seng (Geography, Class of 1973)
- Emeritus Prof Goh Suat Hong (Chemistry, Class of 1964)
- Mr Heng Guan Teck (EEE, Class of 1985)
- Dr Khoo Seow Hwa (Biology, Class of 1970)
- Tan Sri Datuk Dr Ng Lay Swee (Chemistry, Class of 1963)
- Prof Yeo Kiat Seng (EEE, Class of 1993)

### Nanyang Outstanding Young Alumni Award

This category recognises alumni under 40 years of age, whose endeavours in their chosen fields or professions are worthy of recognition and have brought honour to the University.

- Mr Roderick Chia Yeow Kheng (EEE, Class of 1998)
- Mr Chua Chin Hon (WKWSCI, Class of 1998)
- Mr Eng Aik Meng (NBS, Class of 1993)
- Ms Goh Hui Cheng (NIE, Class of 1999)
- Dr Hery Susanto Djie (EEE, Class of 2005)
- Assoc Prof Lam Yeng Ming (MSE, Class of 1996)
- Major Lee Peh Gee (NBS, Class of 1998)
- Ms Serena Ng Gek Yi (WKWSCI, Class of 2000)
- Ms Esther Tan Yinxuan (WKWSCI, Class of 2005)

### Nanyang Alumni Service Award

This category recognises alumni who demonstrate dedication and voluntary commitments through alumni clubs and associations, or to the University's programmes



Dr Ha Nam Khanh Giao (left), President of the newly-launched NTU Alumni Association of Ho Chi Minh City, receives the NTU flag from Dr Su Guaning (right), President of NTU

and activities, which have significantly enriched the University.

- Mr Chong Peng Jek (Geography, Class of 1970)
- Mr Jeffrey Chua Leong Chuan (CEE, Class of 1986)
- Mr See Yong Leng (Accountancy, Class of 1966)
- Ms Shi Yuehan (NBS, Class of 2003)
- Mr Shu Dajun (NIE, Class of 2007)
- Mr Sim Kuang Meng (Economics, Class of 1967)
- Mr Wang Hairong (NBS, Class of 2007)
- Mr Raymond Wee Keat Kheng (SCE, Class of 2001)

### Global Alumni Network

In the past year, a total of eight international alumni chapters were formed. The growing alumni base of NTU has created a demand for localised groupings around the world, that help

our alumni stay in touch with one another and keep up to date with University developments. New alumni chapters were established in China (Guangxi, Hebei, Henan, Sha'anxi, Shanxi and Tianjin) and Vietnam (Hanoi and Ho Chi Minh City). As at 31 July 2010, the number of NTU alumni living and working in China and Vietnam had grown to 11,214 and 589, respectively.

### Outreach programmes

NTU's Class Agents are crucial in helping the University stay in touch with its alumni. In the past year, a total of 1,516 class representatives were appointed. The Class Agents network is an important volunteer group integral to sustaining our alumni activities.

A record number of 1,700 alumni returned to the Yunnan Garden Campus for the Alumni Homecoming, with some making the journey



The Executive Committee of NTU's School of Electrical and Electronic Engineering Alumni Association at NTU Alumni Homecoming



**From left to right:** Prof Er Meng Hwa, Senior Associate Provost, NTU; Dr Su Guanng, President of NTU; Mr Chew Kheng Chuan, Chief University Advancement Officer, NTU; and Mr Soon Min Yam, Director of Alumni Affairs, NTU, at NTU's Alumni Family Day

from as far as China, Indonesia, Malaysia and the US. In response to feedback from previous years, the annual event was extended over a full weekend, as many felt that one day did not afford them enough time to rekindle old ties and soak in the atmosphere. The Alumni Barbeque kicked off the gathering on the evening of Friday, 23 October 2009. Activities lined up for homecoming over the next two days included forums, the Alumni Night ceremony and Alumni Sports Competition. The overwhelming response ensured a successful inaugural Alumni Homecoming weekend.

NTU's Alumni Family Day 2010 was held at the Jurong Bird Park on 22 May 2010. The event was attended by 720 alumni and family. The University outing is organised every year to

celebrate close family bonds and NTU's links to the community.

Over the past year, alumni were spoiled for choice, with more than 50 activities organised by the University's Alumni Affairs Office. Forums, reunions, sports networking, travel, social events and movie screenings reconnected our alumni and reinforced links to NTU. Participation in alumni activities has grown steadily, along with our expanding alumni base.

The University revamped its quarterly alumni magazine, NTULink, for a stronger visual impact and improved content layout, to better serve its readers of more than 100,000 alumni.





## **GIVING BACK FOR GOOD**

**The number of donors to NTU has steadily increased, despite an uncertain economic outlook in 2009. Strong support from the University community has empowered NTU in its efforts to advance excellence in learning, research and service.**

# BENEFACTORS

## Benefactions

We wish to express our deepest gratitude to all our donors – comprising foundations, corporates, individuals, alumni, students, parents and friends – for their generous giving. In spite of the uncertain economic outlook, FY2009<sup>1</sup> saw a 24% increase in the number of NTU donors. This resounding support is a testament to the aspirations in education and research our benefactors share with the University.

Thanks to our benefactors, NTU received philanthropic support totalling S\$53,094,241 (including Government matching funds) in FY2009, which ended 31 March 2010. A total of 9,631 donors gave to NTU in FY2009, as compared to 7,753 donors in FY2008.

The steadfast commitment of our donors has empowered NTU in its efforts to advance excellence in teaching, learning and research, and to create solutions for individuals and the larger community.

## Giving highlights

The **Lien Foundation** injected fresh funds of S\$12 million into Phase 2 of the Lien Foundation-NTU Environmental Endeavour

(Endeavour), aimed at bringing clean water and sanitation to one million people in Cambodia, China and Vietnam by 2013. Started in 2006, the Endeavour programme seeks to improve the living conditions of Asia's developing communities through technology-based developmental work. It is administered by NTU's Nanyang Environment and Water Research Institute (NEWRI), an eminent centre for environment and water technologies.

In 2009, the **Temasek Foundation** gave NTU a total of S\$4,340,406 toward various causes designed to produce a multiplier effect in the areas of disaster mitigation, education, journalism and leadership development in communities across Asia. Temasek Foundation supported various causes at NTU, including:

- Training and capacity building programmes on seismic strengthening technologies in India and China
- An annual fellowship programme for journalists from Asia established at NTU's Wee Kim Wee School of Communication and Information
- Leadership programmes conducted for educators in Indonesia and Cambodia,

<sup>1</sup> Gifts reported here are from April 2009 to March 2010



School children in Dazhou, Sichuan Province, China, have access to safe water and sanitation facilities, thanks to Lien Foundation-NTU Environmental Endeavour



Mr Adam Scott (centre) with Ms Cheryl Lim (left) and Ms Crystal Wee (right), the first two Adam Scott Foundation Asia Scholars at NTU

with the participation of National Institute of Education

- The Temasek Foundation-NTU Leadership Enrichment and Regional Networking (LEARN) programme

In support of NTU's Campaign for Accessibility to Higher Education, the **Goh Foundation** gave S\$1 million to establish the endowed Goh Foundation Bursary Fund at NTU, benefiting up to 16 financially disadvantaged NTU students each academic year. NTU celebrated the successful conclusion of the Campaign in November 2009, with a dinner to thank Prof Lim Chong Yah and other donors. Supported by more than 2,000 donors, the Campaign made possible the creation of a S\$10.5 million endowment (including Government matching)

to benefit NTU students in financial need. Income from the endowment enables NTU to support 120 bursaries each year.

Continuing its longstanding support for NTU, the **Lee Foundation** gave S\$777,753 in total to benefit a wide range of causes across the University as well as projects involving the community. Among these causes are student bursaries and activities to enhance learning, school advancement and research.

Of special mention is a gift to enable NTU's Robotics Research Centre to develop the prototype of an assistive leg device for patients suffering from partial paralysis. The function of the device is to sense and coordinate the movements of the patients' legs, and to provide the support needed for them to



Temasek Foundation LEARN scholars (AY2009) making a difference



Graduation giving has increased steadily over the years

move about. Lee Foundation also funded a joint project by the School of Computer Engineering and the National Institute of Education to develop interactive, multitouch tabletop computer games for autistic children. Incorporating social interactions, collaboration, and non-verbal and verbal communication skills, the games are designed to improve the quality of life for these children.

A gift of S\$180,000 from the **Adam Scott Foundation Asia** made possible the establishment of the Adam Scott Foundation Asia Scholarship, for students pursuing the new Bachelor of Science in Sport Science and Management degree programme at the National Institute of Education. The Scholarship, the first of its kind in Singapore, is awarded based on academic performance, track record

in co-curricular activities, and financial need. It was initiated by Mr Adam Scott, an Australian professional golfer who created the Foundation to support and offer opportunities to young people in Asia.

Gifts totalling S\$558,888 by NTU alumnus **Mr Wong Nam Sin** and his companies went toward the advancement of learning, entrepreneurship and innovation. Specifically, the gifts were designated for the establishment of the Thye Hong Scholarship and Bursary Fund, and the Thye Hong Entrepreneurship Fund for Sub-contracting Works in Construction for Civil Engineering Graduates (THEF), as well as to support the Professor Lim Chong Yah Bursary Fund. THEF is open to civil engineering students pursuing a degree at NTU, as well as to NTU civil engineering alumni with three

years of relevant industry experience. The Fund provides seed money for selected business ventures in start-up innovations and in sub-contracting works.

An award for excellence in doctoral-level environmental and sustainability research, the first of its kind in Singapore, was established at NTU with a US\$50,000 gift from the *World Future Foundation*. Valued at US\$10,000 each, the World Future Foundation PhD Prize in Environmental and Sustainability Research @ NTU will be awarded to the year's top five completed PhD theses relating to the environment, sustainability and cities of the future.

### Alumni Giving

FY2009 saw a record number of 5,933 alumni donors giving back to NTU, registering a 5% increase, as compared with the 5,632 NTU alumni who made gifts to their alma mater in the preceding financial year. Three outstanding examples of generosity stood out, with gifts exceeding S\$100,000:

- **Mr Chew Teow Hong Daniel** gave to establish the Chew Yew Hock & Lim Sew Lan Scholarship to honour his parents
- **Mr Lim Cheng Eng** topped up his gift to Mr Lim Cheng Eng Bursary Fund established in FY2008, to benefit financially needy students

- **Mr Wong Nam Sin**, together with his companies, contributed generously to the Professor Lim Chong Yah Bursary Fund. He has also established two new funds at NTU: the Thye Hong Scholarship and Bursary Fund, and the Thye Hong Entrepreneurship Fund for Sub-contracting Works in Construction for Civil Engineering Graduates

### Graduation Giving

The University's consistent efforts to sow the seeds of a culture of giving among our seniors continue to bear fruit. The annual iGave Graduation Giving campaign set a new record for the fourth consecutive year. The percentage of graduating students who supported the campaign by making class gifts to fund student bursaries hit a new high of 45.6% in FY2009. The encouraging support marks a significant increase from participation rates of 36.5% in 2008, 27% in 2007, 21% in 2006, and 8% in 2005 at the start of the programme.

### Faculty & Staff Giving

FY2009 saw the launch of NTU's first structured, university-wide faculty and staff giving programme, with encouraging results. As many as 29% of the University's employees participated in the first annual Faculty & Staff Giving campaign to support student bursaries and school advancement. At nine NTU departments and offices, every staff made a gift to achieve 100% participation.

# GIFTS TO THE UNIVERSITY

## APRIL 2009 – MARCH 2010

### **S\$10 MILLION AND ABOVE**

Lien Foundation

### **S\$1 MILLION AND ABOVE**

Goh Foundation Limited

Temasek Foundation CLG Limited

### **S\$250,000 AND ABOVE**

Kwek Leng Joo

Lee Foundation

The Shaw Foundation Pte

Wee Foundation

### **S\$100,000 AND ABOVE**

Adam Scott Foundation Asia

Cathay Photo Store (Private) Limited

Chew Teow Hong Daniel

Haji S. M. Abdul Jaleel

Hb Glass and Aluminium Pte Ltd

HK & Macau Taiwanese Charity Fund Ltd

Ian Ferguson Foundation

Khoo Hock Tin

Khoo Whee Luan

Lian Ho Lee Construction Pte Ltd

Lim Cheng Eng

Lim Chong Yah

Lim Suet Fern

Norden Shipping (Singapore) Pte Ltd

Singapore Technologies Engineering Ltd

Singapore Totalisator Board

The Ford Foundation

The University of North Carolina at Chapel Hill

Thye Hong Management & Services Pte Ltd

Woh Hup (Pte) Ltd

Wong Nam Sin

### **S\$25,000 AND ABOVE**

Archdiocesan Crisis Coordination Team (ACCT)

Bengawan Solo Pte Ltd

DMC Event Management Pte Ltd

EADS Deutschland GMBH

Exploit Technologies Pte Ltd

ExxonMobil Asia Pacific Pte Ltd

Frontken (Singapore) Pte Ltd

Hindu Endowments Board

Isetan Foundation

Jamiyah Singapore

Keppel Corporation Limited

Khoo Ban Hock

KMC Transmission (Suzhou) Co. Ltd

Kwee Liong Keng

Lien Clinic For Women Pte Ltd

Lien Siao Sze

Lim Kia Wee

Mary Ann Tsao

Max Lewis Scholarship Fund

Motorola Foundation

Oversea-Chinese Banking Corporation Ltd

Professional Engineers Board Singapore

Singapore Hainan Hwee Kuan

Singapore Leong Khay Huay Kuan

Tan Joo Kee Scholarship Fund

Tan Kai Hee

Taoist Federation (Singapore)

Teo Tong Lim

The Singapore Buddhist Lodge

The Tan Chin Tuan Foundation

World Future Foundation Ltd

Yeung Ching Foundation



**Top, from left to right:** Mrs Margaret Lien, former Chairman of Lien Foundation; Dr Su Guanng, President of NTU; Mr Laurence Lien, Chairman of Lien Foundation; Mr Chew Kheng Chuan, Chief University Advancement Officer, NTU; and Assoc Prof Wu Wei, Director of Nanyang Centre for Public Administration, NTU, at an appreciation lunch for the Lien Foundation **Bottom:** NTU Honour Roll of its major benefactors, at the Nanyang Auditorium

# EMINENT VISITORS

## AUGUST 2009 – JULY 2010

### NOBEL LAUREATES

**Prof Anthony Leggett**

Nobel Laureate in Physics, 2003

**Prof Jerome Isaac Friedman**

Nobel Laureate in Physics, 1990

**Prof David Jonathan Gross**

Nobel Laureate in Physics, 2004

**Prof Douglas Dean Osheroff**

Nobel Laureate in Physics, 1996

**Sir Richard Roberts**

Nobel Laureate in Physiology or Medicine, 1993

**Prof Yang Chen Ning**

Nobel Laureate in Physics, 1957

**Prof Murray Gell-Mann**

Nobel Laureate in Physics, 1969

**Prof Kenneth Geddes Wilson**

Nobel Laureate in Physics, 1982

**Prof Gerard 't Hooft**

Nobel Laureate in Physics, 1999

**Prof Françoise Barre-Sinoussi**

Nobel Laureate in Physiology or Medicine, 2008

**Prof Aaron Ciechanover**

Nobel Laureate in Chemistry, 2004  
Lee Kuan Yew Distinguished Visitor

**Prof Claude Cohen-Tannoudji**

Nobel Laureate in Physics, 1997

**Prof Rudolph A Marcus**

Nobel Laureate in Chemistry, 1992

### HEADS OF STATE AND FOREIGN DIGNITARIES

**His Royal Highness Prince Andrew**

The Duke of York, UK

**His Excellency Mr Lee Hsien Loong**

Prime Minister of Singapore

**His Excellency Mr Lars Lokke Rasmussen**

Prime Minister of Denmark

**His Excellency Dr Nguyen Thien Nhan**

Deputy Prime Minister and Minister of  
Education and Training, Vietnam

**His Excellency Mr Saad bin Ibrahim**

**Al Mahmoud**

Minister for Education and Higher  
Education, Qatar

**His Excellency Mr Li Yuanchao**

Minister of the Organisation Department,  
Communist Party of China Central  
Committee, China

**Prof Annette Schavan**

Federal Minister of Education and  
Research, Germany



**From left to right:** Mr Lim Chuan Poh, Chairman of the Agency for Science, Technology and Research; Prof Murray Gell-Mann, Nobel Laureate in Physics (1969); Ms Mary McFadden; and Dr Su Guaning, President of NTU at the 80th Birthday celebration of Prof Murray Gell-Mann

**His Excellency Mr David Seigny**

High Commissioner, High Commission of Canada

**His Excellency Dr Simeon Selby Ripinga**

High Commissioner, High Commission of the Republic of South Africa

**His Excellency Dr Tirumallai Cunnuvakum Anandanpillai Raghavan**

High Commissioner, High Commission of India

**His Excellency Dr Richard O'Brien**

Ambassador, Embassy of Ireland

**His Excellency Mr Rashid bin Ali Hassan Al-Khater**

Ambassador, Embassy of the State of Qatar

**His Excellency Mr Antonio Villegas Villalobos**

Ambassador, Embassy of Mexico

**His Excellency Mr Oh Joon**

Ambassador, Embassy of the Republic of Korea

**His Excellency Mr Wei Wei**

Ambassador, Embassy of the People's Republic of China

**OTHER DISTINGUISHED VISITORS**

**Lord Martin Rees**

Lee Kuan Yew Distinguished Visitor  
Master of Trinity College, University of Cambridge, UK

**Prof Wolfgang A Herrmann**

President, Technical University of Munich, Germany



His Royal Highness Prince Andrew, The Duke of York, speaking at the first UK-Singapore Water Futures Forum at NTU

**Prof Harriet Wallberg-Henriksson**

President, Karolinska Institutet, Sweden

**Prof John Beddington**

Chief Scientific Adviser to the Government, UK

**Prof Ho Peng Yoke**

Director Emeritus, Needham Research Institute at Cambridge, UK

**Prof Patrick Aebischer**

President, Swiss Federal Institute of Technology, Lausanne, Switzerland

**Prof Yusuf Ziya Ozcan**

President, Council of Higher Education, Turkey

**Prof Nigel Thrift**

Vice-Chancellor, University of Warwick, UK

**Prof Alice Gast**

President, Lehigh University, USA

**Prof Jane McAuliffe**

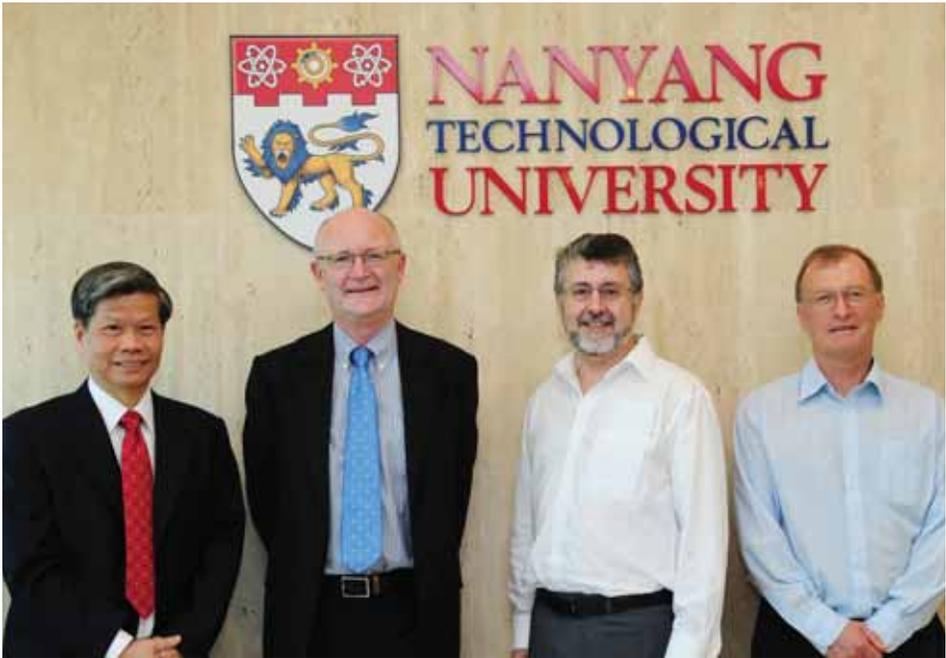
President, Bryn Mawr College, USA

**Prof David Phillips**

President, Royal Society of Chemistry, UK

**Prof Jean-Charles Pomerol**

President, University of Pierre and Marie Curie, France



**From left to right:** Prof Lam Khin Yong, Associate Provost (Graduate Education and Special Projects), NTU; Prof Nigel Thrift, Vice-Chancellor, University of Warwick; Prof Mark Featherstone, Interim Dean, College of Science, NTU; and Prof Ron Matthews, Head of Graduate Studies and Deputy Director of Institute of Defence & Strategic Studies, S Rajaratnam School of International Studies at NTU

**Dr Tsu-Tian Lee**

President, National Taipei University of Technology, Taiwan

**Prof Eugene H Levy**

Provost, Rice University, USA

**Prof Datuk Dr Ghauth Jasmon**

Vice-Chancellor, University of Malaya, Malaysia

**Ms Ton Nu Thi Ninh**

President, Tri Viet International University Project, Vietnam

**Sir Keith O’Nions**

Rector, Imperial College London, UK

**Dr Jared L Cohon**

President, Carnegie Mellon University, USA

**Prof Yu Shicheng**

President, Shanghai Maritime University, China

**Dr Jacques Rogge**

President, International Olympic Committee

**Dr Robert Easter**

Chancellor and Provost, University of Illinois at Urbana-Champaign, USA

**Dr Ng Ching-Fai**

President and Vice-Chancellor, Hong Kong Baptist University, Hong Kong



**Top:** His Excellency Dr Tirumallai Cunnuvakum Anandanpillai Raghavan (right), High Commissioner, High Commission of India in Singapore being welcomed by Dr Su Guaning (left), President of NTU **Bottom:** Prof Er Meng Hwa (left), Senior Associate Provost of NTU, and Prof Tony Chan (right), President of Hong Kong University of Science and Technology



Prof Alice Gast (left), President of Lehigh University, USA and Mr Sonny Lim (right), Director of International Relations, NTU

**Prof Don Nutbeam**

Vice-Chancellor, University of Southampton, UK

**Dr Michael Stevenson**

President and Vice-Chancellor, Simon Fraser University, Canada

**Prof Wolfram Ressel**

Rector, University of Stuttgart, Germany

**Dr Mark Wrighton**

Chancellor, Washington University in St Louis, USA

**Mr Patrick Molle**

President, EMLYON Business School, France

**Prof Tony F Chan**

President, Hong Kong University of Science and Technology, Hong Kong

**Prof Feng Da Hsuan**

Senior Vice President, National Cheng Kung University, Taiwan

**Dr Trinh Minh Thu**

Vice Rector, Water Resources University of Vietnam, Vietnam

**Prof Zhang Bo-Li**

President, Tianjin College of Traditional Chinese Medicine, China

**Prof Gong Ke**

President, Tianjin University, China

# MILESTONES

## AUGUST 2009 – JULY 2010

### August 2009

NTU's Lien Institute for the Environment (LIFE) and Temasek Foundation team up to bring seismic-resistant building construction techniques to China.

### September 2009

NTU holds its fourth China Convocation in Xiamen to commemorate the achievements of 288 of its Master's graduates based in China.

Singapore's Prime Minister, Mr Lee Hsien Loong, addresses more than 1,500 students at the 14th Ministerial Forum, organised by the NTU Students' Union.

NTU and Sweden's Karolinska Institutet establish a joint PhD programme in biomedical sciences.

### October 2009

More than 1,700 alumni return to NTU's Yunnan Garden campus for the University's inaugural homecoming weekend.

NTU co-establishes the CNRS (French National Centre for Scientific Research) International-NTU-Thales Research Alliance to develop nanotechnologies for commercial and defence applications.

### November 2009

NTU joins the leading innovation transfer group, iBridge Network, as its 100th member and the first university outside the USA.

The NTU-Warwick Double Masters Programme is launched to groom policymakers and researchers with an international perspective.

### December 2009

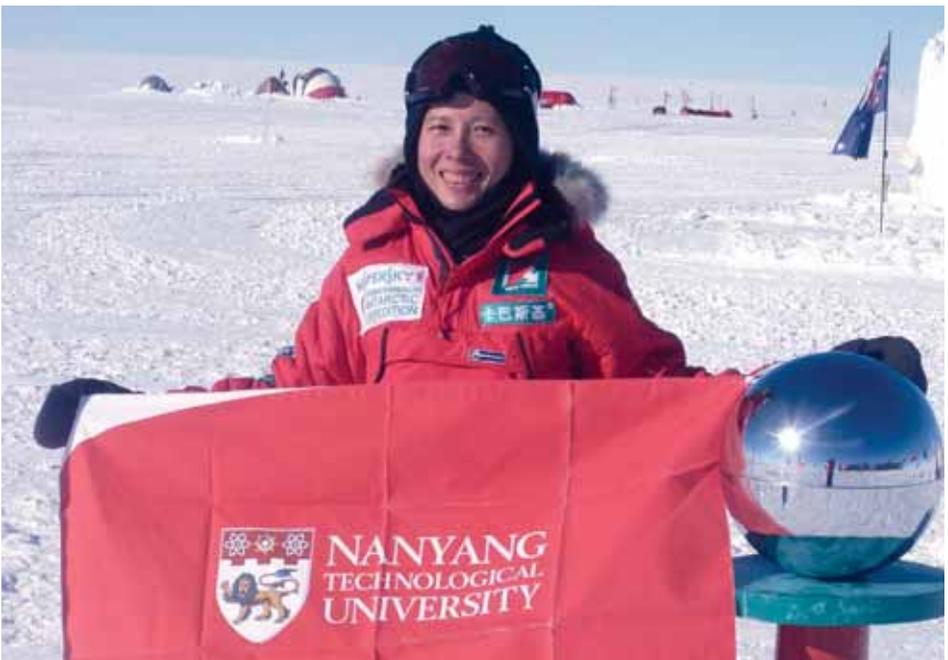
The Nanyang Centre for Public Administration is set up to meet the growing demand from China's senior government officials for postgraduate and executive education at NTU.

VIRTUS, a S\$50 million integrated circuit design research centre, is launched by NTU and Singapore's Economic Development Board to develop key technologies for "green" electronics.

### January 2010

Nanyang Business School's MBA is ranked 27th in the world and fourth in the Asia-Pacific by the London-based Financial Times – the only Singaporean MBA among the top 100 full-time global MBA programmes.

Alumna Sophia Pang creates history as the first Singaporean woman to ski to the South Pole. As part of the all-women's Kaspersky



**Top:** Prime Minister Lee Hsien Loong at the 14th Ministerial Forum organised by the NTU Students' Union **Bottom:** Sophia Pang (NBS, 1994) is the first Singaporean woman to ski to the South Pole as part of the all-women's Kaspersky Commonwealth Antarctic Expedition



**Top:** Students, alumni, faculty and friends turn out to support Run Round Singapore 2010 **Bottom:** The Class of 2010 sets a record for Graduation Giving

Commonwealth Antarctic Expedition, she took 38 days to complete the 900 km journey.

NTU launches the Institute of Catastrophe Risk Management, the first multidisciplinary research institute of its kind in Asia, to better understand risks related to natural disasters.

NTU wins four out of five competitive research awards in sustainable development worth S\$40 million from Singapore's National Research Foundation.

The S Rajaratnam School of International Studies is ranked third among more than 1,000 Asian think tanks in the Global "Go-To Think Tanks" survey by University of Pennsylvania.

### February 2010

The Singapore Centre on Environmental Life Sciences Engineering, the second national research centre of excellence to be located at NTU, after the Earth Observatory of Singapore, receives government funding of S\$120 million.

NTU opens the High Performance Computing Centre, home to one of the world's fastest and greenest supercomputers for high-end research.

### March 2010

Close to 10,000 participants support NTU's Run Round Singapore, a 218 km ultra-marathon, to celebrate the University's 55th anniversary and raise funds for student bursaries.

NTU and Carnegie Mellon University establish a dual PhD degree programme in Engineering to study new-generation robotics and intelligent systems.

### May 2010

NTU President Dr Su Guaning is re-appointed the Chairman of the Global Alliance of Technological Universities for a second consecutive term.

Singapore's largest international conference on the overseas Chinese is co-hosted by NTU and the Chinese Heritage Centre.

NTU and Germany's Fraunhofer-Gesellschaft collaborate to develop and commercialise interactive digital media technologies at the institute's first research centre in Asia.

### June 2010

The S\$200 million Energy Research Institute @ NTU officially opens its doors.

NTU collaborates with Technical University of Munich to conduct research on electric vehicle solutions at the TUM-Campus for Research Excellence and Technological Enterprise in Singapore.

### July 2010

More than 70% of graduating students contribute to the Class of 2010 iGave campaign to support bursaries for needy students.

NTU is the lead organiser of the second World Conference on Research Integrity, where 350 delegates from 59 nations develop the world's first research integrity code.

Singapore's first eco-friendly hydrogen-electric bus, GreenLite, is jointly launched by NTU and China's Tsinghua University.

# FACTS & FIGURES

Figure 1: Undergraduate Enrolment

## AY09-10 UNDERGRADUATE ENROLMENT BY PROGRAMME & GENDER<sup>1</sup>

■ Male | Female ■

Total Undergraduates: 23,043 (Male: 11,762; Female: 11,281)

### COLLEGE OF ENGINEERING

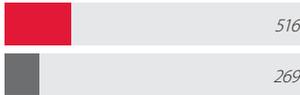
#### AEROSPACE ENGINEERING

Total: 388



#### CHEMICAL & BIOMOLECULAR ENGINEERING

Total: 785



#### COMPUTER SCIENCE

Total: 631



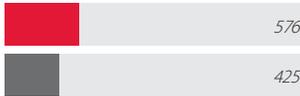
#### ENGINEERING & ECONOMICS

Total: 34



#### MATERIALS ENGINEERING

Total: 1,001



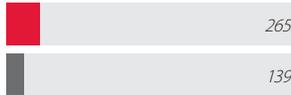
#### BIOENGINEERING

Total: 342



#### CIVIL ENGINEERING

Total: 404



#### ENGINEERING

Total: 1,056



#### ENVIRONMENTAL ENGINEERING

Total: 301



#### MECHANICAL ENGINEERING

Total: 2,084



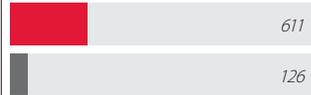
#### BUSINESS & COMPUTING

Total: 78



#### COMPUTER ENGINEERING

Total: 737



#### ELECTRICAL & ELECTRONIC ENGINEERING

Total: 2,684



#### INFORMATION ENGINEERING & MEDIA

Total: 158



#### MARITIME STUDIES

Total: 263



<sup>1</sup> As at 7 September 2009

Figure 1: Undergraduate Enrolment (cont'd)

**AY09-10 UNDERGRADUATE ENROLMENT BY PROGRAMME & GENDER<sup>1</sup>**

■ Male | Female ■

Total Undergraduates: 23,043 (Male: 11,762; Female: 11,281)

**COLLEGE OF SCIENCE**

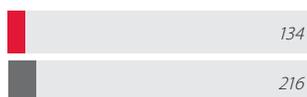
**BIOLOGICAL SCIENCES**

Total: 1,015



**MATHEMATICS & ECONOMICS**

Total: 350



**SPORT SCIENCE & MANAGEMENT**

Total: 35



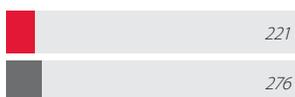
**BIOMEDICAL SCIENCES**

Total: 310



**MATHEMATICAL SCIENCES**

Total: 497



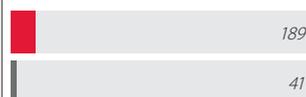
**CHEMISTRY & BIOLOGICAL CHEMISTRY**

Total: 1,154



**PHYSICS & APPLIED PHYSICS**

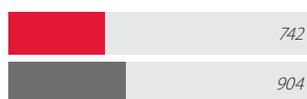
Total: 230



**COLLEGE OF BUSINESS (NANYANG BUSINESS SCHOOL)**

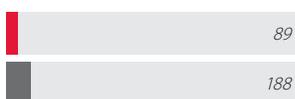
**ACCOUNTANCY**

Total: 1,646



**ACCOUNTANCY & BUSINESS**

Total: 277



**BUSINESS**

Total: 1,249



<sup>1</sup> As at 7 September 2009

Figure 1: Undergraduate Enrolment (cont'd)

**AY09-10 UNDERGRADUATE ENROLMENT BY PROGRAMME & GENDER<sup>1</sup>**

■ Male | Female ■

Total Undergraduates: 23,043 (Male: 11,762; Female: 11,281)

**COLLEGE OF HUMANITIES, ARTS & SOCIAL SCIENCES**

**ART, DESIGN & MEDIA**

Total: 629



**ECONOMICS**

Total: 462



**PSYCHOLOGY**

Total: 381



**COMMUNICATION STUDIES**

Total: 692



**ENGLISH**

Total: 457



**SOCIOLOGY**

Total: 434



**CHINESE**

Total: 422



**LINGUISTICS & MULTILINGUAL STUDIES**

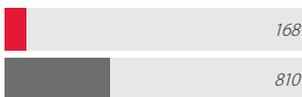
Total: 122



**NATIONAL INSTITUTE OF EDUCATION**

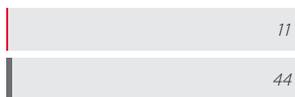
**ARTS (EDUCATION)**

Total: 978



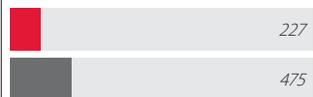
**EDUCATION**

Total: 55



**SCIENCE (EDUCATION)**

Total: 702



<sup>1</sup> As at 7 September 2009

Figure 2: Postgraduate Enrolment

**AY09–10 POSTGRADUATE ENROLMENT BY PROGRAMME & GENDER<sup>2</sup>**

■ Male | Female ■

Total Postgraduates: 10,044 (Male: 5,463; Female: 4,581)

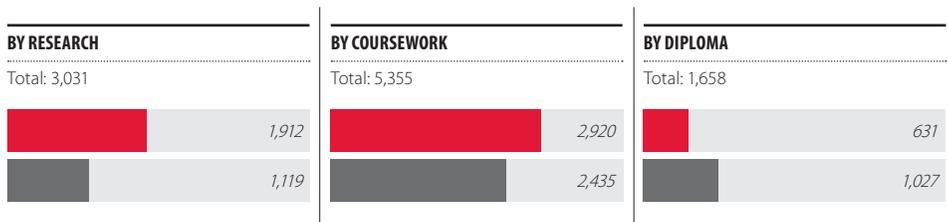
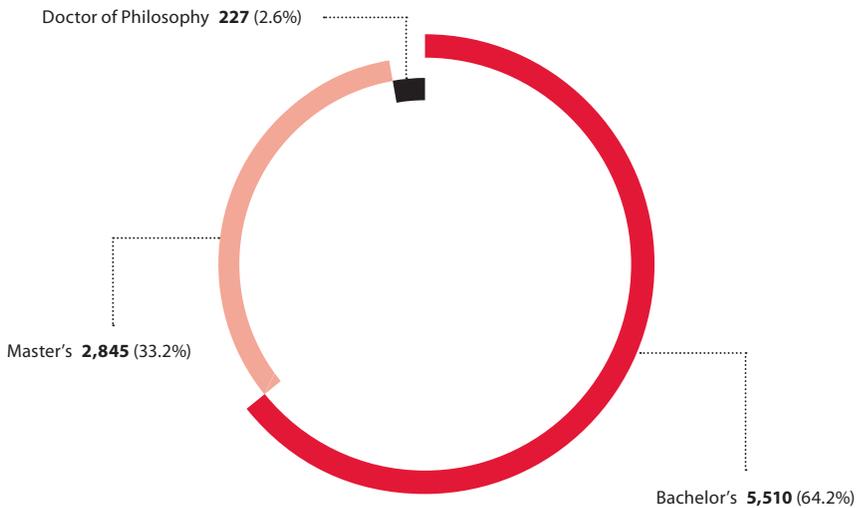


Figure 3: Graduation by Degree

**AY09–10 GRADUATES BY TYPE OF DEGREE<sup>3</sup>**

Total Graduates: 8,582



<sup>2</sup> As at 7 September 2009

<sup>3</sup> As at 27 September 2010

Figure 4: Graduation by Programme

**AY09–10 GRADUATES BY TYPE OF PROGRAMME<sup>4</sup>**

Total Graduates: 5,510

**BACHELOR'S DEGREES**

**COLLEGE OF ENGINEERING**

B Eng (Aerospace Eng)	59	1.1%	
B Eng (Bioengineering)	64	1.2%	
B Eng (Chemical & Biomolecular Eng)	180	3.3%	
B Eng (Computer Eng)	243	4.4%	
* B Eng (Computer Science)	119	2.2%	
B Eng (Civil Eng)	134	2.4%	
B Eng (Electrical & Electronic Eng)	867	15.7%	
B Eng (Environmental Eng)	92	1.7%	
B Eng (Maritime Studies)	64	1.2%	
B Eng (Materials Eng)	255	4.6%	
B Eng (Mechanical Eng)	619	11.2%	

**COLLEGE OF BUSINESS**

B Acc	623	11.3%	
* B Bus	493	8.9%	

**COLLEGE OF SCIENCE**

B Sc (Biomedical Sciences)	72	1.3%	
B Sc (Biological Sciences)	197	3.6%	
B Sc (Chemistry & Biological Chemistry)	235	4.3%	
B Sc in Mathematics and Economics	31	0.6%	
B Sc (Mathematical Sciences)	82	1.5%	
B Sc (Physics)	30	0.5%	

**COLLEGE OF HUMANITIES,  
ARTS & SOCIAL SCIENCES**

B A (Chinese)	88	1.6%	
B A (Econs)	91	1.7%	
B A (English)	62	1.1%	
B A (Psychology)	85	1.5%	
B A (Sociology)	76	1.4%	
B Comm Studies	177	3.2%	
B Fine Arts	143	2.6%	

**NATIONAL INSTITUTE OF EDUCATION**

B A (Ed.)	215	3.9%	
B Sc (Ed.)	114	2.1%	

<sup>4</sup> As at 27 September 2010

\* Figures include 19 students who graduated from the double degree in Business and Computing. These graduates are counted twice, in B Eng (Computer Science) and in B Bus.

Figure 5: Research Grants

**FY07-09 COMPETITIVE RESEARCH GRANTS**

in S\$million

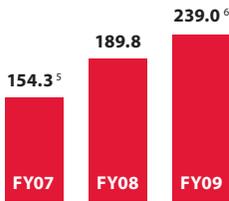


Figure 7: Employee Profile

**FACULTY & STAFF<sup>7</sup>**

Total: 5,761

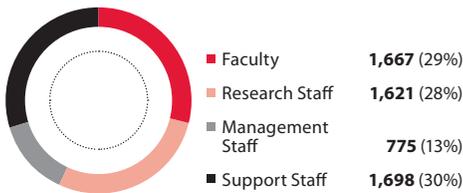


Figure 8: Faculty Profile

**FACULTY BY APPOINTMENT GRADE<sup>7</sup>**

Total: 1,667

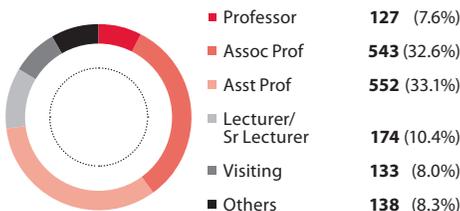


Figure 6: Research Revenue

**FY07-09 RESEARCH REVENUE**

in S\$million

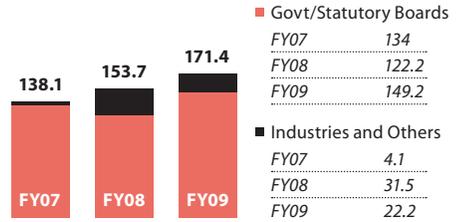
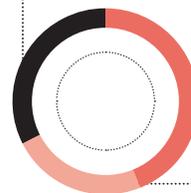
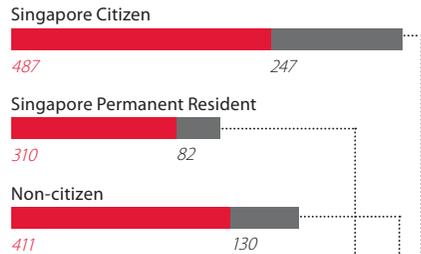


Figure 9: Faculty Profile by Gender & Nationality

**FACULTY BY GENDER & NATIONALITY<sup>7</sup>**

Male | Female

Total: 1,667



Our faculty comes from 56 countries

<sup>5</sup> FY07 figure excludes S\$150 million for Earth Observatory of Singapore

<sup>6</sup> FY09 figure excludes S\$120 million for Singapore Centre on Environmental Life Sciences Engineering

<sup>7</sup> As at 31 March 2010



**NANYANG TECHNOLOGICAL UNIVERSITY**

Reg No: 200604393R

50 Nanyang Avenue, Singapore 639798

T (65) 6791 1744 F (65) 6791 1604

[www.ntu.edu.sg](http://www.ntu.edu.sg)