

The Global Imperative

National University of Singapore Summary Report 2004



A Review of Academic Year 2003 – 2004
(covering July 2003 – June 2004)

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VISION

Towards a Global Knowledge Enterprise

*building synergies between
education, research and entrepreneurship*

MISSION

Advance knowledge and foster innovation,
educate students and nurture talent,
in service of country and society



At NUS, we have
embarked on a journey
to become a global university.
This year's annual report salutes
the programmes and achievements
leading the way.

CHAIRMAN'S MESSAGE

I am very pleased indeed to note the many achievements of staff and students in the past academic year 2003 to 2004 as highlighted in this Report. These achievements are related not only to academic pursuits but include service to society and nation.

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To retain its position as the nation's premier tertiary institution, NUS must spare no effort to raise the quality of its teaching and research. Against a backdrop of increased competition from other universities, including foreign ones that are about to establish campuses in Singapore, matters related to University governance and funding framework are under review with the Ministry of Education to enable NUS to move swiftly and effectively.

In line with the greater operational autonomy granted to NUS in recent years and the increased focus on quality and accountability, the University's governance structure was strengthened a year ago through the setting up of five standing Committees of Council: the Executive Committee, Establishment Committee, Audit Committee, Campus Planning & Development Committee and Nominations Committee. Since



DR CHEONG CHOONG KONG
CHAIRMAN, NUS COUNCIL

their establishment, these Committees have contributed immensely to Council's discharge of its main responsibilities of external accountability, strategic planning and oversight of the conduct and operations of the University.

- The Executive Committee (ExCo) has met monthly and whenever necessary to exercise the powers delegated to it in a number of areas, particularly those related to financial and asset management, campus development and safety standards.
- The Establishment Committee has oversight of senior appointments, especially those reporting directly to the President of the University. It also looks closely at succession planning, a task that no organisation can afford to ignore.
- The Investment Committee, a sub-committee of ExCo, is playing a key role in overseeing the investment policies for the University's endowment funds. Because investment returns from endowment funds will form an important source of future income to NUS, this is a particularly important committee.
- Following the Audit Committee's review, a restructuring of the Internal Audit Unit is underway to improve the audit function. The Audit Committee's role in reviewing the effectiveness and efficiency of the University's administrative, operating and accounting controls ensures the integrity of the institution and its operations. Changes made during the year and the increased emphasis on accountability have raised management's awareness of the need for transparency and due process in decision making.
- A critical issue under review by the Campus Planning & Development Committee, which has oversight of the strategic management of the University's land and buildings, is the upgrade of the University's physical infrastructure to international standards. With a student population of some 30,000 in a campus that was planned to accommodate a third of that, the Council has reviewed various options to alleviate the critical shortage of space, including the acquisition of the old Bukit Timah campus and the Warren/Medway land close to Kent Ridge.

Many of the plans deliberated upon at Council meetings and those of its Committees will require time for fruition. Results are seldom achievable immediately. I am grateful to my fellow Council members, especially those who served on the various committees, for their patience and willingness to devote precious time to a worthy institution.

The tasks ahead for NUS are numerous and varied as the educational environment is reshaped by technology and globalisation, and competition for staff, students, research funds and industry support intensifies. For NUS to improve and establish itself among the best universities of the world, more is required than an enhanced governance

structure. Skilful management and nurture of teaching staff, and strong leadership that inspires everyone to work as a team towards common goals, are equally essential. Funding changes and growing pressures for financial efficiency and enhanced accountability will require the University to adopt a more businesslike and professional approach to financial and asset management. Ultimately, the challenge for NUS will be to preserve its unique nature as an academic institution while operating as a large, complex organisation in a more diverse, competitive and uncertain environment.

I am very pleased indeed to note the many achievements of staff and students in the past academic year 2003 to 2004 as highlighted in this Report. These achievements are related not only to academic pursuits but include service to society and nation.

This was my last year on the NUS Council. It has been a very educational and stimulating four years. I thank my fellow Council members for their unstinting cooperation, without which my role would have been far more daunting. Special mention should be made of the following members who are retiring from the Council, having served diligently and well:

Mr Chay Wai Chuen
Professor Chong Chi Tat
Mr Kwa Chong Seng
Mr Liew Heng San
Mr Lim Jit Poh
Professor Wang Gungwu
Mr Wee Heng Tin

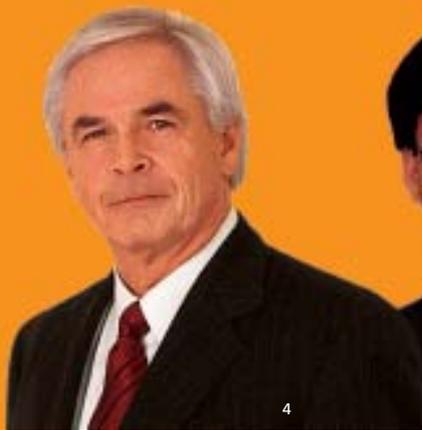
I will continue to watch the progress of NUS with keen interest, and I wish it continuing success.

DR CHEONG CHOONG KONG
CHAIRMAN, NUS COUNCIL



NATIONAL UNIVERSITY OF SINGAPORE COUNCIL

- | | | |
|--|--|--|
| <p>1 DR CHEONG CHOONG KONG
Chairman, NUS Council
Chairman and Executive Director
OCBC Bank</p> | <p>3 PROFESSOR SHIH CHOON FONG
President
National University of Singapore</p> | <p>6 MR CHAY WAI CHUEN
Chief Executive Officer
Grocery Logistics of
Singapore Pte Ltd</p> |
| <p>2 MR WONG AH LONG
Deputy Chairman, NUS Council
Chief Executive Officer
Suntec City Development Pte Ltd</p> | <p>4 DR STEVEN BAXTER
Director
Yong Siew Toh Conservatory
of Music
National University of Singapore</p> | <p>7 PROFESSOR CHONG CHI TAT
University Professor
National University of Singapore</p> |
| | <p>5 MR CHAN YENG KIT
Deputy Secretary (Policy)
Ministry of Education
wef 1 April 2004</p> | <p>8 MR EDWARD D'SILVA
Director
SAA Architects Pte Ltd
wef 20 December 2003</p> |



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9 MR WINSTON HODGE
Principal
Raffles Junior College

10 MR HSIEH FU HUA
Chief Executive Officer
Singapore Exchange Ltd

11 MR KWA CHONG SENG
Chairman & Managing Director
ExxonMobil Asia Pacific Pte Ltd

12 MR LIEW HENG SAN
Permanent Secretary
Ministry of Law

13 MR LIM JIT POH
Chairman
ComfortDelGro Corporation Ltd

14 MR JAMES LOH SINN YUK
Managing Director
JL Capital Pte Ltd

15 MS OLIVIA LUM
Group CEO and President
Hyflux Ltd
wef 20 December 2003

16 MR CHANDRA MOHAN K NAIR
Partner
Tan Rajah & Cheah

17 MAJOR-GENERAL NG YAT CHUNG
Chief of Defence Force
Ministry of Defence

18 PROFESSOR MARTHA PIPER
President
University of British Columbia

19 PROFESSOR WANG GUNGWU
Director, East Asian Institute
National University of Singapore

NUS acknowledges
Mr Wee Heng Tin's
contributions as a
Council member from
November 1998 to
March 2004.

NUS COUNCIL COMMITTEES

There are five NUS Council Committees, namely the Executive Committee, Nominations Committee, Establishment Committee, Audit Committee, and Campus Planning & Development Committee.

1. Executive Committee

The Executive Committee comprises the following members:

DR CHEONG CHOONG KONG (CHAIRMAN)
MR WONG AH LONG
PROFESSOR SHIH CHOON FONG
MR LIM JIT POH
MR JAMES LOH
MR CHANDRA MOHAN K NAIR

2. Nominations Committee

The Nominations Committee comprises the following members:

DR CHEONG CHOONG KONG (CHAIRMAN)
PROFESSOR SHIH CHOON FONG
MR LIEW HENG SAN
MR LIM JIT POH
MR WEE HENG TIN

3. Establishment Committee

The Establishment Committee comprises the following members:

DR CHEONG CHOONG KONG (CHAIRMAN)
MR WONG AH LONG
PROFESSOR SHIH CHOON FONG
MR KWA CHONG SENG
MR WEE HENG TIN

4. Audit Committee

The Audit Committee comprises the following members:

MR HSIEH FU HUA (CHAIRMAN)
MR WINSTON HODGE
MR KWA CHONG SENG
MR LIEW HENG SAN
MAJOR-GENERAL NG YAT CHUNG

5. Campus Planning & Development Committee

The Campus Planning & Development Committee comprises the following members:

MR WONG AH LONG (CHAIRMAN)
PROFESSOR SHIH CHOON FONG
MR CHAY WAI CHUEN
MR EDWARD D'SILVA
MR JAMES LOH

CALENDAR OF EVENTS

The NUS community stayed on course during the review year, steering the University towards becoming a global knowledge enterprise. Responding to new challenges and opportunities along the journey, their activities gave the year its distinctive calendar of events.

JULY – SEPTEMBER 2003



A change in tradition was made when the University brought forward its Commencement from September, to dovetail graduation with the close of the academic year in June. A 12-day event held in July, Commencement 2003 stood out as the longest cap-and-gown run in the University's annals. It will also be remembered for the record number of degrees conferred for the first time by graduate programmes jointly taught by NUS and its international partners. The happy faces of their graduates reflected the coming of age of the NUS global classroom.



NUS celebrated its first International Exchange Day on campus. Dedicated to underscore the global dimension of the NUS learning experience, the day's focus was the University's student exchange

programmes (SEP). A case was made for the day's rallying cry to "go global" with an exhibition that was manned by former and present participants of SEP. Many of them gave positive accounts of their experiences. Nearly 1,000 students and visitors participated in the event.



NUS signed a Memorandum of Understanding (MOU) with Karolinska Institutet, a top medical research institute in Sweden, to establish a joint Doctor of Philosophy degree programme in Genetic & Molecular Epidemiology and other aspects of Molecular Medicine. The programme, which will train scientists to face the rising challenges in genomic research, will build upon the strengths of existing research collaborations between the Institutet's Department of Medical Epidemiology and the NUS-Genome Institute of Singapore (GIS) Centre for Molecular Epidemiology. A pioneer batch of 18 candidates from both institutions started classes in August.

OCTOBER – DECEMBER 2003

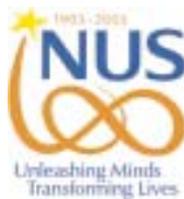


NUS, together with the University of Southern California, co-chaired the inaugural conference of APRU Enterprise to signal the launch of the latter. APRU Enterprise is a NUS-led strategic initiative aimed at promoting the best entrepreneurial programmes and practices amongst the 36 member universities in APRU (Association of Pacific Rim Universities). The *APRU Enterprise Conference* was held in conjunction with *Global Entrepolis@Singapore*, an entrepreneurial showcase, where NUS and APRU jointly hosted a booth to exhibit their technologies and research applications.

Chancellors Dr Andrew Chew, Mr Ridzwan Dzafir and Mr Ngiam Tong Dow. The logo was a winning design chosen from 200 entries submitted in a competition open to NUS staff, alumni and students. The design depicts the infinite growth of NUS from its founding to the future.



The 2003 World Student Summit, an annual student forum supported by the United Nations, was held at NUS. The student-driven event saw participants from Europe, Australia, Africa, South America and Asia converging at Kent Ridge campus to address issues of global significance and formulate youth action strategies. Among the keynote speakers were Mr William Adrainasolo, Head of the UN Volunteers Research Unit, Dr Amien Rais, Chairman of the National Assembly of Indonesia and Mr Gerson Florez, a Nobel Peace Prize nominee.



In a run up to the University's centennial celebrations in 2005, the University launched its centennial logo at the President's annual State of the University Address. Doing the honours were NUS Pro-

JANUARY- MARCH 2004

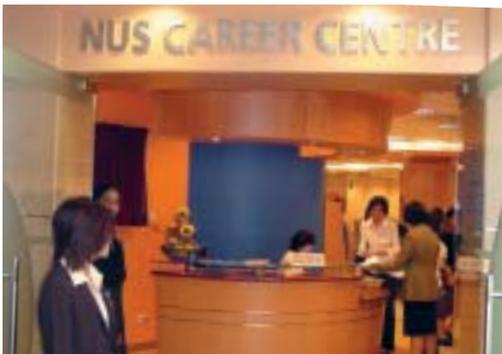


NUS Chancellor, President S R Nathan, officially opened Kent Ridge Hall's new premises at Heng Mui Keng Terrace. In keeping with the integrated living and learning experience that lies at the heart of NUS residential living, the new complex was designed to provide optimum social spaces where residents can meet to interact and engage. The oldest hall of residence on campus, Kent Ridge Hall can accommodate more than 500 residents at its new home.

training them in career development skills. A major initiative of the facility is the eJob Centre, an online job portal that gives students anytime and anywhere access to job recruitment advertisements.



Mr Tharman Shanmugaratnam, Singapore's Acting Minister for Education, was the guest-of-honour and keynote speaker at the Fourth Annual Symposium of the Singapore-MIT Alliance (SMA), an interactive distance learning collaboration between Massachusetts Institute of Technology (MIT), Nanyang Technological University (NTU) and NUS. Focusing on the theme of "Global Linkages", the Symposium showcased research activities and accomplishments arising from the partnership. Attended by more than 400 participants, this year's gathering marked the Alliance's transition as the partners embark on a more ambitious level of collaboration in SMA-2. The success of the first phase was celebrated with the presentation of the Distinguished Fellow Award to Professor Hang Chang Chieh (NUS) and Professor Merton Flemings (MIT) for their pivotal roles in its founding and development.



A new student resource was made available on campus with the opening of the NUS Career Centre. Offering a comprehensive range of career planning services, the Centre will add a further dimension to the development of students' personal growth by



APRIL – JUNE 2004

The NUS High School of Mathematics and Science emerged from the drawing board with the convening of its ground-breaking ceremony. To be located close to the University at Clementi Avenue 1, the school will occupy a land area of five football fields. Scheduled for completion in 2006, it is Singapore's first pre-tertiary school that is developed and managed by a university as well as the first to offer its own High School Diploma. The High School has tied up with DuPont Singapore to sponsor mathematics and science camps and the Singapore Science Centre to organise academic activities.

the Willem C Vis Arbitration Moot Competition, another NUS team not only took the *Best Memorandum Award* but a team member was named one of the top speakers in the competition.



NUS' Jessup International Law Moot Court team.

NUS Faculty of Law had a boom month in April. Three of its moot teams took to the world's stage and acquitted themselves admirably. The team competing at the Philip C Jessup International Law Moot Court Competition in Washington DC was the overall runners-up. At the Asia-Pacific regional rounds of the Manfred Lachs International Space Law Moot Court Competition in Sydney, the NUS team won the *Best Memorial Prize*. In Vienna, at

The Structural Biology Research Group under the Office of Life Sciences has succeeded in its bid to win a Shared University Research (SUR) award from the IBM Life Sciences Initiative. IBM awards approximately 50 SUR awards each year to institutions of higher education all over the world to facilitate research in areas of mutual interest such as life sciences, grid computing, automatic computing and deep computing. Under the award, NUS will receive the IBM eServer pSeries 670 server with 1.5GHz POWER4+ processors. The University will be using the computers to work with IBM Computational Biology Centre (US) on developing Platform Computational Technologies for Automatic Protein Structure Calculation, Drug Design and Protein Side-chain Dynamics Simulation.





NUS, like any university, is defined by its student population and the quality of its educational programmes. With higher education becoming globally competitive, the University revised its admission policy in the year to attract key talent and enhance their educational experiences at Kent Ridge.

The new criteria are centred on helping students discover and optimise their talents and passions. They will put in place a more intellectually challenging and stimulating environment made up of students with diverse and complementary strengths to trigger sparks in the classroom.

The new system which will apply to the intake for academic year 2004-2005 is characterised by the following features:

- Greater flexibility and differentiation, with students given the option to transfer between faculties and across disciplines during their first year to better enable them to make informed choices that balance their interests with abilities.
- Use of diverse measures of excellence, above and beyond academic achievements, to identify different abilities in students and better match them with learning programmes that will suitably challenge and stretch their potential.
- Making of dual offers to qualified and successful applicants, so that they can have a choice on the best programme that would maximise their personal and intellectual growth.
- A discretionary admissions policy, to admit up to 10 per cent of the incoming cohort applicants displaying singular talent or leadership qualities.

In implementing the revisions, the greatest change will resonate in the Faculties of Medicine and Engineering. Applicants to the former will now be measured not only on academic excellence but also on the basis of their communication skills and emotional quotient (EQ) in the form of a written essay and interviews. At the Faculty of Engineering, students will now be able to select a course of their choice at the point of admission and have the flexibility to transfer to another course within a year.

Global Brand,
**Global
Competition**





The Singapore Racer One (circa 2003), the first roadster to be built from scratch in Singapore, embodies the spirit of NUS education. It started out as the final-year project of seven students from the Departments of Mechanical and Civil Engineering, all avid fans of Formula One racing. Without any background in automotive engineering, they were able to accomplish what they did, encouraged as they were at NUS, to put theory into practice, to be creative and to see opportunities in challenges.

It took the team seven months to put together the seven designs they drew up for separate parts of the car. The car's fibre glass body panels, the steering mechanism and fuel-tank were built at the University's workshop. The modules the students took offered no model answer or textbook solution. They found their own answers through self-directed learning (by doing their own research) and inter-disciplinary application of knowledge (by seeing, for example, the driveshaft in terms of mechanics and materials). They gained deeper insight working, hands on, 16 hours a day on their project in a nurturing environment provided by NUS staff supervision and funding.

The final product is a single-seat SGR-01 with a lightweight steel space frame, powered by a 600 cc Suzuki motor-cycle engine that can reach 100 kmh in 4.2 seconds and has a maximum speed of 140 kmh.

The students took their new set of wheels to the 2004 SAE (Society of Automotive Engineers) Inter-university Race in Pontiac, Michigan, making history as the first team from South-east Asia to compete in it. It did not matter that they were not the first to pass under the chequered flag. What mattered most was they had finished the race they set for themselves – turning an idea into reality, powered by their passion, resourcefulness and problem-solving skills.

Knowledge Insights,
**Outward
Application**

Review

NEW BEGINNINGS

The academic year opened with a cohort that was the first to be admitted by applications submitted online. The year's intake was also the first to register for their modules online which gave them a homogeneous platform to bid for modules that are allocated according to their preferences. A total of 21,000 students took part in the bidding exercise to sign up for cross-faculty modules which form the crux of NUS' broad-based education.

Nearly 90 per cent of them succeeded in their bids for the modules of their choice.

Two new faculties started out in the academic year signalling new paradigms in NUS education. Offering NUS' first degree programme in music, the Yong Siew Toh Conservatory of Music received its first enrolment of 72 students from Singapore and the Asia-Pacific. The NUS Graduate School for Integrative Sciences and Engineering (NGS), a university-wide endeavour to spearhead trans-disciplinary graduate education and research in science, engineering and related aspects of medicine, started out with a register of 48 well-qualified local students and a 137-strong faculty recruited from the University and the national research institutes under the banner of the Agency for Science, Technology and Research (A*STAR). A report from its International Advisory Panel in March 2004 noted that NGS already has a base of academic excellence and significant momentum has been established since its opening.

At the Faculty of Engineering, a name change of the Department of Chemical & Environmental Engineering to the Department of Chemical & Biomolecular Engineering followed a growing trend in American universities that acknowledges the increasing role of biology as an enabling science in chemical engineering. The new programme will produce a new breed of engineering students with a solid background in biology and chemistry combined with the quantitative-integrative skills of an engineer.

QUALITY EDUCATION

NUS education made its mark as a regional leader in higher education with some bold initiatives. The new Specialist Master's programme in Chinese Law that the University will be jointly offering with East China University of Politics & Law, and Peking University Law School is the first programme of its kind to be taught outside of China. NUS is also the first Asian university to tie up with the University of Illinois at Urbana-Champaign (UIUC) to offer a joint PhD in Chemical Engineering. The University is the first in Asia to offer an Environmental Science and Engineering programme.

NUS Business School continued to retain its position as a leading provider of quality MBA programmes. Its full-time MBA programme was rated by *Asia Inc* (August 2003) to be one of the best 15 in Asia-Pacific and the best in ASEAN, and by the *Economist Intelligence Unit* (October 2003) to be amongst the world's top 100.

Life Sciences programmes continued to be well represented in the new programmes brought on in the year to enhance the University's curriculum. A Chemical Sciences programme was put together by the Faculties of Engineering, Science and Medicine and the Office of Life Sciences to provide undergraduates with a strong foundation in biological and life sciences. Work was in progress during the year to introduce a new Computational Biology course, an emerging inter-disciplinary science that would require students to be conversant in the Life Sciences as well as in Computing and Mathematical Sciences.

THE NUS GLOBAL CLASSROOM

Programmes jointly taught with international teaching partners, renowned for their niche expertise, continue to raise the quality of NUS education and give it a global dimension. This is especially true in the building up of NUS graduate education.

The value-add of a global perspective was underscored as new programmes now offer multi-location study stints rather than just a cross-campus experience. The Dual Degree Executive Master of Business Administration programme with

UCLA Anderson School of Management holds classes in Singapore, Los Angeles and Shanghai.

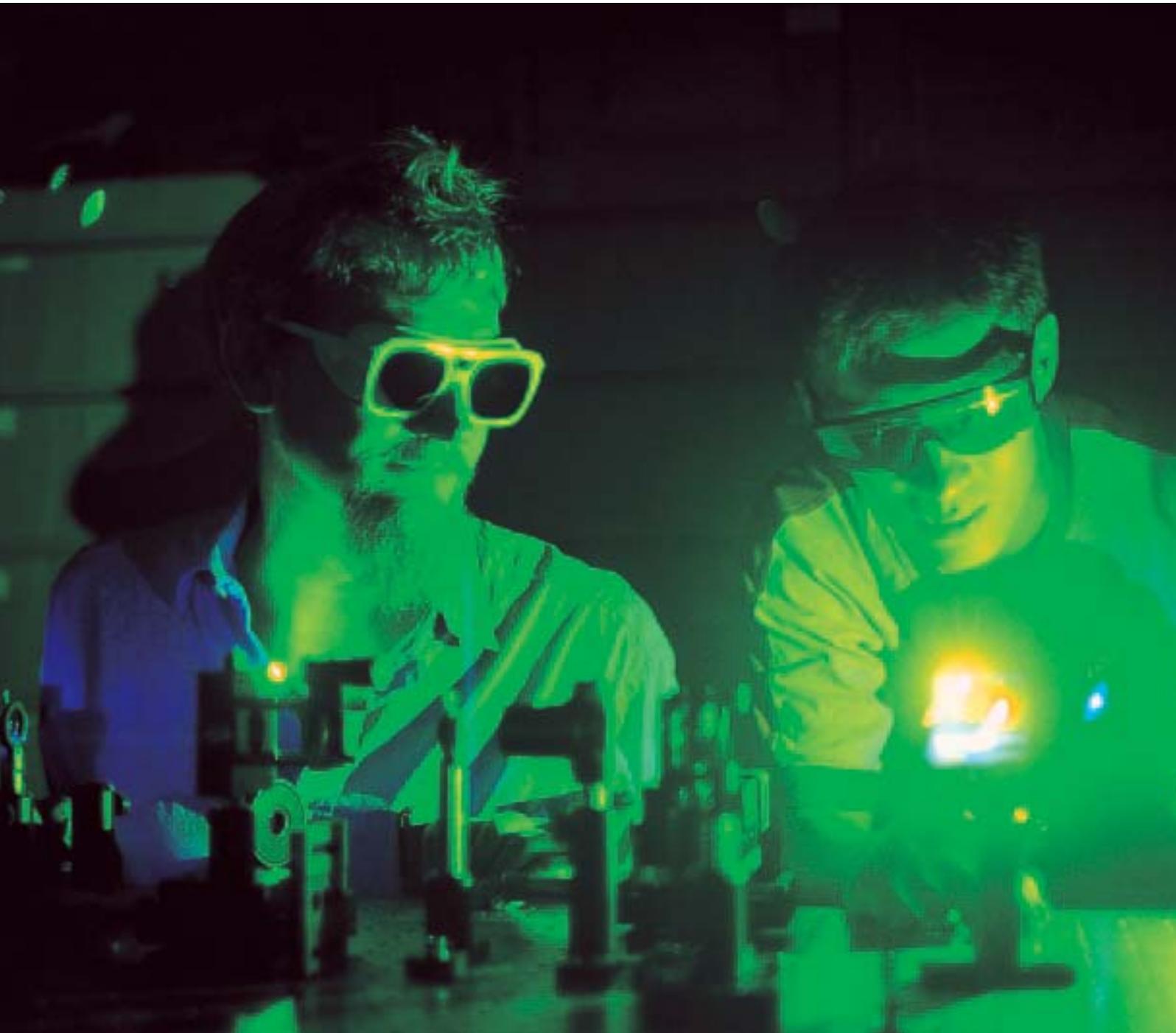
A major teaching partnership was formed in the year with a fellow member of the Association of Pacific Rim Universities (APRU). A joint degree agreement with the Australian National University gives NUS students a host of unique opportunities that combine the academic strengths of both universities. The comprehensive range of courses include a Joint Bachelor of Social Sciences honours degree in Actuarial Studies and Economics, a Joint Master of Arts degree in South-east Asian Studies and a Joint PhD degree in Physics.

THE EXTENDED CLASSROOM

In line with NUS' commitment to life-long education, NUS Extension increased its curriculum by 30 per cent to offer 250 courses by the first quarter of 2004. Of these, 17 were online courses on engineering and business law. Giving its portfolio a whole new profile, it has tied up with the extension arm of the University of California, San Diego, to offer a series of courses in life sciences and with Massachusetts Institute of Technology (MIT) to offer topical courses such as *Combating Bioterrorism* and *Promoting Innovations*.

THE VIRTUAL CLASSROOM

The University continued to leverage on IT technology to enhance its teaching. This was stepped up at the Faculty of Medicine with the establishment of the Simulation Training Laboratories. Jointly set up with the National Healthcare Group, the multi-disciplinary resource complements bedside training in medical instruction, using simulation technology for training in acute medicine, laparoscopic surgery and clinical skills.





NUS' Quantum Information Technology Laboratory captured the imagination of the scientific world when its work in photons was highlighted by the *New Scientist* (January 2004) as one of the year's top 10 scientific developments.

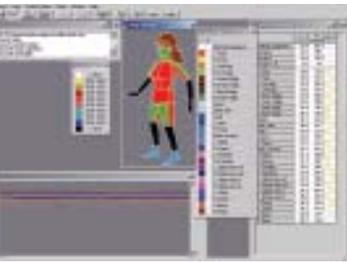
In quantum cryptography, small light particles called photons carry a "key" that locks up information sent between users. They offer unparalleled security in the field of communications as any attempt to intercept them will disturb their quantum state, that is, the way they behave. The disturbances are easily detectable as the quantum state is integral to generating the "key". An encryption protocol built on the ability to create, manipulate and detect single photons of light ensures that the key cannot be intercepted without detection. It has vital real-world applications particularly in financial and military operations.

Researchers at NUS are working on a new protocol to make the technology more robust against "noise," such as sunlight, which can affect readings. They are setting their sights on making Singapore the first country with a nationwide network of communication channels protected by quantum cryptography.

NUS' "no walls" culture is particularly conducive to the inter-disciplinary nature of quantum cryptography which draws its science from quantum physics, mathematics, computer science and engineering. The University's Quantum Information Technology Laboratory enjoys an international reputation that is drawing some of the top brains in the field to work on campus, attracted by its unique blend of theory and experimentation. The research initiative is co-headed by Professor Oh Choo Hiap (Head, Department of Physics) and Professor Artur Ekert, a pioneer of the technology, visiting from Cambridge University under the aegis of A*STAR's Science and Engineering Council.

Locally Made,
**Globally
Endorsed**

Campus Facilities, International Standards



NUS' research facilities are focal points of the University's research excellence. They provide both the resources and platform for the development of niche research critical for building up NUS' research vibrancy as well as contribute to undergraduate and graduate education. Well-equipped and state-of-the-art, they complement talent and a "no walls" collaborative culture to form the bedrock of NUS' research-intensive vibrancy.

Completed in the review year was the Field Environmental Chambers (FEC), a facility believed to be the first of its kind in the tropics, where a new paradigm of "field laboratory" research can be conducted to study human and indoor field environment phenomena. Located at the Department of Building, it has been designed to support a wide range of research initiatives in the areas of indoor air quality and energy.

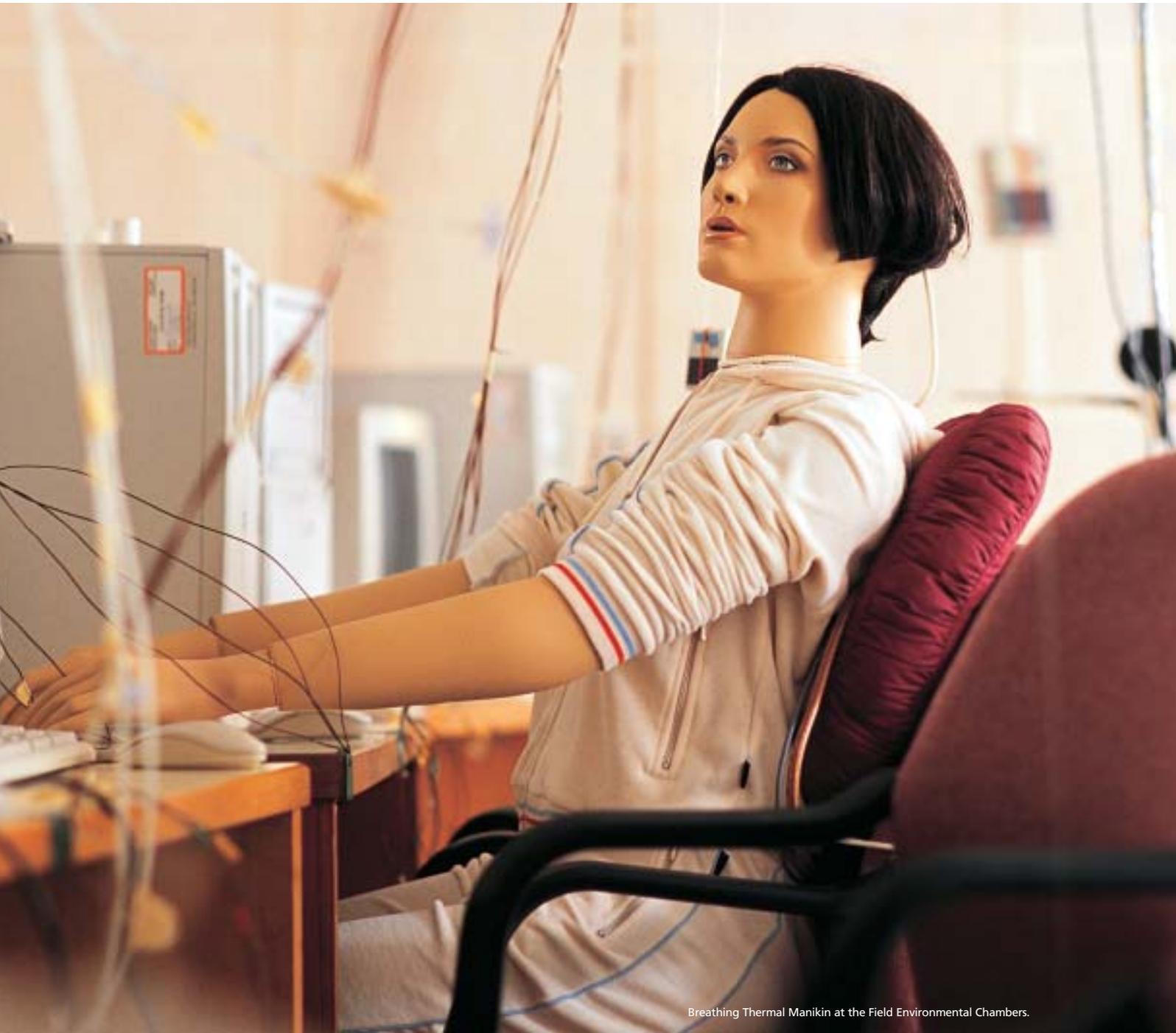
Integral to the facility with its two low pollution emitting rooms that can simulate ventilation strategies and real-life scenarios is a Breathing Thermal Manikin. The most advanced model of its kind, it has embedded under its skin a myriad of thermal sensors making it an invaluable tool, especially as a human replacement in experiments measuring thermal and air quality.

A new genre of research facilities, each anchoring on several interdisciplinary labs, is fast appearing on campus. Described appropriately as research corridors, their clustering of niche-related resources makes for an ideal environment to optimise on the leveraging of multi-disciplinary synergies.

A Nanobioengineering Corridor was jointly set up by NUS Nanoscience & Nanotechnology Initiative (NUSNNI) and the Division of Bioengineering. Comprising the Nano Biomechanics Lab and the Nanobioengineering Labs, it will enhance the medical and biological investigations carried out at the adjacent Bioengineering Corridor with nanotechnology approaches.

With a Structural Biology Research Corridor newly renovated and upgraded to include a Protein and Proteomics Centre, the Lee Hiok Kwee Functional Genomics Laboratories and Lee Wee Kheng Structural Biology laboratories, Singapore now has a dedicated facility to conduct research into proteins. Located at the Department of Biological Sciences, it is equipped with powerful instrumentation for micro-arrays, protein and cell chips, genomic and proteomics investigations.





Breathing Thermal Manikin at the Field Environmental Chambers.

Review

FUNDING

The process of creating and discovering knowledge positions NUS at the forefront in both its educational and entrepreneurial thrusts. In financial year 2003, sources as diverse as the Ministry of Education, the Ministry of Health, A*STAR, as well as public and private sector organisations injected funds of more than \$165 million into NUS.

The University scored in international recognition by qualifying for some high-profile funding that is highly sought after all over the world. As part of an international consortium made up of Johns Hopkins School of Medicine, Johns Hopkins Singapore and Brazil's health research foundation, NUS received a \$12.8 million grant from the National Institutes of Health, US, to study the dengue virus and develop a corresponding vaccine. In another tie up with Johns Hopkins School of Medicine and the National University Hospital, the University received a planning grant from the National Centre for Complementary and Alternative Medicine (CAM), US, to develop an infrastructure and scientific base for multi-disciplinary research in CAM.

RESEARCH ACTIVITIES

A total of 1,841 projects made up the year's research pulse. A third of them were new projects. The output was high both in quantity and quality. More than 2,600 research papers were published in refereed journals, both international and local.

The East Asian Institute, a university-level research resource, undertook an assessment of the Singapore-Suzhou Industrial Park project for the Ministry of Trade & Industry and published a report timed for the 10th anniversary celebration of the joint venture.

The University strengthened its research portfolio in the year with several new thrusts. They included focuses on Bioimaging, a programme led by Professor Colin Sheppard, renowned internationally for pioneering the development of several new generation microscopes; Tissue Modulation, an area that complements the University's existing programmes on Biomaterials/Tissue Engineering/Tissue Repair

research; and research on Chemo- and Bio-MEMS (microelectromechanical systems) and NEMs (nanoelectromechanical systems) to address the emerging trend towards labs-on-chips and plants-on-chips devices. A new Vaccine Research Initiative was formed to work on the development of vaccines against major infectious diseases such as dengue, SARS and tuberculosis.

Research in Grid Computing took off to a fine start with the joint set up of GIZ@NUS by NUS, IBM and Intel. Other new research facilities that took off in the year to spearhead niche research included the Saw Centre for Financial Studies and the Centre for Offshore Research and Engineering. The new MSEI-NUSNNI multi-disciplinary laboratory promotes interactions between researchers of the Materials Science & Engineering Initiative (MSEI) and Nanoscience & Nanotechnology Initiative (NUSNNI). A Disease Genetics Laboratory which seeks to uncover the genetic basis of human diseases using modern molecular techniques was another new addition.

"NO WALLS" RESEARCH CULTURE

The University continued to work closely with the national research institutes to leverage on synergies anchored on the strong teaching-research nexus between the two sectors and to meet national objectives. Joint appointments with research institutes under the A*STAR umbrella were formalised in the year with an MOU that spelt out over-arching provisions to streamline the process and facilitate a consistent application of terms and conditions in joint appointments.

The location of the recently-completed Defence Science Organisation Building at Kent Ridge brings to the campus researchers from the Defence Medical & Environmental Research Institute and SAF Military Medicine Institute to engage and collaborate with the University's research community.

In another high-impact collaboration at the national level, NUS joined the National Grid Pilot Platform to pool its IT resources with those of Nanyang Technological University (NTU) and the

A*STAR research institutes. The grouping of 200 CPUs made up a 1 Gbps (gigabits per second) high speed network that provides not only a seamless but also a secured and integrated cyber infrastructure to advance scientific, engineering and bio-medical research and development.

Unfettered by artificial and physical boundaries, NUS researchers look beyond the confines of their laboratories to build the critical mass of talent and cross-fertilisation of ideas needed for high-impact research. Collaboration with public and private sector organisations are a strong suit as well as interdisciplinary and international partnerships. Multi-pronged partnerships can be as multi-faceted as the one engaged in the year by the Division of Bioengineering. It teamed up with the Department of Biological Sciences, the Department of Biochemistry, the Singapore Eye Research Institute, the National Eye Centre, University of Freiburg and FibroSys, a German spin-off company, to study the application of novel pharmacological agents in down regulating scar formation in eye tissue repair. The findings will have high impact on eye surgery as well as contribute to the treatment of pterygium, a prevalent eye disease in Singapore and South-east Asia.

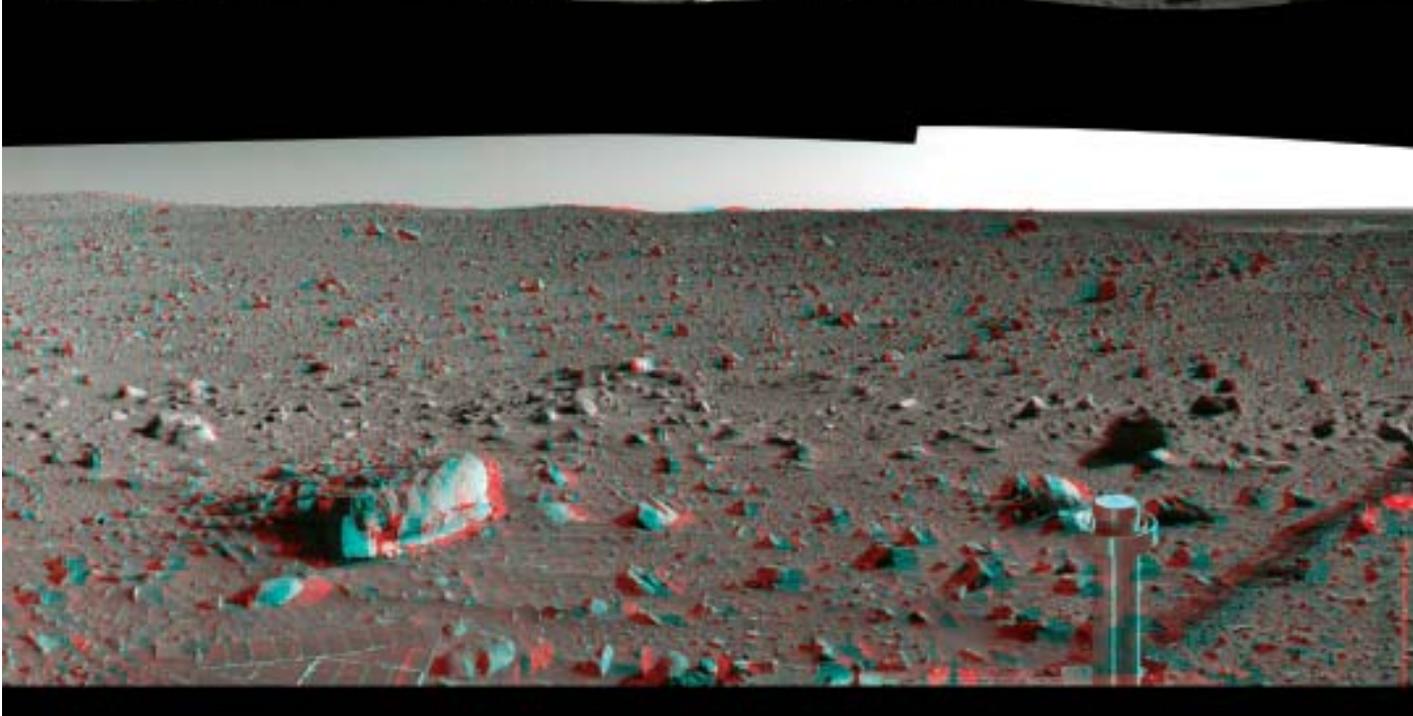
RESEARCH BREAKTHROUGHS

NUS researchers contribute to the push of knowledge frontiers with their research and development. Some of their findings that made an impact in the year included the following:

- Discovery of a monoclonal antibody that can detect RUNX3, a family of human cancer genes that suppresses the growth of cancer cells in the stomach. This breakthrough by researchers in the Office of Life Sciences is a boon to researchers seeking to analyse the protein in experimental systems. A patent is being filed.
- Development of a new strategy to get rid of cancer tumours by using drug and gene therapies to induce cancer cells to produce a protein on their surface, the way they do when they are dying. The protein attracts white blood cells which engulf and kill off the cancer cell. The findings of

this chemotherapy-free treatment, a joint collaboration between NUS and Karolinska Institutet, were published in the *Federation of American Societies for Experimental Biology Journal* (January 2004 issue).

- Development of a small portable test kit that will allow small blood samples to be analysed in minutes without the need to send them to a laboratory. The breakthrough to create the mini-lab, made up of computer chips fitted with miniature electronic components that have test chemicals built into them, was accomplished by a multi-disciplinary group of doctors, engineers and scientists from NUS, NTU and the Institute of Microelectronics.
- Development of several water quality assessment tools and enhancement system to facilitate the long-term viability of NEWater and contribute towards Singapore's aspiration in becoming the regional hub for water quality enhancement services. The project is spearheaded by NUS Centre for Water Research in partnership with the Ministry of the Environment, the Public Utilities Board, the Defence Medical & Environmental Research Institute and the Faculty of Medicine.
- A breakthrough was made by the Faculty of Engineering in the optimal fabrication of composite nanofibres that will ensure their filtering efficiency when used in air cleaning and impact positively the repair of damaged bones when applied to bone regeneration.
- The ability to stretch malaria-infected red blood cells (RBCs) above and beyond that currently possible. The larger deformation will enable researchers to gather more realistic information on the elastic properties of RBCs and better assist them in studying the mechanisms leading to the clogging of blood vessels and in overcoming the latter. The breakthrough is the combined effort of NUSNNI and MIT.



There is no telling where an idea can end up with creativity and enterprise.

Being part of a high-profile NASA (National Aeronautics and Space Administration) mission to Mars was probably the last thing on their minds when Assistant Professor Martin Henz (School of Computing) teamed up with his graduate student Sevugan Alagappan to work on an advanced programming technology that will shorten computing time needed to generate complex sports schedules from 24 hours to one minute.

Their immediate prospect for their schedule optimisation software was to submit it with a business plan to the *Start-up@Singapore (2001)* technology business plan competition. Walking away with the top prize, they went on to win *StartUp@Asia (2001)* at the regional level. With their prize money and a grant from NUS, the pair took the bold leap to start a spin-off. FriarTuck Pte Ltd was conceived in 2001 with Dr Henz as Managing Director and Mr Alagappan as Chief Operating Officer.

Three years down the road, FriarTuck made headlines with the announcement that its award-winning technology had been customised into FTStaffRosterer, a manpower-rostering software programme that churns out automated schedules for the 200 scientists working on the Mars Exploration Rover. The rest, as they say, is history when the Rover successfully landed on the planet on 4 January 2004.

In crediting NUS for the crossover that took them from the research lab to the boardroom, Dr Henz pointed to the constraint-programming group in the School of Computing for providing them with an engaging research environment. FTStaffRosterer was written in OZ, a constraint-programming language. He also credited the Incubation Centre at the School for hand-holding them when they were developing the product to bring it to the marketplace. For the final transformation from idea into business start-up, he acknowledged the help from NUS Enterprise, which was set up to inject an enterprise dimension to NUS teaching and research.

FriarTuck's other customers include Wharton Business School, the Big East (a major American sports league), the National University Hospital and Nanyang Business School.



Home Grown Technology, Global Reach



In the global development of knowledge-based economies, the research environments of universities have become hotbeds of innovations and new technologies. It takes, however, both entrepreneurial foresight and an enterprising spirit to create value out of knowledge. One way to bridge the gap is for academia to partner industry in synergistic alliances to develop questions being posed or investigated in campus labs.

One such connection in the year was a tie-up between NUS and Stem Cell Technologies Pte Ltd (SCTi), a company set up to apply adult stem cells to cell replacement therapies, to find a cure for diabetes. The cutting-edge collaboration will be the first in Singapore to work with adult stem cells. It will bring together the complementary strengths and expertise of basic research, clinical application, industry collaboration and surgery.

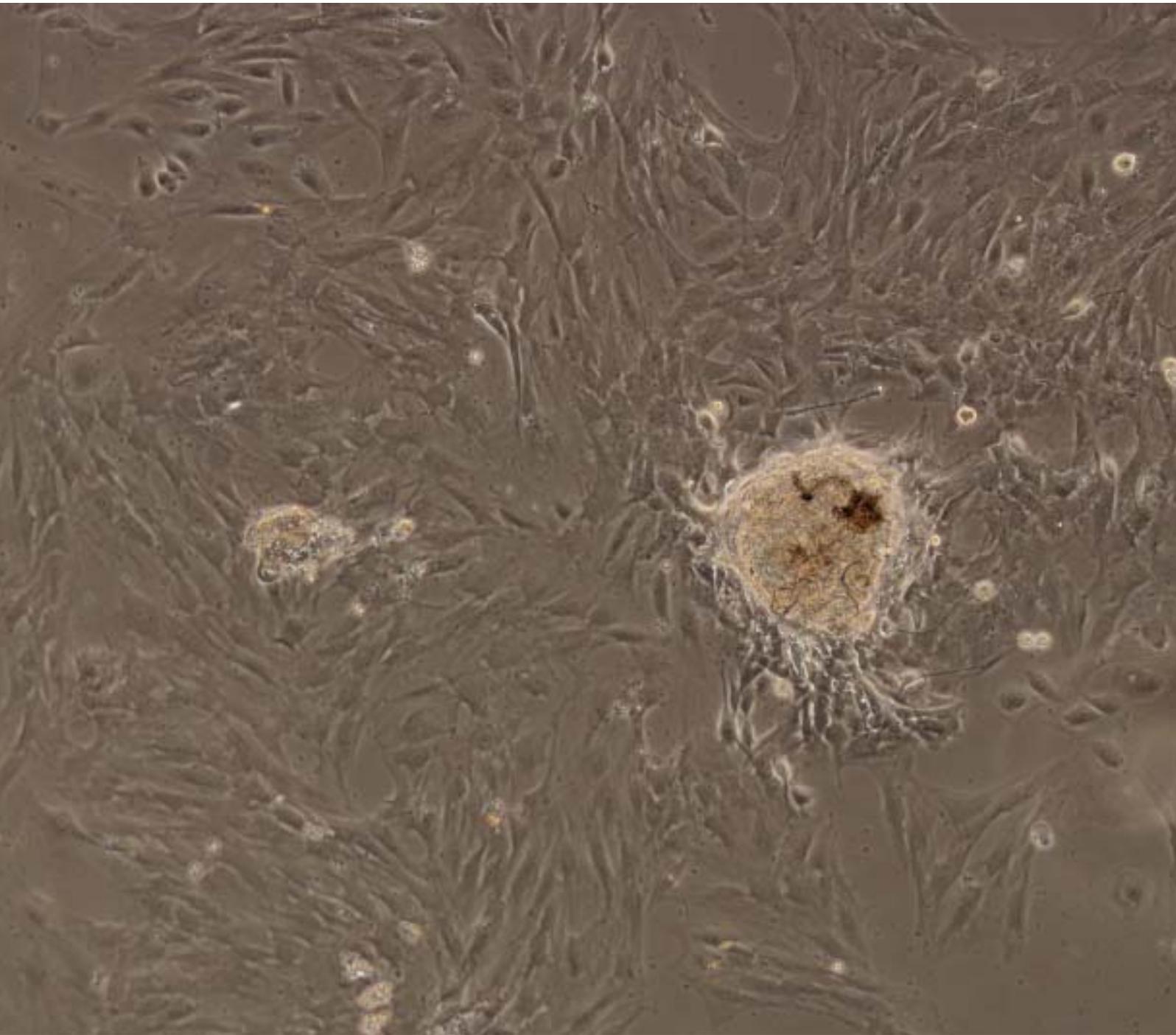
The project is based on academic premises with strong clinical possibilities. It will look into harvesting abdominal fat tissues from a diabetic and differentiating them to create insulin-producing cells which will then be transplanted back to the patient's liver. The value-add is in using the patient's own cells in treatment as this eliminates rejection.

Researchers in the project will be working with nine other research laboratories in Europe which are similarly engaged. Through this link-up, they will be able to tap into the expertise of such eminent researchers as Sir Roy Calne, Emeritus Professor of Surgery, Cambridge University and Professor Bernat Soria, Director, Institute of Bioengineering in Alicante, Spain. Dr Susan Lim, the Chief Executive Officer of SCTi, is well-known for her work in liver transplantation.

The collaboration was brokered by NUS Industry and Technology Relations Office, as part of the University's initiative to infuse education and research with an entrepreneurial dimension. According to the World Health Organisation, the number of diabetics worldwide will increase to 215 million by 2025.



Local Connection, Global Market



Review

EDUCATING ENTERPRISE

Spearheaded by NUS Enterprise and its host of enabling facilities, the University's entrepreneurial dimension experienced an upbeat year making good growth on all fronts.

The grooming of entrepreneurial intelligence was on course with the opening of NUS College in Shanghai (NCS), the third of the University's five proposed NUS Overseas Colleges (NOC). The first batch of students departed for China in February to take up internships and attend part-time entrepreneurial courses at Fudan University.

The formation of an alumni body by the first cohort to attend the first NUS Overseas College in Silicon Valley (NCSV) was a clear indication that the programme has come of age. Under the umbrella of NOC Alumni, graduates of the programme will bring together different sets of experiences towards a common goal of venture creation.

The success rate of the NOC programme has been encouraging. Fourteen teams which competed in the *Start-up@Singapore Business Plan Competition* in 2004 comprised students who had attended NOC. Engineering student Heng Eu Jin, who attended NCSV, is part of the team QuantaGen which won the 4th *Start-up@Singapore* and was a runner-up in the inaugural *Global Start-up@Singapore* competition. Other NOC students who had put theory into practice include real-estate student Goh Yiping with her venture World Indigo, and Simranjit Singh (Faculty of Science) and Chua Teck Hiong (School of Computing) with their partnership venture HelpToScreen. All these enterprises mirrored the grounding that their founders received from NOC. All are high-tech based, globally connected and targeted at world markets.

FUNDING ENTERPRISE

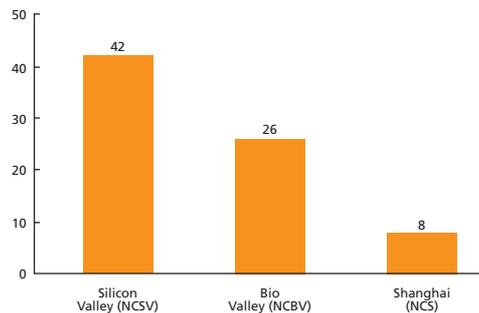
One of the biggest commitments made by NUS in the year to bring university-developed technologies and innovations to the market place was to set up dedicated funds catering to different needs and sectors. The University was appointed an EDB SEEDS Partner with the objective to promote

the growth of NUS start-up ventures. Three NUS spin-offs each received seeding from NUS and matching funds from the Economic Development Board (EDB) under the scheme.

The Technology-to-Market Fund with a purse of \$200,000 was launched as a funding mechanism to help new innovations bring across their commercial appeal through prototype development or shorten their launch time-frame through conduct of market feasibility studies.

Following the successful launch of the \$2-million NUS Venture Support Fund I in supplying seed money for NUS-start-ups, steps were taken in the year to kick off NUS Venture Support Fund II and raise \$36 million to fund 100 start-ups over the next few years.

NUS STUDENTS ATTENDING NUS OVERSEAS COLLEGES
Academic Year 2003-2004



ENABLING ENTERPRISE

New platforms were introduced that added to the entrepreneurial buzz on campus as they created opportunities for networking and new markets. An MOU was signed with the Edinburgh Research and Innovation Ltd, University of Edinburgh, to jointly market technologies from both universities and share resources and best practices. The *Global Wireless Venturing Forum* organised by NUS Entrepreneurship Centre enabled delegates to explore business and partnership opportunities and identify emerging markets, technologies and investment opportunities. A research to glean insights into the role of Asian entrepreneurs in

creating an enterprise ecosystem in Silicon Valley is being conducted by the University together with Stanford University and Majulah Connection.

Business plan competitions, which NUS took up to encourage innovators to think like entrepreneurs, came of age in the year. *Start-up@Singapore* initiated by the University as the nation's first technology business plan competition was brought to the regional level in 2001 as *Start-up@Asia*. In the review year, it completed its growth cycle with the *Global Start-up@Singapore Business Plan Competition*. Organised jointly with INSEAD, the event was held in conjunction with *Global Entrepolis@Singapore*, a showcase of leading-edge technologies and innovations.

Bearing out the common quest of both academia and industry to promote knowledge creation as a driver of economic growth, NUS teamed up with Motorola and the Business Incubation of Global Organisations (BINGO) to organise its first business

plan competition with an industry partner. The top prize in the inaugural competition was awarded to LIASER, a group of NUS graduate students and their partners, for a patent-pending technology that turns waste products like incineration ash and excavated marine clay into non-toxic, reusable products suitable as land fill in reclamation projects.

NUS ENTREPRENEURIAL DRIVE
1 April 2003-31 March 2004

No. of patents filed	115
No. of patents granted	25
No. of technology disclosures	125
No. of options and licensing agreements signed	17
No. of research collaborative agreements signed	75
No. of consultancies undertaken by NUS community	770

NUS ENTREPRENEURIAL DRIVE: THE SPIN-OFFS

The following companies succeeded in transforming the intangible into the tangible. In accomplishing this crossover, they secured the vitality and relevancy of the University as an engine of growth in the knowledge-based economy.

Biomimético Pte Ltd is developing applications like purification of bio-pharmaceuticals, water treatment, drug sensitive probes and active transdermal delivery patches. It is spun off from Supported Liquid Membrane technologies developed at NUS.

Brookly-Media Pte Ltd plans to develop and market 3D books. It is based on Augmented Reality technologies licensed from NUS Mixed Reality Labs.

Building System and Diagnostics Pte Ltd specialises in building systems and diagnostics, maintainability of buildings in the tropics, fire technology and facade engineering.

Decision Ware Simulations & Gamers Pte Ltd aims to further develop a multi-player business

simulation into a learning tool to train students in decision-making. It is a take-off of a computer simulation game with information systems support called MAGNUS.

Mikrotools Pte Ltd looks into developing precision micro-level machining technologies. It has developed a prototype machining tool that is capable of producing part features below 100 microns as well as carrying out multiple machining processes.

Osteopore International markets a biodegradable mesh-like plastic that facilitates bone to grow back when used to cover holes in the skull after surgery. The revolutionary material was developed by a multi-disciplinary team of researchers from NUS and National University Hospital (NUH).

Robust Dynamics provides services and technical expertise in material testing and characterisation to help engineers identify the most suitable materials for a robust product design. It is based on technologies developed at the Impact Mechanics Lab.

The trend started modestly with the establishment of NUS Overseas Colleges. In the review period, it gathered momentum with the University increasing its physical presence overseas. Whether driven by demand or needs, staking a foothold in global settings has raised the University's profile in the international arena and broadened the perspectives of NUS faculty and students as they venture to work and study abroad. International footholds were established in the year in the following countries:

- In China, with the setting up of the NUS-Fudan Joint Graduate School in Suzhou Industrial Park (SIP) Dushu Lake Higher Education District. The School will offer professional continuing education courses tailored to meet the managerial and executive communities working in the SIP as well as Master's programmes in Business, Science, Information Technology and Engineering.
- In China, with the launch of NUS Project Office in Pudong, Shanghai. A multi-functional centre, the Office will serve as "home" to alumni of NUS' MBA Chinese Programmes as well as a critical support centre to facilitate teaching and research, and promote NUS Business School in China.
- In France, with the setting up of SONDRRA at the Gif-sur-Yvette campus of French university Ecole Supérieure d'Electricité (Supelec). The research laboratory, with joint stake holdings by Singapore's Defence Science & Technology Agency (DSTA), Supelec, ONERA (France's Aeronautics & Space Research Centre) and NUS, will focus on advanced electromagnetics and radar.
- In Malaysia, with the opening of the Tun Tan Cheng Lock Centre for Architecture & Urban Heritage at Malacca. An extension of the Department of Architecture, the centre will conduct courses on heritage and conservation architecture.
- In the Netherlands, with the establishment of the Design Technology Institute/Eindhoven (DTI/E) at the campus of Eindhoven University of Technology. A joint venture between NUS and the latter, the facility is dedicated to research, education and knowledge transfer in the field of technological design.

Flying the NUS Flag Abroad



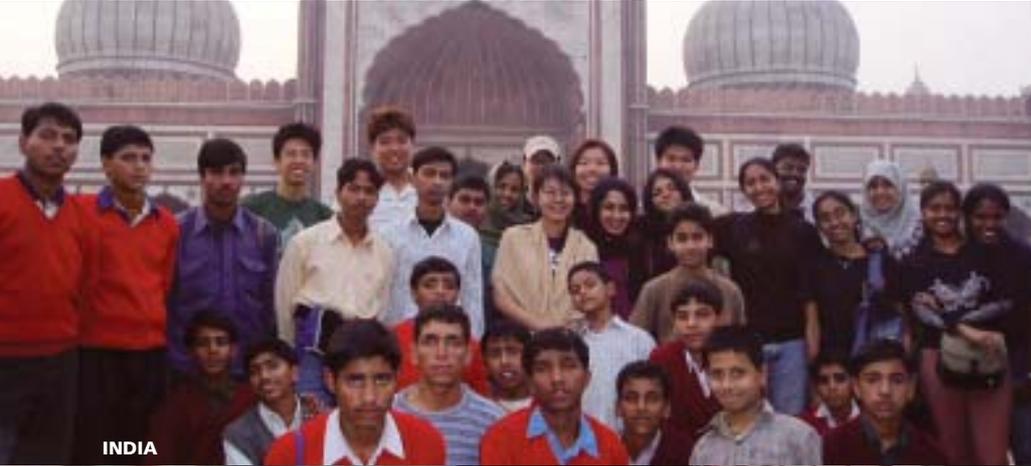


NUS

National University
of Singapore



CHINA



INDIA



VIETNAM



In an increasingly globalised world, adding a global dimension to the curriculum has become critical in equipping NUS students with a comparative advantage. The NUS Global Classroom started out as campus-based lessons taught in real-time by state-of-the-art distance learning technology. With internationalisation formalised as a major university thrust, first-hand real-life experience now complements the virtual experience.

The University Scholars Programme (USP), an honours programme that provides personal, intellectual and leadership development to highly-motivated students, underscores the development of leadership with a global outlook in the review year. This was executed through its *Global Programme-Learning Beyond the Classroom*, with the conduct of three projects:

- *Project: India – Initiative & Discovery in Action*, a study trip initiated and organised by students, to experience first-hand and reinforce what they have learnt in their module *Visual Cultures in India: Art, Architecture and Cinema*.
- First Sino-Singapore Undergraduate Exchange Programme, an offshoot of an idea mooted by Prime Minister Goh Chok Tong and Chinese Vice-President Hu Jintao to cultivate personal networks among youth leaders of both countries. USP's active participation in the programme saw its students making up nearly half of the Singapore delegation that visited tertiary institutions in Beijing and Shanghai, and Chinese government agencies. In reciprocation, USP together with several government agencies hosted Chinese students from four of China's top universities.
- *Venture Vietnam*, a community service project to Mit Mai Village. In addition to community work, the students also carried out extensive cultural documentation of minority groups in the Muong community at two villages in Ba Vi.

The success of the three programmes was featured at the *Third Schreyer National Conference*, under the theme *Innovations in International Education*. The Conference was organised by the Schreyer Honours College and the Schreyer Institute for Teaching Excellence, Pennsylvania State University, in association with the National Collegiate Honors Council, US.

Internal Programme, External Dimensions

Review

With internationalisation as the road map to gain a global presence, NUS continued to build up an international dimension in its educational, research and entrepreneurial thrusts. This build up will also support the larger Singapore vision of becoming a global entrepolis.

THE CHINA CONNECTION

As an emerging global economic power, China was a prime focus in the University's international positioning in the year.

A minor in China Studies was made available to all students to provide them with a basic understanding of Chinese culture, history, society, politics and economy that complements their major courses of study and prepares them for a career in or relating to China.

Bridges were built to connect with the country's wealth of talent as the University actively sought new partnerships with top Chinese universities and strengthened existing ones. Collaborative MOUs were signed with top-notch universities such as Shanghai Jiao Tong University and Tsinghua University.

Two MOUs signed with Fudan University led to the setting up of the third NUS Overseas College in Shanghai and provided the impetus for joint initiatives in academic exchange, research and student exchanges. The NUS-Zhejiang University collaboration inked in the year marked a new model of exchange between NUS and a Chinese university. Under the MOU, students as well as executives of local companies from both countries will attend cross-campus summer courses to better understand the host country's history, culture, governmental system and business environment.

Relations between the two countries' academic community were so robust that the *4th Sino-Singapore Conference on Biotechnology* hosted by the Faculty of Science was attended by seven Chinese universities that included Fudan, Peking, Sun Yat-Sen, Nankai, Wuhan, Tsinghua and Xiamen.

In a timely move, NUS set up the China Initiatives Steering Committee (CISC) to co-ordinate the University's efforts to move into China. Besides

driving existing relationships to higher levels of partnership, CISC will look into cultivating new strategic relationships with emerging Chinese cities to seize first-mover advantage and secure future sources of graduate students. The committee's mission was strengthened by the support it received from the Lee Foundation with a pledge of a \$2.55 million gift.

In a parallel development, a China Virtual Office was set up to serve as a one-stop information portal of NUS' activities in China for easy referencing.

EXPANDING EXTERNAL DIMENSIONS

NUS continued to build up on student exchanges and cross-campus study stints to provide its students with a global education.

The University's distinctive Double Degree Programme (DDP), drawn up with six of France's top *grandes ecoles*, to give its engineering and science students a French perspective in their knowledge fields, was expanded to cover ASEAN students and those from the School of Computing. The scope of the programme with Supelec was broadened to include a Joint PhD in electrical and computer engineering.

The Eastern Europe Research Scientists & Students (EERSS) Exchange & Collaboration Programme also expanded its scope in the year. Applications this year came from Poland, Ukraine and the Czech Republic, besides the traditional source, Russia. Since the programme started in 2001, a total of 58 scientific visitors from the region had visited NUS and conducted 105 seminars under the programme. The 1st NUS-Moscow State University (MSU) Scientific Forum was convened in the year.

New exchange destinations were opened up in the year through the facilitation of the DUO-Denmark Exchange Fellowships, a newly-launched programme sponsored by the Danish government for Asian partners. NUS clinched two such Fellowships with the Technical University of Denmark and Aarhus University.

Student exchange to North America received a boost with a grant of \$3 million from the Lee Foundation to facilitate a reciprocal student exchange

programme between NUS and the University of British Columbia for a period of six years.

At the close of the academic year, the University has in its books a total of 136 universities signed up as student exchange partners.

INTERNATIONAL NETWORKING

NUS continued to play an active role in academic networks in which it is a key member. They are the Association of Pacific Rim Universities (APRU), the ASEAN University Network (AUN) and Universitas 21 (U21). Besides hosting the *APRU Enterprise Conference*, NUS was also the venue for the *APRU 4th Distance Learning & The Internet Conference* and the *2004 ASEAN University Network Quality Assurance Workshop*. NUS President, Professor Shih Choon Fong, in his capacity as chairman of APRU, addressed university presidents of the Association of American Universities (AAU) at its Spring Meeting in Washington DC. The occasion represented a unique opportunity for NUS to engage the presidents of some of the top universities in the US.

INTERNATIONAL STUDENT MOBILITY Academic Year 2003-2004

No. of NUS students who went on student exchange	539
No. of international exchange students hosted by NUS	728
No. of NUS students studying in NUS Overseas Colleges	76
No. of students who went to France under the DDP	9
No. of French students in NUS under the DDP	10



Integrated living and learning ensures the NUS experience is not just a paper chase. It is the value-add that gives the NUS graduate that extra mettle to take on the world, even as they are empowered by knowledge, a global outlook and an enterprising spirit.

In the familial setting of residential life, learning is enriched as living skills are honed through community living, shared experiences and social engagement. Character is built participating in a myriad of activities ranging from sports events to hall productions. Service and a sense of community are gleaned from the spirit of volunteerism that prevails in the student organisations. Minds are open and outlooks broadened through bonding and networking in the cosmopolitan community that is NUS.

In the review period, NUS students continued to meet their goals. The 2003 Rag and Flag Day raised an impressive sum of over \$400,000 for charities. The Make-It-Real mountaineering team successfully scaled the 6,180m Island Peak in Nepal. The NUS Everest Team completed their climb up the 8,035m Mount Gasherbrum II in Pakistan in preparation for their assault of Mount Everest, as part of the 2005 NUS Centennial celebrations.

The well-roundedness of NUS students extend to their connection and integration with the world at large. No one proved this more than Quek Wei Cheng when he received a Gold Medal in the *Engineering Colours Awards* for his outstanding contribution to the community as a grassroots leader. His service record includes organising more than 40 events for the Kreta Ayer-Kim Seng constituency. Lim Hong Tai (Faculty of Engineering) responded to the nation's call when he represented Singapore at the 22nd South-east Asian Games in the 500m and 1,000m canoeing races.

University as a Launch Pad to the World

INTEGRATED COMMUNITY

The health of a University is contingent upon renewal. Each new cohort, however, is connected to the past even as they define the future. In this chain, the alumni play a key role cementing the ties that link and boosting new blood with their experiences, insights and achievements.

In step with the University's broadening global dimension, NUS now has 13,000 overseas alumni and nine overseas alumni chapters in major cities around the world.

In aligning graduates to their stakeholding in the University, NUS is cultivating lifelong ties with its alumni from the first day they set foot on Kent Ridge as undergraduates, rather than the day they leave the University. Associate Directors both at the faculties/schools and halls of residence engage students long before they graduate.

In evolving to becoming an alumni-centric university, NUS is building a permanent home for its 140,000 strong alumni to reconnect with one another and the campus community, as well as to serve as a base for them to engage in life-long learning. The Shaw Foundation Alumni House, so named after a gift of \$10 million from the Shaw Foundation, will be completed in 2006. It will be part of an Alumni Complex that will connect up with the Kent Ridge Guild House of the National University of Singapore Society (NUSS).

To facilitate alumni bonding, *AlumNET*, the alumni website, was revamped to create an active and vibrant e-community. New features boosting connectivity include chat rooms, e-groups, business card directories and e-mail forwarding facility.

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University for Life





NUS
NATIONAL UNIVERSITY OF SINGAPORE

VISION
Towards a Global Knowledge Enterprise
Creating a world-class university
with a global perspective

MISSION
Advance knowledge and foster innovation
through academic and research efforts
in service of country and society

Review

REVIEW OF RESOURCES AND SERVICES

The University's resources and services provide a framework on which NUS can build its excellence in education, research and entrepreneurship. In supporting the three core competencies, the corporate cluster too has risen to the challenge of becoming part of a global knowledge enterprise.

CAMPUS DEVELOPMENT

Through campus development, NUS continued to build a physical sense of identity, place and community for all its stakeholders. Some of the buildings completed in the review period were the interim building of the Yong Siew Toh Conservatory of Music and Centre for Animal Research. By April 2004, the Office of Estate and Development had completed more than 70 per cent of the \$322 million Campus Upgrading project. It had also factored into all high-cost campus development projects key cost-saving initiatives such as the Value Engineering Review and Electronic-Bidding Mechanism.

IT RESOURCES

A key university resource, IT has been strategically leveraged to enhance the quality of NUS teaching, research and administration.

The Computer Centre spearheaded a drive with the faculties and departments to re-engineer, integrate and automate many business processes in the year. A quantum leap was achieved with the commissioning of over 50 e-services. This has enabled the University to meet several key performance indicators defined in the e-Government Action Plan mandated by the Ministry of Education.

The University has achieved a record of zero break-in into its IT resources with the reinforcement of 12 additional firewalls as well as refinement of its security policies and user education and training.

LIBRARY RESOURCES

NUS libraries directed their activities in the year to increasing access to information, raising levels of customer service and promoting information literacy. At the Central Library, these were carried out as

seamlessly as could be under the challenges posed by upgrading works at its premises.

IT-driven information access was a major drive, in a year that saw the implementation of E-reserves, the launch of InfoGate, a search facility, and the unveiling of the NUS Library Portal, where users can personalise the Library's homepage according to their needs.

In a role-changing move that signalled the broadening of its agenda, NUS Libraries took on an external dimension by accepting A*STAR's appointment to manage the library at the Biopolis, the nerve centre of Singapore's biomedical science industry.

As at 30 April 2004, the NUS Libraries collection stood at over 1.2 million unique titles. Loan transactions were over 1.22 million and memberships stood at over 50,000.

ARTS AND CULTURAL ENRICHMENT

Arts and culture on campus continued to evolve dynamically and vibrantly. The year stood out for the verve and vivacity brought about by many exciting developments.

A new platform was introduced targeted at both enrichment and education. Aptly named *Inspiring Artists*, it will be presenting to the campus and Singapore communities international artists who will not only perform but also conduct master classes and engage in artistic collaborations. The series started off with Russian piano virtuoso Konstantin Scherbakov.

Bringing new sounds and artistic expressions to the campus were the formation of the NUS Singa Nglaras Gamelan Ensemble and the promotion of plastic arts through the staging of an inaugural solo competition by sculptor Jacqueline Ng. The NUS community was enriched with donations of artwork to NUS Museums that included 105 paintings by the late American Chinese artist, Dr David Kwo, and an eclectic collection of ceramics and paintings donated in memory of the late Mr S C Lu.

In a far-sighted gesture that will impact the forging of a distinctive Singapore sound, the Kent Ridge

Ensemble was formed under the banner of the Centre for the Arts' (CFA) Special Projects initiative. Comprising a Chinese and an Indian section, as represented by the Xin Yun Quintet and Sur Shringar Quartet respectively, the Ensemble hopes to provide the best of Chinese and Indian music while underpinning the creation of new directions that would help define music that the nation would be proud to call its own.

While NUS arts and culture have always reached out to engage the local community, CFA made its first foray to embrace an international audience with its first international tour. Student performing groups under its auspices presented a multi-cultural fusion of music and dance during a 13-day tour of India. The NUS Museums took its Chinese calligraphy collection across the causeway to premiere at the Islamic Arts Museum Malaysia in Kuala Lumpur.

FIRST STRIKES

In working towards excellence and challenging themselves to give of their best, NUS stakeholders have set new records as pioneers and front-runners.

- NUS President Professor SHIH CHOON FONG made his mark as the first Singaporean to garner one of the highest professional distinctions accorded an engineer with his election into the US National Academy of Engineering (NAE) as a Foreign Associate. His election was in recognition of his contributions to the development of innovative computational methods in non-linear fracture mechanics and for his international leadership in engineering.
- The co-terminal programme of the Department of Architecture is the first of its kind in the University's curriculum structure. It filters undergraduates with strong design portfolios into the Master of Architecture programme and subsequent professional registration with the Singapore Board of Architects, without the need to re-apply.
- *The 7th triennial International Conference of the International Society of Indoor Air Quality and Climate (ISIAQ)*, jointly hosted by the Department of Building and ISIAQ, was the first to be held outside the traditional European-American circuit.
- NUS is the first Asian university to receive the *Best Paper Award* from the *Computers and Chemical Engineering Journal* when a paper co-authored by Associate Professor I A KARIMI, Dr R SRINIVASAN and graduate student Mr N JULKA on chemical supply chain management was given the *2002 Best Paper Award*.
- In a double first, Assistant Professor ONG SOH-KHIM is the first female engineer from ASEAN to receive the *M Eugene Merchant Outstanding Young Manufacturing Engineer Award* from the US Society of Manufacturing Engineers. A paper she co-authored with Professor NEE, ANDREW and Dr LI WEIDONG also made an impact as the first from an Asia-Pacific university to win the coveted Norman A Dudley Award 2002 from the *International Journal of Production Research*. The paper was judged as having the most potential to make the greatest contribution to advancing manufacturing practice.
- *The Inaugural Conference of the Asian Law Institute* hosted by the Faculty of Law saw one of the largest gatherings of Asian legal scholars ever assembled.
- NUS research has pioneered the world's first glow fish, genetically modified to produce fluorescence as pollution indicators. Associate Professor GONG ZHIYUAN's (Faculty of Science) patented technology is sought after by biotech companies in the US and Taiwan interested in producing the genetically-modified zebrafish for the ornamental fish trade.
- A breakthrough achieved by the Biophysics group led by Associate Professor LIU XIANG YANG (Faculty of Science) on the mechanisms of anti-freezing by anti-freeze proteins to inhibit ice crystallisation has been described by the editor of the *Journal of Biological Chemistry* (Vol 278, 2003) as the "first detailed mechanistic study on the process".

LOOKING AHEAD

The year ahead looks just as exciting for NUS. Several milestone developments are expected to take place. Below are some of the programmes and initiatives that the University expects to roll out in academic year 2004-2005.

- The 9th Annual Presidents' Meeting of the Association of Pacific Rim Universities (APRU) will be hosted by NUS.
- Celebration of the centennial anniversary of the founding of NUS.
- Emergence of InfoComm and InfoTech (ICIT)-related research under the ICIT Initiative.
- An *International Conference on Teaching and Learning in Higher Education* will be held at NUS. The theme will be *Individual and Institutional Self-Assessment in Higher Education*.
- The Lee Kuan Yew School of Public Policy will start classes as an autonomous school. The inaugural dean will be Mr Kishore Mahbubani who was Singapore's Permanent Representative to the United Nations before taking up his new post.
- A Master of Science (Financial Engineering) by Distance Learning will be offered by NUS making the University the first in Singapore to offer such a programme.
- The Master of Science Joint Programme between NUS and Technische Universitat Munchen (TUM) will be expanded to include a second specialisation in Information Security and Cryptography.
- New academic programmes to be introduced in the next academic year include
 - a Master's programme in Industrial Design by research
 - a graduate programme in Nanoengineering under the NUS Nanoscience & Nanotechnology Initiative (NUSNNI)
 - a Specialisation in Offshore Engineering.
- The NUS High School of Mathematics and Science will begin classes at its temporary premises at Raffles Junior College.
- The setting up of a South Asian Institute to complement analysis and insights presently offered by the East Asian Institute and the Institute of South-east Asian Studies.



