

**STATE OF THE UNIVERSITY ADDRESS 2002  
BY PRESIDENT AND VICE-CHANCELLOR OF  
NATIONAL UNIVERSITY OF SINGAPORE  
PROFESSOR SHIH CHOON FONG  
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**RE-MAKING NUS:  
FOSTERING A NEW ORGANIZATIONAL CULTURE**

NUS Council  
Students, alumni, faculty and staff  
Ladies and Gentlemen

**1. Paradigm Shift in the Global Economy**

We have entered a new millennium where knowledge and talent constitute the critical resources for wealth creation.

For much of the first and second millennia, China was the unrivalled economic, technological and military power. The Chinese invented the compass, paper, silk, fireworks, gunpowder, the seismograph and printing, among others. However, China placed greater emphasis on maintaining the status quo than advancing knowledge and exploiting technology. In the end, the Middle Kingdom stagnated.

The past two centuries were marked by the ascendance of trans-Atlantic industrial powers. Propelled by the invention of the steam engine and steamship, electricity and telephone, automobile and airplane, Europe followed by America became the dominant economic and military powers. In the second half of the 20<sup>th</sup> century, America surpassed Europe. One might call the 19<sup>th</sup> and the 20<sup>th</sup> centuries the Atlantic Rim centuries.

The turn of the millennium witnessed a paradigm shift.

Over the past decade, the world experienced fundamental changes in knowledge discovery and transfer, commercialization and wealth creation. Incremental innovation and refinement, critical for past successes of developed economies in Europe and Japan, is no longer sufficient to assure continued economic growth. Industrial economies deriving their strengths from incremental refinements are unable to break out of their state of stagnation. By contrast, significant sectors of the American economy are charging ahead by taking advantage of rapid innovations in information and communications technologies.

Today, the Pacific Rim region encompasses some of the world's most vibrant economies. They include advanced, post-industrial economies, as well as rapidly industrializing economies. Some Pacific Rim economies are investing in their up and coming research universities, which are taking on roles as engines of innovation and wealth creation. At the same time, we are seeing the intensification of trans-Pacific ties and linkages facilitated by a more balanced talent flow between North America and Asia. Not surprisingly, some have forecasted that the 21<sup>st</sup> century will be the Pacific Rim century.

## RE-MAKING NUS: FOSTERING A NEW ORGANIZATIONAL CULTURE

This paradigm shift in the global economy presents challenges and opportunities for Singapore. As Singapore remakes itself to seize these opportunities, we must also re-make NUS.

### 2. Our New Mission

Moments ago, the new NUS mission was launched. Advancing knowledge and fostering innovation calls for a culture of openness, alertness to opportunities, and willingness to take on challenges.

Quality university education must embrace both learning and discovery. Both should be integrated with the processes of creating and applying knowledge. In this way, the teacher-scholar can unleash the students' intellectual curiosity, foster their mental agility and critical thinking skills, as well as inspire them to be persistent learners throughout their lives.

An NUS education should offer opportunities for industry involvement that connects learning and discovery with knowledge transfer. Indeed, advancing knowledge, fostering innovation, educating students, and nurturing talent are intertwined and mutually reinforcing.

At the opening of Prince George's Park Residences, DPM Dr Tony Tan spoke of the major roles a world class university should play in a modern economy and society: that is deliver quality undergraduate education; develop graduate education and research; foster entrepreneurship and industry involvement.

Dr Tan also stressed that as Singapore embarks to re-make itself, NUS too must re-make itself to become "*a premier university in the region and an institution which all Singaporeans can be proud of*". He called on the whole NUS community – faculty, students, and alumni – to generate ideas, debate and deliberate towards attaining this goal.

The NUS community is delighted to take on this challenge. We are grateful for the trust and confidence the government placed on us to serve country and society. Indeed, our new mission resonates with Dr Tan's call to re-make NUS.

Moments ago, you watched "The Year in Review". More details of our achievements are given in my written address which will be available on the NUS web.

### 3. Fostering a New Organisational Culture: Saying No to Walls

I like to return to the challenge to "Re-make NUS". Re-making NUS calls for nothing short of infusing a new organizational culture. It is about saying "No to Walls" and saying "Yes to Partnerships".

I'm sure you have heard the expression "hit a wall". Let me share some of my travel experiences with hitting walls.

#### The Walls of China

##### *The Great Wall*

The first wall I hit was the Great Wall of China, the only made-made structure visible from the moon. Like all "hao(3) han(4)" or tough guys in the making, I climbed the Great Wall. I was awe-struck. Why was the wall built?

## RE-MAKING NUS: FOSTERING A NEW ORGANIZATIONAL CULTURE

My guide book claimed that the Great Wall was meant to keep out barbarians. I mused. For all the protection the wall offered, China fell to the Mongol invaders in the 13<sup>th</sup> century and the Manchurians in the 17<sup>th</sup> century. The wall promoted complacency and a false sense of security.

### *Burning ships to build a sea wall*

On a trip to Melaka, I visited a museum containing extensive records of Admiral Cheng Ho. Cheng Ho made seven voyages to the Americas, Europe, Africa, Middle East, South Asia, and Southeast Asia. His flagship was 400 feet long and had nine masts. By comparison, the 85-foot long Santa Maria, which took Columbus to the New World nearly a century later, was a dwarf. We can see this in the slide.

Let us do some arithmetic. Dividing 400 by 85 and taking the cube, we find that Cheng Ho's ship had 100 times more capacity than the Santa Maria. Cheng Ho's armada of 300 ships was also 100 times larger than Columbus' "fleet" of three.

Rather than seeing Cheng Ho's armada as an asset, the Chinese emperor ordered the ships to be burnt and records of his voyages destroyed. The Emperor banned naval expeditions and ships with more than three masts.

The moral of the Cheng Ho story is that the burning of the ships raised a sea wall that ended up extinguishing the greatest naval power at the time. This paved the way for the entry of the Portuguese, Dutch, and English into Asia.

### *Intellectual and Cultural Walls*

China has a long record of building walls including intellectual and cultural walls. This took its toll on creativity and technological progress. The middle kingdom's "culture of walls" contributed to its decline in the past centuries.

### Berlin Wall

In the mid 80s, I "hit another wall". When I traveled from West Berlin to East Berlin, I saw a most oppressive sight – the Berlin Wall. I felt a shudder when I stood there looking at this forty-three-kilometer monstrosity. The Berlin Wall, which stood for three decades, symbolized isolation and oppression. By the time it fell in 1990, the East Germans were deep in poverty and misery.

Over the years, I came to appreciate how nations and institutions can fall when they build walls. Walls built to insulate, isolate, preserve vested interests or in reaction to myopia and parochialism are of little use. Ultimately, they proved futile.

### Say "No to Walls"

Today, walls are no longer in fashion. The Berlin Wall fell. The Sea Wall is demolished. Along with the world, China has also changed. It is now saying "No to Walls".

In the last two decades, China has taken bold steps to tear down walls standing in its way of progress. An example is how it has embraced globalization. By joining WTO, China opens itself up to global competition. As China learns and integrates best practices from the rest of the world, it is well on its way to becoming a global economic powerhouse.

We can take a leaf from China's history. As we embark on our mission and take on the challenge to re-make NUS, we must also remove walls and compete globally.

#### 4. Fostering a New Organisational Culture: Saying Yes to Partnerships

In April this year, I spoke at the 13<sup>th</sup> Singapore General Hospital (SGH) Annual Scientific Meeting Dinner. I must have been thinking about “no walls”, for I spoke on the topic of synergy, that is, the whole being greater than the sum of its parts. In particular, I focused on the question of how NUS and SGH can build a win-win partnership. I felt that we could accomplish this by leveraging on the distinctive yet complementary strengths of the two organizations.

Let me explain “synergy”. I will draw an analogy from vector algebra. Vectors are similar quantities. When we add vectors, the result can equal the algebraic sum of its parts, or the result can be less. When vectors are aligned, the result equals the algebraic sum of its parts. When they are not aligned, the result is less. This math analogy describes an additive effect between like quantities, which falls short of synergy.

Synergy goes beyond additive effects. Synergy entails multiplier effects. Science can provide a glimpse into how synergy works. Scientists can now create advanced material systems that build on the complementarity of constituent materials rather than their similarity. These advanced materials possess enhanced properties exceeding the aggregate of the constituent materials. The special properties and multiplier effects are derived through intelligent arrangements of constituent materials with dissimilar properties, rather than homogenizing them.

Let me illustrate with a specific example of how intelligent arrangements can create synergy. Advanced materials in computer memory chips and recording devices are made by depositing alternate layers of materials, with dissimilar properties, at the atomic level. The new material is able to store huge amounts of data and retrieve them at extraordinary speeds. This technology, built around synergy of intelligent arrangements, will soon enable something the size of a wrist watch to pack as much as information as a thousand CDs.

The phenomenon of the whole being greater than the sum of its parts can also be found in human situations.

Barely a month ago, many of us caught the World Cup fever. I watched some matches and marveled at how different players in top teams executed their parts seamlessly. You will probably agree with me that a top team in the World Cup must competitively recruit talented players with complementary strength. More than that, the players must be intelligently organized in order to unleash the synergy among them. This is the essence of intelligent partnerships.

Similarly, NUS faculties and departments must competitively recruit top talent and build synergistic teams. This competition for talent is global. Just as soccer coaches are rewarded for putting together winning teams, our heads and deans will also be assessed for their accomplishments in building strong departments and faculties.

##### Habitat for Innovation and Entrepreneurship

Let me now move from World Cup soccer to Silicon Valley – a habitat for innovation and entrepreneurship.

What makes such a habitat tick?

## RE-MAKING NUS: FOSTERING A NEW ORGANIZATIONAL CULTURE

Silicon Valley has an insatiable appetite for value generating networks. These are complex, dynamic and interdependent relationships, unfettered by walls. Shared conversations, projects and deals promote collective learning, co-evolution of ideas, and fast responses to challenges and opportunities.

A visible example of this is the café culture, which promotes free sharing of ideas and knowledge between friends as well as competitors. Today's competitor is likely to be tomorrow's strategic partner.

### *Creating a Culture of Connectedness at NUS*

A culture of connectedness at the Silicon Valley habitat, anchored by Berkeley and Stanford, continues to inspire NUS and our industry partners.

A stellar example of connectedness is Cisco Systems in Silicon Valley. Founded in 1984 by computer scientists from Stanford University, Cisco is now a US \$22 billion corporation. It uses technology to create a fully networked organization. Cisco employees world-wide enjoy access to company strategies and performance. Employees are empowered, productivity improved, and competitive advantage sustained. Almost all staff training and sales are conducted online. Cisco's success is built on a culture that says "No to Walls" and "Yes to Partnerships".

In partnership with Cisco Systems, NUS organized a 2-day workshop on enhancing campus wide connectedness. I am confident that NUS will integrate some of Cisco's organizational culture and best practices. NUS should move towards a flatter and more empowered structure, where decisions are made by frontline people. Operational decisions should be made by those that deliver our primary functions in education, research, and knowledge transfer.

Campus wide connectedness can facilitate the mushrooming of intelligent partnerships throughout our community and with our global partners.

## **5. Building Intelligent Partnerships**

NUS has been forging partnerships with leading universities and knowledge enterprises around the world. Over the past year, NUS has taken leadership roles in two global consortia: Universitas 21 (U21) and the Association of Pacific Rim Universities (APRU). At the same time, NUS is working with One North to create a vibrant science and technology habitat in Singapore.

### Global Partnership – Universitas 21

U21 is a global network of 17 leading research-intensive universities in 10 countries. It enables members to pursue global initiatives that would otherwise fall beyond their individual capabilities.

A key initiative is *U21global*. This is a global e-university headquartered in Singapore with initial capitalisation of US\$50 million. In partnership with Thomson Learning, a private-sector provider, *U21global* aims to provide online higher education worldwide. Courses are expected to come on stream in early 2003.

## RE-MAKING NUS: FOSTERING A NEW ORGANIZATIONAL CULTURE

NUS' involvement in *U21global* is strategic. E-learning will enable NUS to strengthen its educational programmes as well as radically extend its reach to students in the era of globalization.

### Global Partnership – APRU

NUS took over the leadership of APRU in June this year. This consortium of 34 leading research universities along the Pacific Rim was established in 1997. Members include Stanford, Caltech, USC, UC Berkeley, UCLA, and British Columbia in North America; Peking, Tsinghua, Fudan and HKUST in China; Tokyo, Kyoto and Waseda in Japan; Seoul National; National Taiwan; Australian National; Auckland; Chulalongkorn; U Philippines; U Indonesia and U Malaya.

APRU aims to promote the scientific, educational, and cultural collaboration and advancement among Pacific Rim economies.

APRU is modeled after the 100-year old Association of American Universities, a highly influential consortium of research universities. The success of APRU under NUS' leadership will elevate our university's standing among research universities and knowledge organizations around the world.

### *APRU Enterprise*

At the recent Annual Presidents' Meeting of APRU held at Berkeley, I proposed the creation of APRU Enterprise. This enterprise can exploit positive network effects associated with processes of knowledge creation and transfer. It can act as an expressway for knowledge and technology transfer across the Pacific Rim. In time, APRU Enterprise will spawn a synergistic network of APRU centers for innovation and enterprise.

### NUS and One North

One North, a 200-hectare science and technology park at Buona Vista encompasses bio-medical industries in Biopolis, and infocomm and media industries in Technopolis. We envisage some joint development of research facilities and laboratories between One North and NUS. Some units of NUS Enterprise could be sited in One North. In turn, cultural and social facilities in NUS will be opened to One North researchers. With increased connectedness, a vibrant community of students, scholars, researchers, and entrepreneurs will evolve.

In sum, One North and NUS will work closely to realize seamless connectivity between students, researchers and entrepreneurs, thereby spawning a habitat of innovation and entrepreneurship.

### Multi-Campus NUS

Three months ago, DPM Dr Tan spoke of how NUS could leverage on our established Kent Ridge campus towards becoming a university comprising several campuses. The intent of a multi-campus NUS is to leverage on the distinctive and complementary strengths of its constituent campuses. This will enhance NUS' education offerings and spearhead world-class research.

This proposal calls for NUS to explore the development of two additional campuses – one to offer graduate-entry medical education located near the SGH in Outram, and another campus offering degree programmes with a more practical orientation.

## 6. Towards an Entrepreneurial University

The emergence of habitats of innovation and entrepreneurship around research universities has generated debate and tension in academia about the appropriate mission of the university. These debates are similar to those that took place a hundred years ago concerning the roles of research universities. At that time, many argued that the demands of research would compromise the university's teaching mission. Today, many acknowledge that teaching and research is a synergistic confluence of purposes. The research university has become the model for universities all over the world.

Similarly, the ambivalence to universities' added entrepreneurial role is likely to change. Look at the success of premier entrepreneurial universities such as Stanford, Berkeley, Penn, and MIT. Increasingly, we also witness a confluence of purposes between academic and entrepreneurial pursuits. Clusters of firms, originating from academic research, are co-locating with these premier universities. They even share infrastructure in some cases. These premier universities have learnt to balance their academic and entrepreneurial roles and harvest the benefits.

### NUS Enterprise

NUS aspires to stand among the entrepreneurial universities. We have taken steps to inject an entrepreneurial dimension. We have established NUS Enterprise. This is a "free enterprise zone" where innovation and entrepreneurship are freed from traditional rules, allowing greater flexibility and faster response. It is also a platform to push the boundaries of best entrepreneurial practices and launch major innovations.

Under the umbrella of NUS Enterprise, we have the Centre for Entrepreneurship, NUS Overseas Colleges, NUS Incubators, and Industry and Technology Relations Office, among others.

In partnership with Stanford University, NUS Enterprise organized the Global Entrepreneurs Challenge (GEC 2002) held in Singapore. This highly prestigious international business plan competition attracted the participation of winning teams from leading universities worldwide.

In collaboration with Stanford and Penn, NUS is developing a rich menu of quality entrepreneurship courses. Visiting professors and adjunct staff also provide guest lectures and seminars on entrepreneurship. By 2005, NUS aims to offer a minor in Technopreneurship to 25% of our students in Business, Computing, Engineering, and Science.

NUS Enterprise is working to expand the range of support services, including protecting and licensing of intellectual property, and incubating NUS startups.

To promote strong partnerships with industry, NUS recently signed an MOU with Incubators@Work!, the intrapreneurship arm of Singapore Technologies. This provides for a joint incubation programme with \$1million seed fund. NUS students could also do internships at one of Incubators@Work!'s portfolio companies.

### *NUS Overseas Colleges*

## RE-MAKING NUS: FOSTERING A NEW ORGANIZATIONAL CULTURE

One of the first initiatives of NUS Enterprise was to establish overseas colleges at entrepreneurial hubs around the world. By immersing students in a challenging and stimulating environment, we hope to nurture dynamic and resourceful entrepreneurs.

Perhaps you have read The Straits Times' two-page spread on our Overseas Colleges. This article carried interviews with our pioneer batch of students in NUS College in Silicon Valley (NCSV). These students take on internships at Silicon Valley start-ups while doing part-time studies at Stanford.

On a recent visit to California, I spent some time with our NCSV students and saw for myself how they were thriving in the intense Silicon Valley environment. I even took them on a fishing trip in the Pacific Ocean. Our students are fired up by the entrepreneurial energy and enthusiasm of the Valley.

The second NUS overseas college in Bio Valley (NCBV), located in Philadelphia, is a collaboration with University of Pennsylvania and University City Science Center. NCBV will leverage on the academic strengths of Penn while drawing on the rich resources in the New York-Philadelphia-Washington corridor. This area abounds with biotechnology and bio-medical science start-up companies.

### **7. Task Force to Re-Make NUS**

The world has changed. Singapore is changing. NUS has also to change.

Let me quote from SM Lee when he spoke at an NUS forum on re-making Singapore. He said "*change is the essence of life.... We are a people on the move. We are not a static society. But more than any society, we have changed, and must continue to change*".

Indeed, our ability to respond to change is the key to our survival. In "*The Origin of the Species*", Charles Darwin wrote: "*It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to change*". The veracity of this insight has withstood the test of time.

We will form a task force to re-make NUS. This taskforce will solicit ideas and suggestions from a broad representation of NUS stakeholders, including employers and industry partners. It will put forth recommendations towards making NUS a world-class institution, one that combines education and research with an added entrepreneurial dimension.

The taskforce will comprise members from a cross-section of the NUS community – students, alumni, faculty and staff. I would like to receive your suggestions for the scope and composition of the Task Force for Re-making NUS.

### **8. Our Challenge**

Over the past year, many of you have worked hard in the service of university and society. Your dedication and support have made a difference.

NUS has made progress in carrying out its mission to deliver quality undergraduate and graduate education, undertake high impact research, and foster entrepreneurship and industry collaboration. Much has been achieved but the greater challenge of re-making NUS lies ahead.



## RE-MAKING NUS: FOSTERING A NEW ORGANIZATIONAL CULTURE

As we take on this challenge, I urge that each of us play an active part for we all share the responsibility to move this university forward. With the support of talented faculty, resourceful staff, bright students, and esteemed alumni and friends, I am confident we will surmount any “Wall”.

Let us work together to re-make NUS. Let us work together to foster a culture of saying “No to Walls” and “Yes to Partnerships”.

Thank you.

### **Year In Review**

NUS Business School is one of three in Asia ranked among the top 100 business schools world-wide for full-time MBA programmes by The Financial Times in 2001 and again in 2002. The latest Asia Inc. survey of 62 business schools in Asia-Pacific, placed NUS Business School third. NUS Business School has been in the top 3 for the last 4 consecutive years.

### Education and Research

NUS has strengthened our educational and research programmes, particularly in multi-disciplinary initiatives. The General Education Requirement implemented in Academic Year 2001/02 will build a firm foundation for broad based undergraduate education. The launch of the Singapore Conservatory of Music in November 2001, in alliance with the Peabody Institute at Johns Hopkins, enriches the educational offerings at NUS.

#### *Life Sciences Initiatives*

NUS has put in place an integrated, cross-disciplinary life sciences curriculum at both the undergraduate and graduate levels. The new Life Sciences undergraduate curriculum implemented in July 2002 draws from the strengths of five faculties – Computing, Dentistry, Engineering, Medicine, and Science. The teaching of the life sciences is facilitated with 9 laboratories with state-of-the-art equipment. These facilities provide 600 students with hands-on training to ensure that they have the relevant experience and skills for industry.

The newly-launched Bioengineering Division offers undergraduate, masters and doctoral degrees. They draw on the expertise of the Faculties of Dentistry, Engineering, Medicine, and Science. Six new laboratories clustered in the Bioengineering Corridor will facilitate discovery and development of new technologies and therapies through a combination of biology-based research, cutting-edge engineering technology and clinical applications.

#### *Cross-disciplinary studies*

NUS has continued to widen its range of cross-disciplinary research and education programmes. The NUS Nanoscience and Nanotechnology Initiative (NUSNNI) coordinates nanoscience and nanotechnology across the university, in particular the Faculties of Engineering and Science. The Master of Science (Environmental Management) programme is a multi-faculty graduate programme taught by faculty members from seven faculties.

#### *Research Achievements and Awards*

## RE-MAKING NUS: FOSTERING A NEW ORGANIZATIONAL CULTURE

Research output continues to be substantial. More than 2000 international journal publications and a similar number of international conference papers were published in Academic Year 2001/02. There has been a steady increase in the number of research projects involving industry partners. A total of close to \$35 million was received in 2001 from industry and government organisations in the form of sponsored research.

The University Awards, recognising faculty's achievements in education, research and service, were awarded to 10 NUS faculty members. The Awardees were honoured for their perseverance, dedication and spirit to excel in scholarship and in service to country and society.

Collectively, NUS faculty members received a hundred regional and international awards and prizes. In collaboration with A\*STAR's Biomedical Research Council (BMRC), the Office of Life Sciences gave out awards to 12 young faculty members from Engineering, Medicine, and Science who have demonstrated potential of a lifetime of creative and integrated contribution to research and education in life sciences. The inaugural Temasek Young Investigator Awards to two NUS faculty members aim to encourage promising faculty members to undertake leading edge research in defence and security.

The Singapore Millennium Foundation (SMF) awards augmented NUS' efforts to identify and support graduate students, with good track records in research, to pursue doctoral degrees. Awards were also given to postdoctoral fellows, who have excelled in research, to gain further research experience under the guidance of established scientists. Altogether, 15 graduate students and 11 postdoctoral fellows are being hosted by NUS through the SMF awards.

### Partnerships with Renowned Foreign Universities and Organisations

NUS has moved ahead in cultivating global partnerships. NUS' research capability and impact are strengthened through increasing collaboration with reputable external organisations. About 700 of these are with other universities and a large number with external agencies. NUS is the partner for several world class universities including MIT, Johns Hopkins, Georgia Tech, Eindhoven University of Technology, Technical University of Munich, and University of Illinois.

In addition, major institutions around the globe have tied up with NUS to offer special Joint or Double Degree graduate programmes with French Grandes Ecoles. Originally begun with the Faculties of Engineering and of Science and two French partners, it has now extended to include four other French partners. NUS also launched an international exchange and research collaboration programme with Russia and Eastern Europe. This programme promotes research collaboration and post-graduate study in science and technology.

### INTRO

Our Industry and Technology Relations Office (INTRO) received about a hundred invention disclosures from NUS inventors in 2001. Of the 500 technology disclosures in Physical Sciences & Engineering, Life Sciences and Information Technology received since 1992, 70 licensing agreements have been generated, 500 patents have been filed, and more than 100 granted. INTRO currently manages a portfolio of some 250 technologies developed by NUS inventors.