

National University of Singapore



Putting the spotlight on Singaporean research, *International Innovation* speaks to **Professor Tan Chorh Chuan**, President of the National University of Singapore and Deputy Chairman of the Agency for Science, Technology & Research, Singapore (A*STAR)

Could you begin by describing your role as President of the National University of Singapore?

As President of the National University of Singapore (NUS), which in 2006 became a not-for-profit company limited by guarantee, I report to the NUS Board of Trustees. My key roles are to:

- Develop a collective vision, set of goals, strategies and key thrusts that will enable the university to leap-frog ahead
- Raise additional resources especially through philanthropy
- Put in place a strong leadership team and administration that will drive effective implementation
- Create an overall environment that attracts, retains and develops talented students, faculty and staff and enables them to excel and find fulfilment
- Raise the profile and standing of the university both nationally and globally

Upon what founding principles is the university based, and what are the main aims driving the institution forward today?

As the national university, the founding principles for NUS include service to nation and society, creating distinctive value through quality education, research and service. These founding principles still underpin the University's current directions. NUS' vision is to be a leading global university centred in Asia, influencing the future. Our work at NUS is driven by three mutually reinforcing thrusts:

- Transformative education that nurtures thinking individuals who are alive to opportunities to make a difference, are valued members and leaders of society, and global citizens effective in diverse settings

- High-impact research that advances the boundaries of knowledge and contributes to the betterment of society

- Dedicated service, as a national university, that adds to social, economic and national development

As a global university, we seek to adapt and innovate best practices, pioneer distinctive global education programmes that prepare students to be effective in cross-cultural settings, and to be a global thought-leader through our research and its application, differentiated by our special expertise, insights and connections, especially those relating to Asia.

The Yong Loo Lin School of Medicine is ranked as the top medical school in Asia. What measures are you taking to ensure the long-term success of the School?

NUS was recently named the top university in Asia for Medicine and ranked 18th globally for Medicine in a survey released on 4 May 2011 by London-based Quacquarelli Symonds.

The Yong Loo Lin School of Medicine at NUS will build further on its distinctive research expertise and strengths in the biology and responses to treatment of common diseases in Asian populations, which are often different from Caucasian populations. In particular, the School will continue to integrate basic science and clinical research groups in NUS and Singapore around five diseases, namely cancer, cardiovascular and metabolic diseases, neurocognition, eye diseases and infectious diseases. The School will continue its strong focus on recruiting top faculty especially clinician-scientists. A new translational research and education building completed this year will provide ~40,000m² of additional space while construction of another translational medicine building has just commenced.



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NUS working with the Singapore Ministry of Health, brought together the Yong Loo Lin School of Medicine, the Faculty of Dentistry, and the National University Hospital under a common governance framework in 2008, to form an academic medical centre called the National University Health System. This will enable even greater and synergistic development of medical research, education and service.

Can you outline some of the novel research that is taking place within the School at present?

The Yong Loo Lin School of Medicine at NUS strives to achieve research excellence and translate basic science findings into better outcomes: better screening, better identification of high risk populations to allow early intervention, better diagnosis, better therapies, effective public health strategies for an ageing population, developing high quality, affordable care models and developing safer patient care in a tertiary setting. In cancer, a major research institute, the Cancer Science Institute of Singapore was set up through a competitive S\$170 million grant. A new national cancer centre (called the National University Cancer Institute Singapore) has also been set up as part of the National University Health System (NUHS). Two programmatic research grants have been awarded to research in gastric cancer (S\$25 million), and study of cancers with high prevalence or unique pathogenesis in Singapore (S\$6 million). The NUHS also has a strong Investigational Medicine Unit for first-in-man and early phase trials of new drugs, particularly in cancer.

In cardiovascular and metabolic diseases, the National University Heart Centre Singapore has won a grant of S\$6 million to address serious cardiovascular disorders.

NUHS also runs a S\$25 million translational clinical research programme focused on the developmental pathways to metabolic diseases especially in

Asians. In neurocognition, two programmes to study Ischaemic Stroke (S\$10 million) as well as vascular and neurodegenerative mechanisms in dementia (S\$6 million). In eye diseases, a programmatic grant of S\$25 million has been awarded to the Singapore Eye Research Institute to address the two major causes of global blindness, ie. corneal disorders and glaucoma.

In addition, the NUHS has recruited Professor Naoki Yamamoto, a world-leading expert in HIV research to establish an infectious disease programme and the NUHS team has published important findings on the H1N1 outbreak in top international journals. These six disease research areas are supported by various platforms, such as imaging, molecular epidemiology, immunology, health services research and biomedical ethics.

Moreover, are there any significant research success stories that you are particularly proud of throughout your time at the university?

There are several but I will mention one significant research breakthrough in the healthcare arena by NUS researchers this year: a team of researchers from NUS' Centre for Quantum Technologies and University of Cambridge uncovered a surprise link between weird quantum phenomena. Published in *Science*, the result of the research – concerning non-locality, uncertainty and steering – has been heralded as a dramatic breakthrough in our basic understanding of quantum mechanics and provides new clues to researchers seeking to understand the foundation of quantum theory.

How does the School of Medicine address areas of research in a 'multidisciplinary' manner?

The Yong Loo Lin School of Medicine at NUS encourages translational research and close collaborations between basic scientists and clinicians. Quarterly symposiums on specific disease areas are held to encourage networking amongst basic science and clinical staff.

As part of efforts to leverage on the expertise in other NUS faculties and encourage multidisciplinary collaboration, regular joint workshops with the Faculty of Engineering and Business School are held and seed funding provided for the best collaborative project proposals.

The School has close links with A*STAR, enabling A*STAR scientists to propose joint multidisciplinary projects with the School's clinicians and other investigators. For instance, a joint NUHS-A*STAR/Singapore Institute for Clinical Science Clinical Nutrition Research Centre (CNRC) proposal has been recently approved. The CNRC is a critical element for the development of internationally competitive clinical research in nutritional sciences, and to build and anchor nutrition and food industries in Singapore. Another example is the Clinical Imaging Research Center which is an imaging unit with state-of-the-art facilities jointly set up by the School, NUS and A*STAR.

Small multidisciplinary grant calls encourage the submission of joint projects. In addition, the university has active mechanisms to bring together and support larger multidisciplinary programmes.

Further to the above, could you explain your involvement with A*STAR? How is it helping to foster world-class scientific research and talent? Does A*STAR play an important role in developing the careers of young Singaporean and international researchers?

I am the Deputy Chairman of A*STAR and was previously Chairman of A*STAR's Finance and Budget Committee. My major role in A*STAR is to build up Singapore's Biomedical Sciences Initiative, with which I have been involved since its inception in 2000. I also serve as a 'systems integrator' designing, overseeing and implementing programmes that bring together and synergise expertise from A*STAR and the clinical and extramural research communities. A*STAR has a Science and Engineering Research Council (SERC) and a Biomedical Research Council (BMRC). Each Council has intramural research institutes as well as extramural research programmes.

SERC plays a critically important role in carrying out research and providing highly trained manpower to support the electronics, data storage, precision engineering and chemical industries in Singapore, as well as small and medium enterprises. Over the past 10 years, BMRC has built up a critical mass of top-rate research talent, developed state-of-the-art scientific infrastructure and strongly supported the growth of translational and clinical research capabilities in Singapore.

Over the past decade, A*STAR has provided scholarships for nearly 1,000 of the brightest local students to pursue

studies in NUS and other local universities as well as top universities overseas. The programmes of study range from full Bachelors-to-PhD to PhDs and postdoctoral training. Several of the scholars have now graduated and returned to Singapore and are a very important talent resource that will drive R&D development.

What role does the private sector have in healthcare research in Singapore? Are they drivers of innovation or do they hinder it?

From the outset, Singapore's R&D strategy included a thrust to attract private sector companies to establish corporate R&D in Singapore. Private sector R&D expenditure is about twice that of public sector R&D expenditure. Many of the corporate labs are located in Biopolis where they interact closely with A*STAR research institutes. Lilly's major Phase I clinical trial unit (the Lilly-NUS Centre for Clinical Pharmacology) established in 1998 is located in the heart of the Yong Loo Lin School of Medicine and works very closely with researchers from the Medical School and National University Hospital.

Private sector companies are valuable partners in research and important drivers of innovation. NUS Industry Liaison office and the Biomedical Sciences Industry Partnership Office have encouraged collaboration opportunities between major industry players, such as GSK and Roche, and Singapore public research organisations.

Finally, are there any other aspects of NUS that you would like to highlight for our readers?

NUS believes strongly in the value of diversity in enhancing the learning and research environment. Approximately 20 per cent of our undergraduate students come from overseas and our students and faculty hail from more than 100 countries. NUS also places great emphasis on global education and experiential learning. For example, one in two of our undergraduate students goes overseas on educational programmes and one in four spend six months or more abroad on Student Exchange Programmes. In addition, NUS has more than 60 joint- and double-degree programmes with top universities around the world. On the research front, apart from regular research institutes and centres, NUS has in the past two years developed integrative research clusters that bring the relevant research centres and researchers together around five major themes: finance and risk management, ageing, biomedical and translational clinical research, integrative sustainability solutions, and Asia-related studies.

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