

The National University of Singapore and what it does

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The National University of Singapore (NUS) was founded as the small “Straits Settlements and Federated Malay States Government Medical School” in 1905. Today, NUS is a large and complex University, highly regarded for teaching, research, and service and ranked 34 in the world in 2010 by the Times Higher Education World University Rankings developed in concert with Thomson Reuters on the basis of its reputation and performance. NUS has 14 faculties and schools plus 26 university-level Research Institutes/Centres, including three Research Centres of Excellence (RCEs) plus a joint RCE with the Nanyang Technological University (NTU) (Fig. 1). There are also numerous faculty/school-based research centers and programs. Thus NUS has a broad base of research and scholarship in science, engineering, arts, humanities, business, finance, medicine, law, and other important areas (Table I). This allows NUS to conduct high-level research over a fairly broad range of topics and in addition to grow peaks of excellence. The breadth of knowledge at NUS also enables our academics to effectively tackle complex issues that require a multidisciplinary approach, such as aging, sustainability, the future of health care, financial risk, and the Asian diaspora. As a leading English-speaking global university centered in Asia, NUS offers education and research of high international standards, with unique Asian expertise and perspectives. This is particularly valuable when, for example, research deals with diseases more common in Asia, Asian law and finance, and the rapid rise of Asia in the world.

In addition to its research and educational base, NUS houses on its campus a large teaching hospital. The National University Hospital (NUH) opened its doors to the public on 24 June 1985, mostly staffed by NUS clinicians. Today, NUH has 997 beds, 6 intensive care units, and 23 operating theaters. It employs 5576 staff and treated 1 083 833 patients in 2009, including 129 994 emergency attendances. NUH was the first Singapore hospital to attain Joint Commission International (JCI) accreditation in 2004 (and reaccreditation in 2007), an international stamp for excellent clinical practices. The presence of NUH allows biomedical, engineering, computing, and other research conducted in NUS and at the adjacent Agency for Science, Technology and Research

(A*STAR) laboratories to be immediately tested in the clinic, both as potential new drugs and as medical devices.

NUS is particularly interested in research that breaks new ground and establishes new paradigms, even though its practical applications may not be immediately obvious. As well as science, engineering, and medicine, NUS strongly encourages research in humanities, social sciences, law, and business, both because such research is important in its own right and also because it can integrate with other disciplines to enable the power of different approaches to be brought to bear on important problems facing Singapore. Three of Singapore’s Research Centres of Excellence (specializing in quantum technologies, cancer science, and mechanobiology) were awarded to NUS following stringent external review. They join 22 university-level research institutes and centers (Table I) engaging in a broad spectrum of areas, from environmental sustainability, biomedical science, and translational medicine to financial studies and nanomaterials. The NUS Environmental Research Institute (NERI), for instance, brings together the university’s researchers in the areas of water, air, environmental health, and energy.

Another example is the Solar Energy Research Institute of Singapore (SERIS) established with support from Singapore’s Economic Development Board. SERIS builds on NUS’ strengths in areas such as novel materials, silicon thin film technology, solar-thermal energy systems, and nanoscience to develop innovative and efficient solar energy applications. Other NUS research centers include the Centre for International Law (CIL) established in 2009 at the NUS Bukit Timah Campus. An outcome of close collaboration between the Attorney-General’s Chambers, the Ministry of Foreign Affairs, and the NUS Faculty of Law, the Centre was set up in response to the growing need for international law expertise in Singapore. CIL enhances the stature of Singapore as a hub of international law expertise in the ASEAN and Asia-Pacific regions. Yet another example, the NUS Centre for Remote Imaging, Sensing and Processing (CRISP) began operations in 1995, supported by the National Science & Technology Board. CRISP operates satellite remote sensing capabilities, to meet the research and other requirements of Singapore. CRISP started by receiving data from the SPOT series of French satellites, followed later by the Terra and Aqua system of NASA, the 1 m resolution IKONOS,

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TABLE I. Faculties, Schools and University-level Research Institutes/Centres (including Research Centres of Excellence) at NUS.

Faculties and Schools	
1.	Arts and Social Sciences
2.	Business
3.	Computing
4.	Dentistry
5.	Design and Environment
6.	Engineering
7.	Law
8.	Medicine
9.	Music
10.	Science
11.	University Scholars Programme
Specialist Graduate Schools	
1.	Duke-NUS Graduate Medical School
2.	Lee Kuan Yew School of Public Policy
3.	NUS Graduate School for Integrative Sciences and Engineering
University-level Research Institutes/Centres	
1.	Asia Research Institute (ARI)
2.	Centre for International Law (CIL)
3.	Centre for Maritime Studies (CMS)
4.	Centre for Remote Imaging, Sensing and Processing (CRISP)
5.	East Asian Institute (EAI)
6.	Energy Studies Institute (ESI)
7.	Global Asia Institute (GAI)
8.	Institute for Mathematical Studies (IMS)
9.	Institute of Real Estate Studies (IRES)
10.	Institute of South Asian Studies (ISAS)
11.	Interactive & Digital Media Institute (IDMI)
12.	Life Sciences Institute (LSI)
13.	Middle East Institute (MEI)
14.	NUS Environmental Research Institute (NERI)
15.	NUS Nanoscience and Nanotechnology Initiative (NUSNNI)
16.	Risk Management Institute (RMI)
17.	Saw Centre for Quantitative Finance (SCQF)
18.	Singapore Synchrotron Light Source (SSLS)
19.	Solar Energy Research Institute of Singapore (SERIS)
20.	Temasek Laboratories (TL@NUS)
21.	The Logistics Institute—Asia Pacific (TLI-Asia Pacific)
22.	Tropical Marine Science Institute (TMSI)
Research Centres of Excellence (RCEs) ^a	
1.	Cancer Science Institute of Singapore (CSI)
2.	Centre for Quantum Technologies (CQT)
3.	Mechanobiology Institute of Singapore
4.	Singapore Centre on Environmental Life Sciences Engineering (SCElse) (Joint RCE between NTU and NUS)

^aThese also have the status of University-level Research Centres.

and since 2009, the 0.5 m resolution GeoEye. CRISP has developed a strong capability in synthetic aperture radar imaging and is a partner of the European Space Agency. CRISP's work on environmental monitoring has been widely

featured. In August 1996, CRISP captured an image of a tanker spilling oil into the sea. This was the first remote sensing image accepted as court evidence for oil pollution investigation in the world and helped to convict the culprits. During the 1997 El Niño, Southeast Asia suffered smoke haze from forest and plantation fires. CRISP pioneered the use of SPOT images for accurate location of the fires. Immediately after the Indian Ocean tsunami of December 2004, CRISP's images were the main source of information for the world on the damage suffered. With the road network destroyed, satellite maps prepared by CRISP were used by rescue and relief teams from Singapore and elsewhere to guide them to the worst hit areas near Aceh in Sumatra. CRISP was awarded the Excellence for Singapore Award in 1999.

Faculty-based Research Centers also make major contributions to research at NUS. For example, the Centre for Total Building Performance (CTBP) was established through a MOU signed between the Building & Construction Authority and NUS in 2000. CTBP focuses on building performance research with particular reference to tropical building design for enhanced health and comfort, productivity, and environmental sustainability. Civil Engineering faculty members led the establishment of the Centre for Offshore Research and Engineering. The Centre spearheads the research and development of very large floating structures with the view to solve Singapore's land crunch problem. The Silicon NanoDevices Laboratory has long been providing leading-edge silicon device technology for the international and local semiconductor wafer fabrication industry. The laboratory has joint research programs with Chartered Semiconductor and A*STAR Research Institutes, through which Ph.D. and MS students have been trained to be technology leaders, and joint patents have been filed. The Centre for Hazards Research at NUS was established against the backdrop of tremors that shook many buildings in Singapore in 2007. The Sichuan earthquake in May 2008 and a series of earthquakes in the South Pacific Ocean in 2009 further highlighted the importance of preparing for unforeseen hazards, which may be low in probability but high in consequence. The rapid development of high-density cities, such as Singapore and others in Asia, means that the potential damage to the economy and human lives has expanded considerably. The Centre studies the effects of earthquake tremors on buildings and infrastructure, in collaboration with the Housing and Development Board. Seismic sensors and analysis methodologies are developed for tremor monitoring and performance evaluation of selected HDB buildings.

NUS is interested in ensuring that its research delivers impact. Among the accomplishments chalked up by NUS researchers are a technique to grow knee cartilage *in vitro*: using quantum state tomography for secure information encryption, developing a nanowire membrane material that can selectively absorb oils in preference to water as an agent for cleaning oil spills, conceiving novel methods for overcoming the challenges in estimating structural credit risk models, developing computer imaging analysis of retinal scans to diagnose diseases, developing a hydrogen storage technique



FIG. 1. (Color online) NUS Campus, students and research facilities/buildings.

based on lithium nitride, providing insights on the role of Asia in the emerging global order, as well as producing the world's first haploid embryonic stem cells and semicloned fish using the *medaka* fish. NUS Enterprise, a university-level cluster, promotes a spirit of enterprise in the university community through education, training, internship, and the nurturing of startups, leveraging on the University's intellectual property in diverse fields.

To boost the growth of research talent, NUS continues to make the strengthening of graduate education and cross-disciplinary research among its key priorities. A supportive environment, coupled with NUS' success in attracting competitive external funding from granting bodies and industry, has drawn home-grown and overseas top talents to NUS. A joint recruitment scheme has also been established with Cambridge University and others are in process. On another aspect, the mission of the NUS Lee Kuan Yew School of Public Policy is to improve governance in Asia and beyond, through public policy education and research. Research by

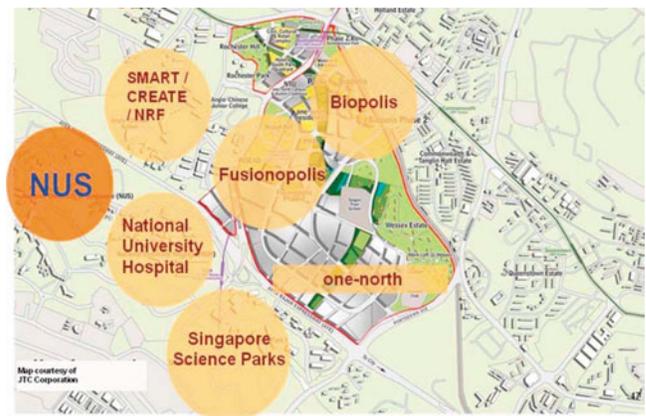


FIG. 2. (Color online) Synergy in proximity. NUS benefits enormously from being in close proximity in Singapore to other science and technology hubs.

the NUS Faculty of Arts and Social Sciences and University-level Research Institutes devoted to the study of Asia (such as the Asia Research Institute) addresses key problems of relevance to modern Singapore, including state of religion, global perception of Singapore, the value of arts and culture, human migration, marriage and the family, and issues related to aging.

NUS has the good fortune to be in close proximity to other science and technology hubs, such as A*STAR (Fig. 2). NUS has developed close links with A*STAR in research and graduate education in a range of areas, imaging being one. In addition, the national level Campus for Research, Technology and Enterprise (CREATE) will be located at NUS' new University Town. CREATE is a collaboration bringing top researchers from other leading global universities to work alongside NUS and other Singapore researchers in areas that are aligned to Singapore's strategic interests. The Massachusetts Institute of Technology (MIT) has already set up its first research programs, focusing on infectious diseases, environmental sensing and modeling, and healthcare technologies. ETH Zurich is in process of joining and Technion from Israel is working with NUS on using stem cells for cardiac regeneration. Others are on the way. Additional strategic global alliances in which NUS plays a key role include the International Alliance of Research Universities (IARUs), a select group of 10 of the world's leading research universities from eight countries. Members include

Yale University, University of California, Berkeley, ETH Zurich, University of Tokyo, Peking University, Copenhagen, Oxford, and Cambridge. NUS President Professor Tan Chorh Chuan has been elected as Chair from 2009 to 2011.

Looking ahead, NUS will continue to build on its strengths and capabilities, to seize the opportunities that come with a rising Asia in order to establish itself as a pre-eminent knowledge center in Asia. Many critical challenges facing Asia and the world today are multifaceted and have complex interconnections. To address these challenges adequately, NUS has built up five integrative research clusters; in Finance and Risk Management, Biomedical Sciences and Translational Research, Aging, Integrative Sustainability Solutions, and Asian Studies. The clusters provide a structure that enables experts in specific knowledge domains to synergize their research so as to tackle complex, multidisciplinary issues. In so doing, NUS seeks to offer new and more holistic understanding of critical issues for Asia and the rest of the world, as indicated by its mission and vision statements.

NUS Vision

Toward a Global Knowledge Enterprise.

A leading global university centered in Asia, influencing the future.

NUS Mission

To transform the way people think and do things through education, research and service.