

SPEECH BY DR FRANCIS YEOH, CHIEF OPERATING OFFICER OF THE NATIONAL RESEARCH FOUNDATION, AT THE NANYANG TECHNOLOGICAL UNIVERSITY'S CONVOCATION CEREMONY FOR SCHOOL OF COMPUTER ENGINEERING ON 25 JULY 2008, 10AM, AT NANYANG AUDITORIUM

Good morning

Mr Pro-Chancellor

Dean, College of Engineering

Distinguished guests

Graduands

1. I would like to congratulate the happy graduands of today's convocation ceremony and their proud parents. Being here means you have completed your course well and have deservedly earned the rights to a university degree. It is always a joy to see so many happy young people so full of potential and bubbling with energy to contribute to our society in the years ahead. But I think you also deserve to be congratulated for another reason. And that is for having the foresight to choose to do a degree in Engineering – Computer Engineering in your case, although the same would apply for other science and engineering disciplines.
2. The world needs more engineers. The modern industrialized economy is built on science and engineering. They are at the core of economic development and value creation. All the great achievements in the 20th century came about because of great science and engineering – the automobile, air-conditioning, television, air travel, electricity, computers and telephony, machines, lasers and fibre optics, drugs, materials and not least, the ubiquitous internet, that we can't live without today. I must declare that I am not totally unbiased, being trained as an engineer myself, but I hope that what I have to say will give you assurance that you have indeed made the right choice when you embarked on your university education some years back.
3. I had the opportunity to visit the National Academies of the United States in June this year. The National Academies comprise the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine and the National Research Council. It is a prestigious organization, with membership given selectively to the top scientists and engineers in the country. I was given a book, put together by the National Academies, containing a very comprehensive report about the United States. It was a 2006 study report assessing the future competitiveness of the US in light of the socio-economic upheavals wrought by the forces of globalization and vividly described by Tom Friedman in his bestselling book 'The World is Flat'.

The report was entitled, 'Rising above the Gathering Storm – Energising and Employing America for a Brighter Economic Future'. It was put together by an illustrious team of people, who are the who's who in science & technology in the US – CEOs of global technology corporations, Nobel laureates, distinguished scientists and eminent academics.

4. The main thesis of the Report was that America was in danger of rapidly losing its leadership position in science and engineering, research and innovation. Drastic action was recommended to be taken to arrest the steady slide. A key finding in the report had to do with the state of America's K-12 education, particularly the low proficiency of students in science and mathematics. According to international comparison studies, American students did increasingly poorly in science and math as they got older and by the time they reached 12th grade, just before university, they were near the bottom of the heap, compared to the rest of the world. We should be proud to note that in these international studies, Singapore came out tops consistently over many years. Indeed Singapore has achieved international recognition as a model of excellent K-12 education, particularly in the United States.
5. Not surprisingly, when it came to university enrolment, the US ranked 16 out of 17 countries surveyed in the proportion of 24 year olds graduating with science and engineering degrees – at 15% in 2000 compared to Singapore, at the top of the table with 67% in 1995.
6. The grave concern expressed in the report was that many Americans do not know enough about science, technology and mathematics to contribute to, or benefit from the knowledge-based society and economy of today and tomorrow. The worry was that Americans would be left behind as other countries, having seen the immense economic and social dividends that pre-eminence in science and engineering has brought to the US, set about aggressively boosting their investments in these critical fields. The 'Gathering Storm' report made many recommendations and resulted eventually in an Act signed by President Bush in Aug 9, 2007.
7. Why do I bring up this report from the United States? Well, the good news is that Singapore fared very well in international comparisons on science and engineering education. We appeared at the top of some of the tables and charts in the 'Gathering Storm' report. The bad news unfortunately, is that we are seeing the same trend of declining interest in science and engineering happening here as our country becomes more affluent. When I was in school, virtually everybody did science and math. Engineering courses, whether civil, mechanical or electrical were the most popular at university. Computer science, a new course at NUS in the early eighties, was a big draw and attracted the brightest students.
8. Unfortunately, the situation today is much different. At both NUS and NTU, there has been a definite decline in interest in engineering and the hard sciences over the years, as Singaporean students are drawn increasingly towards soft courses like law and business administration. So like the US,

we should have the same concerns about our preparedness for the knowledge intensive society and economy of tomorrow. We need more science and engineering graduates in Singapore to keep our economy going. And from this pool, we need to develop capabilities in research and innovation as they are the key to economic growth and societal benefits.

9. You may be aware that the Singapore government has placed great emphasis on research and development in science and technology. Government investment in R&D has been increasing steadily since the '90s and is now easily more than \$2b annually. Clearly, there is no better time than now to be a research scientist or engineer. Whether in the US, Europe, China or here in Singapore, good quality technical talent is very much sought after. Earlier this year, the National Research Foundation awarded 10 research fellowships to bright young scientists from all over the world. Each research fellow is given a couple of million dollars and complete freedom to build a research team to pursue his or her own research topic in Singapore. And just last month, NRF announced 4 big research grants of up to \$10m each to research teams in Singapore. It is to NTU's credit that 3 out of the 4 were won by NTU researchers.
10. The good news for the research scientist or engineer today is that a research career is one with abundant opportunities, involving more than just carrying out interesting experiments in the lab. I would like to dispel the notion that being a good researcher, scientist or professor in the university means that you have to be engaged in ivory tower academic pursuits out of touch with the real world. Not so. If you look at some of the top universities in the world, you will see that the best scientists are usually those who are very well aware of societal challenges and who direct their research to areas with the potential to create great impact to the world. Indeed, many of the professors in these top universities are actually also great entrepreneurs. Not only do they and their students carry out excellent scientific research, publishing prolifically in the top scientific journals, they are also the inventors behind many patents and the founders of successful high tech startup companies to boot! It is often said that venture capitalists 'prowl' the corridors of top research universities, seeking to understand the state-of-art in specific technology areas and looking for new breakthrough technologies to bring to the market. Certainly, many multi-national technology corporations today started life as start-up companies spun out of research labs. Companies like Sun Microsystems, Yahoo and Google come to mind.
11. The Singapore government recognized the importance of the complete value chain of research, innovation and entrepreneurship when it set up the Research Innovation and Enterprise Council (RIEC) in 2006, chaired by the Prime Minister. In March this year, the Prime Minister announced that the RIEC has approved a \$350m National Framework for Innovation and Enterprise initiative that consisted of a comprehensive set of programmes directed at bringing the fruit of research down the value chain to innovation and enterprise. These include proof-of-concept grants for testing out new ideas, incubation facilities with active nurturing of seed companies by experienced entrepreneurs, to early stage venture capital funds that invest in

young high tech start-ups and funds for the universities to spur innovation and entrepreneurship. There is certainly no shortage of opportunity or support for good innovative ideas and talented people with entrepreneurial drive!

12. To be competitive in the knowledge based economy and society of the future, each country must have sufficient scientific and engineering capability to be able to carry out high quality research. The results of such research will feed into innovation and enterprise activities, which will provide the desired economic and societal benefits. If this is true for a large and resource-rich country like the United States, it would be even more so for us in Singapore.
13. In summary, my message to you this morning is this. If you have strong interest in science and technology, this is a great time to embark on a research career in Singapore. Not only will you be able to work on state-of-the-art technologies with top researchers from all over the world, you will also have abundant opportunities to turn your research results into useful innovations and perhaps even start up high tech companies. And in carrying out such stimulating work, you will also be contributing to building up a rich and vibrant eco-system for research, innovation and entrepreneurship that will position Singapore well for the future.
14. I wish you all great success and fulfillment as you embark on your exciting new journeys ahead! Thank you.

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