Distinguished guests

Fellow colleagues

Students

Ladies and gentlemen

Good morning. I am delighted to have this opportunity to speak to you today at the opening of the Ninth Congress of the National Undergraduate Research Opportunities Programme.

Introduction

I see a lot of fresh, young faces in the crowd today, and I’m reminded of my freshman days at The Cooper Union. It was there that my love affair with research began. The passion and vision displayed by some of my teachers and mentors, particularly a Professor named John Bové, gave me the inspiration to make research my lifelong vocation.

Now, 20 years later, I find that I’ve come full circle.

As the executive director of one of A*STAR’s research institutes, the Institute of Bioengineering and Nanotechnology or IBN, I feel a strong sense of responsibility towards reaching out to our young, to get them to carve out a career in research.

Over the past 10 years, I have been a strong supporter of undergraduate research, having supervised over 50 UROP students at the Massachusetts Institute of Technology. MIT is the original founder of the UROP concept, and over 90% of its students participate in UROP. I am very pleased that more than 80% of my UROP students were inspired to pursue PhD studies.

Creating the right environment

As long as we can create the right learning environment for our young, I am sure Singapore would produce some of the top brains in science and engineering.
A conducive environment is one that will provoke creative and independent thinking, and allow students to apply the basic principles found in textbooks. But, unlike classroom learning where projects are well-defined, researchers need to venture out into the great unknown. For them to find the answers they seek, they should never be afraid to ask questions – or even make mistakes. In fact, the best researchers are not necessarily those who score straight “As”, but people who have a keen intuition, a questioning mind, and an abundance of creativity.

Success stories

I am constantly impressed and surprised by the young people I have had the pleasure of working with.

Two of my PhD students at MIT are now proud founders of nanotechnology companies marketing orthopedic implants and drug delivery systems. Their talents were recognized when they won the Grand Prizes of MIT’s $50K Entrepreneurship Contests in 2001 and 2003. Every year, more than 100 business plans based on novel research ideas are submitted in this competition, and part of the Grand Prize is US$30,000 of seed money for starting a company. Besides the media publicity that is given to the winner, he or she will also be able to secure additional funding from venture capitalists.

Over at IBN, where we have an active Youth Outreach Programme, one young scientist, on attachment from Raffles Junior College, also managed to co-author a research paper on glucose biosensor technology in the three short months that she spent with us. The commitment and drive she displayed rivalled even that of some Masters-level research staff.

IBN also holds regular Open House events for NUS and NTU students, and organizes visits for teachers from schools like Raffles Junior College, Hwa Chong Junior College, Raffles Girls’ School, Raffles Institution, and Chinese High. Teachers from these schools are encouraged to do research attachments at IBN, and impart the excitement and expertise they have for research to their students.

NUROP 2003

Today, I’m glad to see the diverse range of UROP projects showcased at this Congress. They encompass various engineering fields, as well as the physical and life sciences. I understand that students from NUS and NTU are involved in an average of 500 to 600 projects every year. It is also interesting to note that virtually all Accelerated Masters and Accelerated Bachelors students have been or are involved in UROP. Clearly, the UROP experience has left a deep impression on many young minds.
Looking forward, the 12 research institutes under the A*STAR umbrella, including IBN will actively participate as mentors in UROP. This is an exciting move, and I look forward to meeting some of you at IBN.

Opportunities at IBN

I’m sure that you’ll have a great time at IBN, given the scope and depth of our research projects. For those of you who are not familiar with IBN, we conduct research at the interface of bioengineering and nanotechnology. Our programmes are geared towards linking multiple disciplines across all fields of engineering, science and medicine to produce research breakthroughs that will improve healthcare and our quality of life.

For instance, you may have heard about our work on smart nanoparticles that can control drug release as desired. These nanoparticles are responsive to physiological or externally applied stimuli, or are able to target specific tissues in the body. By encapsulating insulin in nanoparticles, for example, we can achieve insulin delivery that is responsive to the blood sugar concentration in diabetic patients. In essence, these particles mimic the functions of our pancreas. Other uses of nanoparticles include the targeted treatment of cancerous cells or the diseased parts of central nervous system.

We’re also conducting breakthrough research in medical devices where nanostructured materials are designed to act as ultra-sensitive biosensors that can detect trace molecules. Combined with a microelectromechanical tissue handling system, they can be used to make quick and accurate diagnosis of diseases like breast cancer and Sars.

As you can see, innovations such as these are not the stuff of science fiction. They are being developed now – here in Singapore – in our very own laboratories.

Government’s commitment in science and engineering

Our Government should be lauded for its firm commitment in promoting science and engineering in Singapore. The Agency for Science, Technology and Research or A*STAR, is charting the course for the country in these two areas.

It is actively recruiting young people like yourselves to become leading research scientists and engineers in Singapore. We can never stop emphasizing the tremendous importance of cultivating our own talent. One of our country’s greatest strengths is in its people, and we look to the new generation to take us into the next century of growth.

A*STAR recently handed out 50 scholarships to recipients under the A*STAR Graduate Scholarship scheme. The AGS programme, which was launched in January
this year, is a “4+2” scholarship tenable at NTU or NUS. It comprises of a four-year PhD study at either university, as well as a two-year postdoctoral fellowship at a top university or research institute overseas. We hope many of you would apply for this special scholarship, which would allow you to pursue thesis research projects at NUS, NTU or at the A*STAR research institutes.

Another strong sign of the Government’s support towards our work in the biomedical sciences is the setting up of the Biopolis, a $500-million R&D hub in Buona Vista. In February next year, IBN will move into its new premises at the Biopolis. Our building, called The NANOS, will house state-of-the-art laboratory facilities and specialized equipment to support our cutting-edge research.

Make the right choice

I have always believed that one’s passions in life should be cultivated at a very young age. My daughter will turn two years old soon. Even at her tender age, she constantly surprises me with her ingenuity and resourcefulness. We should never lose this wide-eyed curiosity – and we should not wait for students to progress to the tertiary levels before we involve them in research.

It’s natural for a young person to be unsure about his or her choices in life. Some of you may have already made up your minds about your goals and aspirations. Others may still be uncertain about the road ahead.

I’m here to present you with one attractive option. Research is about passion and dedication in creating new scientific knowledge and exciting technology that can significantly and directly impact and benefit our society. I am proud to say that I have no regrets about choosing the path that I have taken. Feel free to approach me after this presentation if you need further convincing.

In the meantime, let me declare the opening of NUROP 2003. I wish all of you an exciting journey ahead.

Thank you.