



IMAGINING A BETTER LIFE

Professor Freddy Boey, Deputy President and Provost of Nanyang Technological University (NTU), talks about the importance of nurturing scientific talent, and how the new Lee Kong Chian School of Medicine will cater to innovative exchanges between medicine and engineering. BY NIRMALA SIVANATHAN

He was only 14 when he learned to make artificial rayon on his own. More than four decades later, and armed with a PhD in Chemistry and Engineering, 55 year-old Professor Freddy Boey's sterling track record of breakthrough commercial applications has put Singapore on the map when it comes to innovation.

His latest invention is a device made from biodegradable materials that will patch up patients born with a hole in their heart. The device encourages natural cell growth which will eventually cover the hole and then disintegrate naturally, thus minimising complications arising from device erosion and obstruction.

You've described yourself as a scientist first. What started you down this path?

I didn't really aspire to become a scientist when I was young. What I did have was an inquiring mind and the urge to challenge premises. For me, the fun part of a toy was not in playing with it but taking it apart to see how it worked, then putting it back together again. In secondary school, after being scolded by a Physics teacher for asking a question not in the syllabus, I decided to ignore his classes and learn Physics by myself. Soon after came the desire to explore the boundaries of what is known and unknown, what is possible and not possible. That often involves challenging premises and daring to do what is not supposed to be done. As it turns out, these are qualities that make a good scientist, so I ended up being one! As Provost of NTU, I would describe myself as a scientist first and an administrator second. Good administration is important, but it is a means to an end of achieving great science.



Do you have a specialised interest in biomedical engineering? Or do you have inventions that touch on different sectors?

I was interested in everything when I was young. Unfortunately I did not get the opportunity to pursue all these interests in parallel! My previous innovations were an automated wrapping machine, an automated filament-winding machine that produced giant composite pipes, a fully carbon fibre part to replace the aluminium original for a Skyhawk A4 plane, the entry barrier device for the SMRT, and a microdermabrasion machine for my dermatologist friend. The National Parks Board also got me to design a huge composite cage to restrict a tree's rapid growth (it's pretty expensive to trim trees, I was told!). This also enables them to be transported away instead of being cut down.

My interest in biomedical devices was sparked off after meeting a cardiologist who asked if we could produce a heart stent that — after being inserted in the blood vessel — would dissolve and be absorbed into the body.

You've also said there's no better place than Singapore to be a scientist. Why is that?

Singapore has one of the world's best research cultures and the academic sector is well-supported by both the government and industry. What's also great is its predictability — current financial problems notwithstanding — the government has already committed to increase R&D expenditure by 20 per cent, with \$16.1 billion for research, innovation and enterprise from 2011 to 2015. Which other country is doing that?

Singapore's small size and supportive environment has created a 'scientific oasis', offering unparalleled funding opportunities in a truly multidisciplinary and globally diverse community.

What challenges do scientists and researchers face in Singapore today?

What is lacking for now is a credible pool of start-up CEOs who are familiar with technology and have entrepreneurial and business acumen. I also think we can foster more scientists who are excited about innovation and entrepreneurship, to complement their passion for knowledge. Admittedly, these things take time to evolve.

Where would you like to see the biomedical engineering industry in Singapore going in the future?

Singapore today has a Biomedical Industry pillar that contributes substantially to the country's economy. Upstream, if we can increase the opportunities for medical doctors to meet engineers, a lot more great inventions will evolve. Every one of my biomedical inventions was inspired after conversations with medical doctors. In NTU, with the start of our new Lee Kong Chian School of Medicine (LKCSOM), we will ensure that our students have every opportunity to meet and collaborate with faculty from the College of Engineering. The LKCSOM is well placed to not only train the best clinicians, but to also be at the forefront of innovating medical devices and improving healthcare.

I also hope that local investment community and companies will better appreciate the business opportunities coming from the vast R&D investments in Singapore and engage our scientists more. Singapore's ageing population and the focus on health issues will drive demand for better and more sophisticated medical devices and equipment.

What inventions are you working on currently?

We are right now starting the first-in-man trials on a fully biodegradable plug as a remedy for congenital hole-in-the-heart cases, in particular, patent ductus arteriosus, atrial septal defects and patent foramen ovale. The plug encourages natural cell growth to eventually cover the hole.

On a lighter note, if you could invite one person — dead or alive — to dinner, who would it be?

It would be Leonardo da Vinci, the engineer, scientist, artist and inventor extraordinaire! He had 24 hours a day like any of us, [and yet] he could gain a mastery [of many subjects] in a very short time. I suspect it's because he had a simple but hugely effective approach to doing things that work in every field. It would be nice to hear from him what this was, over dinner!