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[I AM A SCIENTIST]

Not all whales swim away

Retiring research head at NUS plans to stay on to study ageing and the determinants of healthy ageing

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Professor Barry Halliwell feels that in a small country like Singapore, about two-thirds of research should be research with clear economic relevance and application, while the other third should be forward-looking blue skies research, whose application and relevance may only appear much later.

Q: You have been deputy president for research and technology at the National University of Singapore for nine years. How do you see your role?

I try to visit every school and institute at NUS annually to discuss what they are doing. That includes our 16 faculties and schools and three research centres of excellence such as the Cancer Science Institute of Singapore. Different parts of the university may be doing similar things and you can make them aware of each other. For example, ageing is a big issue in Singapore, and at NUS alone there are 250 researchers working on the problem, some in basic biology, others in the medical school, and yet others in architecture, humanities, social sciences, engineering and the business school, for example.

But collaboration is important. If the computer school built sensors to monitor the elderly, but nurses in the nursing school do not know how to respond to them, they won't be useful. We have just set up the Centre for Healthtech Innovation and Medical Engineering to enhance cooperation of engineering and computing with the medical school to help the elderly.

Q: You talk about the power of collaboration. Has it yielded any usable products that make an impact on people's lives?

Certainly, many. Just one example is a new tool for cancer surgery, led by Associate Professor Huang Zhiwei from the NUS Faculty of Engineering, with professors in the Yong Loo Lin School of Medicine. When a surgeon is operating on someone with stomach cancer, he has two problems. One is identifying cancerous tissue, and the other is not cutting away too much healthy tissue. This is usually done with biopsies, where you send the tissue for testing in labs. It takes time. But the team found the light spectrum of non-cancer cells is different from cancer cells. So they invented a tool where you shine a certain light and it reports back straightaway, whether the cells are cancerous or not. This technology has since been commercialised.

There are probably about 15 novel devices in the past four or five years originating from NUS.

Q: You're also in charge of enforcing the university's research integrity code. How do you deal with cases – such as when it surfaced last year that former faculty member Anoop Shankar had faked his credentials, and the case of data fabrication by former immunology scientist Alirio Melendez in 2012?

It is always stressful when the university comes under such scrutiny because it affects our reputation for clean and honest research. But we undertake a thorough investigation process when the complaints are credible.

As for the investigation with Dr Melendez, it started with an anonymous tip-off about two of his papers which came with a whole dossier of evidence. We looked at these papers, and noticed the data had been manipulated. We then decided to go back and look at all of his papers, a massive job. We thought it was important to do it in the interests of the scientific record even though we were not obliged to. During that period, I was under scrutiny because I had two papers co-authored with him and so had to hand over the investigation to another senior NUS official. But I was subsequently cleared because they found no wrongdoing on my part. Yet when it was going on, everybody looked strangely at you. It was a stressful affair and I hope we don't go through something like that again.

Q: You are also an intermediary for research funding to the school. How do you know what research is important to fund?

Researchers or funding bodies always say we should do research in areas that are important. But how do you know what is important? You might say that some research is important to Singapore's economy and industries can grow around it.

But research can lead to accidental discoveries too. A lot of early work on lasers was people playing around with a new toy. But nobody would have predicted they would be used in surgery. You have to invest in building up areas that are important economically to Singapore but you equally have to invest in bottom-up ideas.

In my view, in a small country like Singapore, about two-thirds of research should be research with clear economic relevance and application, while the other third should be forward-looking blue skies research, whose application and relevance may only appear much later.

Q: NUS has done very well in the rankings. Quacquarelli Symonds, for example. ranked it 22 worldwide and Asia's top university. What do you think of rankings?

There are some rankings with quantitative indicators, like number of citations, publications in top journals and so on, which are one measure of quality, if a bit narrow. But there are also "reputational" rankings where the ranking agency sends out forms to academics all over the world asking them to rate others. I have always wondered what motivates an academic to answer such a survey. Rankings can also be manipulated – some universities might buy top academics for part-time posts to boost their rankings. A university is ultimately there to serve a country; rankings have a role but they should never drive university policy.

Q: Scientists often complain about the whales that swam away – foreign big names in science who came for a short stint before leaving. What has made you stay? And now that you're stepping down as deputy president of research and technology in June, do you plan to remain in Singapore?

NUS recruits some whales – including Singaporeans who built their research careers abroad – and most have stayed and helped train and inspire others, leaving a legacy of improved research. Equally important is to recruit bright young people who make their career here and become famous, NUS has many of those as well. Personally I plan to stay for another five years at least to help the NUS president and my successor oversee a number of key research programmes like the solar energy institute and our maritime industry collaboration. And I will continue my own research into ageing and the determinants of healthy ageing.

I am researching diet and its impact on the Asian population. Most of what we know about nutrition is based on a Western population and there is a gap in knowledge on the Asian population. It is a gap worth filling and Singapore is a good place for that research. I stayed because it has been an exciting time, watching NUS and Singapore generally growing in research stature and quality and doing a bit to contribute to this.

Q: And what do you do in your free time?

I keep myself hopefully not so obese by jogging. And I enjoy a good bottle of wine. I like reading, but the only time I have to do it is on a long plane journey. The last book I read was on the DNA of ancient humans – it's really fascinating.

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Professor Barry Halliwell, 65, is deputy president (research and technology) at the National University of Singapore. He oversees all aspects of research, ranging from funding and hiring to safety and ethics.

Under his leadership, competitive research grants secured by the university more than doubled between 2007 and 2014, and the amount last year was expected to hit more than $600 million.

Prof Halliwell, a British national and a Singapore permanent resident, got his doctor of philosophy in the biochemistry of plants from Oxford University and doctor of science in medical biochemistry from the University of London. He is widely recognised as a pioneer in research into free radicals and antioxidants, and their impact on human health.

He came to NUS in 1998 as a visiting professor in biochemistry and headed the university's biochemistry department from 2001 to 2007.

Although he may attend up to seven meetings a day with fellow academics, research funding bodies and public agencies, he still manages to squeeze in time for his own research.

The Tan Chin Tuan Centennial Professor has been singled out as one of the top 400 biomedical research scientists globally, and his research laboratory at NUS is ranked No. 1 worldwide, based on how much its work has been cited by other scientists.

He has also won numerous accolades, including a lifetime achievement award by the Society for Free Radical Biology and Medicine in America, Singapore's Public Administration Medal (Silver) in 2010, as well as the nation's highest scientific honour in 2013 – the President's Science and Technology Medal "for distinguished sustained and exceptional contributions to Singapore's Science and Engineering landscape".

Prof Halliwell steps down as deputy president of research and technology in June, and but will continue as senior adviser to the NUS president, overseeing a number of key research programmes covering ageing and neurobiology, solar energy, and industry partnerships, among others.

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