

Queen's Birthday Reception, Government House, 15 June 2010

Tanya Monro - Speech

It is a pleasure and an honour to be here with you today at this Queen's Birthday reception celebrating young people's engagement with Science, Technology and Innovation. This is indeed something to celebrate - and it gives us a wonderful chance to reflect on how we can nurture our passion, enthusiasm and talent for science and technology to make a difference.

Today I would like to share with you my thinking on some of the greatest opportunities for scientific breakthroughs that lie ahead, and to show you how, if we go about it right, we can build this science into technologies with the capacity to transform our future.

I see before me both young and more established scientists and engineers working within and leading SA's most vibrant and capable organisations.

Congratulations to the young scientists and engineers amongst you - you wouldn't be here if you weren't already achieving at the highest levels. I hope that this celebration of your love of science and technology today will inspire you to greater heights. Hopefully you will also have a chance to meet people today who will inspire and connect you with opportunities to enable you to drive forward your ideas that next step.

One of the most wonderful things I have discovered since arriving in SA 5 years ago is that we are a big enough state to do great science and innovate, yet we are still small enough to be strongly connected - connections between people and between organisations. I urge you to seize SA's strong connectedness, and strong enthusiasm to excel in science and technology, to do things that would be difficult to do elsewhere.

This brings me to the central topic of my address today - that is science and technology "at the boundaries" between conventional scientific disciplines. I believe that our greatest opportunities for creating scientific and technological breakthroughs is by working across these boundaries, and by bringing together people with different scientific worldviews to solve some of the problems that we face.

I would like to talk to you about "Transdisciplinary Science for Transforming our Future".

You may wonder what I mean by "Transdisciplinary". If so, I urge you to go to Wikipedia and read about how this differs from cross-, multi- & inter-disciplinary science. What "transdisciplinary" means to me is bringing

together experts from many fields, celebrating and nurturing their disciplinary excellence, while creating an environment in which they can work together in new ways to create tools that will allow new scientific questions to be asked and innovative technologies created.

I am pursuing this vision within IPAS, the newly formed Institute for Photonics & Advanced Sensing at the University of Adelaide. I am its inaugural Director.

IPAS has been founded on the success of the Centre of Expertise in Photonics and the optical fibre research capabilities within this Centre. This Centre is a key collaboration within the strategic alliance between the University of Adelaide and DSTO, and was established in 2005.

We are due to commence construction of a new \$40M facility at UoA North Terrace Campus shortly to house IPAS. This project brings together Defence SA, DSTO and UoA to create state of the art research infrastructure. One very exciting aspect of this development is that it will allow us to build laboratories that integrate the sciences in ways not found today.

On a personal note, I started my journey in science as a theoretical physicist and while doing my PhD I made the decision to take on experimental work. In doing this I discovered the liberation and joy of being able to come up with new ideas and test them in real life.

In my early postdoctoral years I began to work with amazing glass chemists and material scientists and we were able to create new classes of optical fibers which wouldn't have otherwise been possible, and these have gone on to transform applications from materials machining to optical data processing. Working at the UoA I have begun to take this evolution to the next level - bringing together chemists, physicists and biologists.

We are developing novel photonic, sensing and measurement technologies that will change the way science is done within some scientific disciplines, stimulate the creation of new, high-value future industries, and inspire a new generation of scientists to be engaged in solving real-world problems. We are creating disruptive new technologies for 4 areas: defence & national security, environmental monitoring, health and medical diagnostics and food and wine.

Imagine if in the future we could drive forward our fundamental understanding of biological systems by having physicists, chemists and biologists working side by side to create new approaches to measurement rather than having to rely on being the first people to get their hands on a new commercial

measurement solution. Or being able to support decision making by health care workers by providing real-time diagnostics, avoiding the cost and delays associated with sending samples off to centralised diagnostics labs.

IPAS research is already showing that this is possible. For example, in March we patented a new sensing platform capable of detecting flu in near-real time. This has only been possible by bringing together concepts in optical physics, surface chemistry and virology.

Another example is work we have done in collaboration with DSTO that has led to the creation of “dip” sensors capable of detecting chemicals such as hydrogen peroxide and aluminium within nanoscale sample volumes. This required a unique blend of research in chemical synthesis, surface science and optical fibres. This work paves the way towards smart structures for the remote detection of corrosion and for monitoring the health of embryos as they develop.

It is wonderful that we are gathered here today to reflect on how we can change the future of our state, our country and our world by excelling in science and translating these innovations to new products and policies.

Of course it isn't always easy to follow this path - as you all know competition for funding for science and innovation can be stiff, and there are many reasons why you might at times be tempted to follow another path. Even if this thought has never crossed your mind, I would like to share the following tips with you that I have learnt in my journey thus far:

- Follow your passions - if you believe in and are excited by what you are doing you will achieve so much more and it doesn't seem like work!
- Seek advice and mentors at every stage.
- Take risks and do not be deflated by failure - it has the most amazing capacity to help you think in new ways.

Thank you for helping to make SA a state that engages in science and technology.