

OCCASIONAL ADDRESS

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Chancellor, Vice Chancellor, Dean, staff, distinguished guests, graduates, family, friends, many thanks for inviting me today. This is my first Occasional Address and I am tremendously flattered and honoured. I am also concerned. Am I now part of THE ESTABLISHMENT? For a social radical, this comes as a nasty shock.

Let me start by congratulating today's graduates, in all their diversity, on their achievements. To those about to enter a career, I wish you every success in applying the fruits of your academic labours.

To those who studied purely for the intellectual challenge and personal enjoyment, good on you. Study should not be related only to personal career and national productivity. Nor should paid employment be the only way to change the world.

Congratulations to the family and friends. I'm sure you made many contributions, perhaps sometimes by biting your tongues, to the graduates' studies and successes.

Finally, congratulations to the teachers. If only the students knew how desperate we are for them to pass.

My reference to changing the world was not idle; it was stimulated by the Faculty's website, where it states, 'At UTS Science we're interested in science and technology that will change the world'. I commend this aim and wish to discuss some challenges that face our world. Science and technology have contributed to the creation of these challenges; can they contribute responses to meet them?

To my mind, there are four challenges that require urgent attention. Two threaten, fairly immediately, the stability, peace and health of peoples across the globe – these are world poverty and fundamentalism.

The other two imperil, probably in the slightly longer term, the very survival of the human species – these are the destruction of the natural environment and of our genetic code.

Today, I can only summarise these significant issues and ask you to consider how science and technology can change the world to create solutions.

I'll begin with the threats to global peace and health: poverty and fundamentalism.

Avian flu, the Middle East, tobacco, depression, the international arms trade, malaria – so many global threats; how can I identify two as paramount?

Simply because, if we allow current levels of world poverty to continue or if we fail to find a universally acceptable response to fundamentalism, such an unstable, insecure, antagonistic world will develop that the more obvious threats will worsen anyway.

Let me start with poverty, and some basic facts:

poverty is extremely common (about a quarter of the world's population live in poverty, mostly in developing nations);

- poverty is largely hereditary (poor parents have poor children who become poor adults);
- poverty is unhealthy (poor people live much shorter lives);
- poverty has been around for a long time, but it is not inevitable (the poor do not always have to be with us);
- finally, poor people and poor nations cannot themselves eradicate poverty.

Even a halving of the poverty rates in China and India as their economies expand will still leave hundreds of millions in poverty. And there are many poor African countries with no economic boom.

It seems unlikely that the world's poor nations and poor individuals will continue to accept this situation unquestioningly. A day of reckoning will come.

Moving to fundamentalism.

Fundamentalism involves two beliefs. Firstly, that there is a single truth that believers know (for instance that god or economic rationalism or the USA or democracy is supreme and holds the route to universal peace, happiness, salvation). Secondly, that believers have an obligation to convert or eliminate non-believers.

Fundamentalism most commonly refers to religious fundamentalism. However, it can also be applied to economic, political and nationalistic beliefs.

If someone believes in any single all-powerful truth, it's contradictory for them to accept that others believe differently. And if others' beliefs inhibit your ability to live according to your beliefs, trouble is brewing.

Fundamentalist beliefs have always been around but globalisation, industrialisation and easy access to very destructive weaponry have dramatically increased the potential for conflict.

Unfortunately, pluralist solutions (many truths; live and let live) are founded on another fundamentalist belief – that there is no single truth, which is completely contrary to true fundamentalists' beliefs.

Nonetheless, we must find ways of resolving and/or living peacefully with our differences or we'll be forever fighting each other.

I hope none of you are such fundamentalist scientists that you believe that science and technology have little to offer humanitarian concerns like poverty and fundamentalism.

However, I doubt anyone would challenge the relevance of science and technology to genetic engineering and environmental change, my two threats to the survival of the human race.

There are two absolute requirements for human life: our genetic code and an acceptable physical environment. We, Homo sapiens, will not be able to exist if either changes too much.

I'll start with the environment, which has been changing naturally for 5 billion years (sometimes never to return to what it was, sometimes cyclically). Life has evolved as this has occurred and for the last 80,000 years humans like us have been around. However, over the last 200 years humans have been actively changing the environment in ways that threaten our own and other species' health – we've already eliminated many.

We are now more aware of the dangers of environmental change – particularly global warming – and there is widespread acceptance by professional and scientific bodies that non-cyclical, environmental change, caused by industrialisation, poses many serious threats to humans. However, in terms of halting and repairing the damage, we have not turned the corner, politically or technically, and it remains possible that we will create a physical environment that will be incompatible with human life within the next century.

Finally, the genetic code.

The human genetic code has evolved over billions of years. Its structure and functions, which we have begun to understand only during the last 50 years, are phenomenally complex. We don't know if all the genes are essential or if some bits are 'junk'. We share most of our genes with chimpanzees but we don't know which bits make us 'human'. We don't know if transplanted genes behave exactly like identical natural genes. And yet we are already tampering with human genes - chopping some out, putting new ones in, activating 'dormant' ones, putting some of our own into other species.

Leaving aside the moral issues, the danger of changing the human genetic code, its essential core and within that its diversity, could be catastrophic. If we make changes that can be transmitted through generations we might incrementally destroy our humanness and/or our capacity to live in the environment in which we evolved.

To conclude

Scientists cannot limit their attention to theories, methods, publications and patents. My challenge to the new graduates is to broaden your gaze, and to improve the capacity of science and technology to tackle these four threats to health and life. But remember, to change the world, **for the better** the Faculty might usefully add, you must also become skilled participants in political and bureaucratic processes.

Scientists cannot change the world alone but you have an obligation to contribute, and sometimes to lead. I wish you well.

Thank you.