

**PROFESSOR IAN CHUBB AC
CHIEF SCIENTIST OF AUSTRALIA**

AIBN ANNUAL RESEARCH SYMPOSIUM

**STAMFORD PLAZA HOTEL
EDWARD & MARGARET STS, BRISBANE**

FRIDAY 22 JULY 2011

Peter Gray, staff from the Institute for Bioengineering and Nanotechnology, thank you for asking me here to speak to you today.

I won't talk a lot about science today, partly because it is not my place to come here to talk to you about **your** science – even though I once stated that since I could read English, and that I had actually used that ability, I could make a comment about where a particular science was heading. And I meant it; if you take the time and go to the trouble to read a fair amount of what is written by scientists, or summary statements by scientific academies or scientific and professional associations, you can draw inferences even if you are not a deep expert in a particular field.

But today I will speak to you primarily about something different: a new frontier in the astonishing world that nanotechnology and biotechnology are opening up – in medicine, new-age materials and in food.

The new frontier lies in the world of the everyday – people from all walks of life who revel in the wonders of science, find it baffling or, depending on their preconceptions, mind-numbingly dull or a cause for alarm.

Representatives of the AIBN and their associates at this symposium – scientists in research organisations worldwide for that matter – have been living and breathing bioengineering and nanotechnology for years. You understand it, and it gives you a thirst for more.

But spare a thought for those outside the scientific realm – our broader Australian community.

This is why I use the term frontier. For those Australians not involved in the day-to-day work of researchers at places like AIBN, asking them to accept nanotechnology and biotechnology is a huge leap into the unknown – a new and potentially frightening frontier.

Science is a great story but if we allow misunderstanding to flourish, if we don't challenge misinformation when we

see it or hear it, the community labours under incorrect assumptions. And unfortunately as is often the case with the unknown, inadequate explanation spawns mistrust.

This is why we, and our peers, must be at pains to ensure that all Australians know that real scientific endeavour is founded on the premise of good, ethically-based research to achieve the common good and is designed to lead to a healthier, wealthier and smarter society.

Science is presently represented differently: captured by one in the neat little expression: *they would say that wouldn't they*; or by another who reminds us that government funds the research of scientists so presumably, *they would say that wouldn't they*. Gross maybe, unexplained certainly, but an attempt to instill doubt in the public's mind: Research, they hint, is less about the disinterested pursuit of truth than it is about cosyng up to the agency that funds your business class travel.

Let us be clear: the public interest is important **to** what we do; and important **in** what we do. And it is that interest that captures the need for ethically conducted research that is indeed based on the disinterested pursuit of knowledge.

But we have to get the message out – not every now and then but always. We need to provide the public with the opportunity to understand the issues: the message scientists and researchers are attempting to get across – to explain who, how, what, where, when and why. We need to let them know that seeing two serious scientists debating a point on TV is not by definition a rift but more likely a public display of the scientific process at work – ideas are contestable, views are challenged and changed when better evidence is brought forward. And they are not changed if it is not.

The public has to trust science. But that trust should not be taken as a given; and winning it, earning it, should not

be taken as an easy ride.

And, in particular, we need to work at it now; as we push science into new areas some of which at least will have serious effects on people's lives, they will want reassurance that it can be trusted; that we can be trusted.

Nobody would accept that a new pharmaceutical could be put on the market untested in humans because scientists somewhere say it was designed to have only one targeted effect. They expect, even require, that it pass through a process that gives them confidence that side effects are restricted to a few, are small in number and controllable if they arise.

This is a place for government. There is a need to be seen to be leading the way in developing regulatory frameworks that will give the broader community the assurance it needs that the science is safe.

With respect to nanotechnology, the Government bases its position on three major principles:

- to protect the health and safety of humankind and the environment;
- to foster informed community debate; and
- to achieve economic and social benefit from responsible adoption of the technology.

To save buying into descriptions of countless government programs, let's look at the area most relevant to your discussions today, the National Enabling Technologies Strategy – we all call it NETS. It is funded through the Future Industries component of the Super Science Initiative.

Innovation Minister Senator Kim Carr told an ACTU OH&S and Workers' Compensation Seminar last year that the Government regarded nanotechnology as an especially big issue for Australian workers increasingly encountering nanomaterials in the production environment and the broader workplace.

The Minister said we (Australia) needed to achieve the highest possible degree of material progress – without losing sight of obligations to protect the environment and the wellbeing of individuals and communities – and without unreasonably inhibiting innovation. An important path to walk.

To this end there are studies funded through NETS that are investigating things like: improved understanding of how nanoparticles behave; the adequacy of the existing regulatory framework –its responsiveness and strength; whether workplace control measures are equal to the challenge of dealing with nanomaterials.

These are important parts of the whole.

But there is another part of that whole: integrity. I believe it is the common thread that joins what we do across all the programs and all the regulations.

It is the integrity with which the scientists go about their work; it is the integrity of the regulatory frameworks; it is

the integrity with which we treat our scientists across the board – heeding the body of evidence they have amassed and verified through credible research.

It all comes down to integrity. And making sure that the public is aware of the integrity with which science is conducted – and understand the means by which unethical behaviour is found out – whether by peer review or by regulatory framework.

It is one thing of course, to do the science well. If we are to achieve a better lot for humankind, the good science must be taken up and turned into products or services to provide that advantage.

There are a number of initiatives that will give NETS the “legs” to do so, so to speak.

The Department of Innovation engaged the research industry-led Australian Nanotechnology Alliance (ANA) to update the Nanotechnology Capability Report which outlines the capabilities of the sector in Australia.

With the latest information on Australia's nanotechnology sector, the fourth edition of the report contains entries from participating companies, research organisations and Government bodies.

It enables connection between the private sector, research institutions, infrastructure bodies and Australian government agencies involved in nanotechnology.

One of NETS foci is on public engagement and the need to present science in a way that truly engages. A laudable aim; one that we all should follow.

Other areas that fall within its ambit include the biotech sector – again, not entirely foreign to the audience today.

Exciting new developments in industrial biotechnology such as biofuels, bio-plastics and bio-chemicals, some undertaken right here at AIBN, offers us a glimpse into a low carbon future.

And in the health spectrum Australian biotech innovators

like Acrux, Mesoblast and Biota Holdings are carrying the flag internationally. Here in Australia, companies are queuing behind them as they attain critical milestones like advanced-stage clinical trials, regulatory approvals and, for some, the holy grail of international capital and markets through landmark agreements.

With activities across such a broad range, I think we need to make it clear – in unambiguous language – that, as part of the Enabling Technologies Strategy, the Government is examining the environmental, health and safety effects of nanotechnology and biotechnology – and how to guard against any that may prove harmful.

This includes understanding the potential health and safety effects of nano-sized materials and investigating the effectiveness of workplace control measures for them.

Vaccines and other medicines, ointments and lotions, manufactured materials and components ... each and

every one of them has to be exhaustively trialled and certified as safe.

To suggest otherwise would be preposterous and the sooner people realise how to judge the sometimes extravagant claims that certain scientific research is dangerous or life-threatening, the more rewarding the debate will be. The greater the level of understanding, the greater the level of support.

If we don't counter claims when they are silly or wrong, with good sense, with rational explanations and with regulatory rigour, we will have lost at the first hurdle those with whom we want to engage.

We must be alert to a changing relationship between science and society – particularly where contentious technologies are concerned.

Such technologies must have not only community support, but also meet community needs.

We learned from the first generation of Genetically Modified crops that consumers felt they delivered them few benefits. The perception was that companies and farmers were reaping the benefits, while the community carried the risks.

And while we're talking about growing food, bear in mind that our global population, currently at the seven billion mark, is projected to reach nine billion by 2050.

To feed so many, we will have to double current levels of food production. That's a horrifying statistic – I don't think that's too strong a word – in a world where 40 per cent of agricultural land is already badly degraded.

The Inter Action Council, an international body which has been monitoring these issues since the early 1980s, corroborates the OECD view.

It says that even the most optimistic forecasts suggest that some 700 million people, 200 million of them children, are likely to remain malnourished by the year 2020 – less than

a decade away.

Scientists will have to play an important part in addressing the food gap and it will be a longer, harder row to hoe if, each time they arrive at a potential solution to world hunger, they have to run the gauntlet of adverse public opinion.

I wrote recently for the New Scientist that we have an obligation to use our expertise to help inform the public and policy makers – regardless of whether we are communicating topics we think are good or bad news.

If we fear discussing risks as well as benefits, we diminish trust and increase the likelihood of the rejection of new technologies.

This is due in no small part to the largely uninformed who have the wherewithal to get their opinions heard. A better informed community would help put the doomsayers in their place.

Then there are those who try to turn doubt and apprehension to their advantage. We need only to think back a few days to the fracas about sunscreen to find an example of that.

It's natural that many contentious technologies are initially met with concern and viewed cautiously.

Conversely, fear campaigns extend those concerns.

Large slabs of the public are really only interested in the **why** and probably the **how** of the science you do – and will judge it harshly if it doesn't align with their values.

We've seen this in the climate change debate; we've seen it with GM foods and crops, and with embryonic stem cells. Scientists have had to confront death threats, destruction of their research, legal action and misinformation campaigns from those ideologically opposed to their work.

But as much as you believe in the importance of your work

you'll need to believe in the importance of better communicating and engaging with the public. And engaging with our schools.

Only last week, an online teaching resource TechNyou, was launched at the Conference of Australian Science Teachers.

TechNyou, developed **by** science teachers **for** science teachers, focuses on biotechnology and nanotechnology, addressing the new science curriculum with background notes, videos, lesson outlines and classroom activities.

I said before that science is a great story.

We need to be able to tell it in plain language, free from embellishments and free from the misrepresentation that so colours what I hesitate to call “the debate”.

We need to tell someone when they get it wrong – not one of us but all of us.

It's too easy to dismiss a lone opinion as coming from a vested interest (although the *they would say that wouldn't they* brigade do imagine a vast conspiracy of scientists with the single aim of reinforcing each other's bid for more money.

It's still a lot harder to ignore the combined opinion of an entire industry sector or school of scientific thought. It is this very point that we need to stand strong on and communicate to the public. We need to own this responsibility because if we don't speak out about the science and its value and the fact that overwhelmingly it is conducted in a highly ethical environment and is truly based on the disinterested pursuit of knowledge so that we know more, understand better, and that is ultimately for the public good.

Thank you.