Public policies and social appropriation of STI networks
Medellin, Colombia
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Honoured guests, ladies and gentlemen. I am delighted to be in Medellin for a discussion on public policies and social appropriation of science and technology. I would like to thank the organisers for their invitation.

The questions this conference poses are very important ones.

The Government invests in science and scientific research, but how best can this investment be realized? How can new ideas be transformed into new industries, and generate employment? How can scientific research in health, agriculture and the environment be translated into new practices to be adopted by citizens?

These questions are not unique to Colombia but are being considered by governments across the world.

If a society is to take full advantage of the discoveries of scientists, it has to have a basic appreciation of the science and what it means. But the gap between science and citizens is growing. Even well-informed scientists cannot keep up with the rate at which new knowledge is generated; and as the Canadian Bernard Schiele pointed out recently:

> *This explosion of knowledge means we no longer have a shared culture of S&T, and this position is going to worsen in the future.*

If Schiele is correct in claiming that the knowledge gap is growing wider as science expands, then how can a modern democratic society function in a logical and progressive manner?

Government is guided by the views and the votes of the citizens. Ultimately citizens make the decisions in the choices the country faces. Citizens need to have a basic understanding of the issues - and the implications of these issues, even if they are difficult to understand - so they can vote in a rational way at the ballot box.

Let us examine one difficult issue, climate change. The experts say we have a problem, and need to reduce the burning of fossil fuel. The accepted way to reduce carbon emissions is to put a price on it, so the industries that generate carbon dioxide are encouraged to find a cleaner way of conducting their business.

Governments find it hard to act on these matters. Science may give strong advice, but governments know the public is confused about climate change. They also know there will be strong opposition from interest groups – the companies which mine coal or produce electricity - which will attack any proposed policy change at every opportunity. Such campaigns will be attractive to people who work in these industries and anxious about their jobs.

Interest groups and those affected by policy change will find reasons to deny climate change. They will say that similar climate shifts have happened before, and any action

would be a big (and expensive) risk. They will find fault with the models and attack the scientists, quoting a few highly selective facts. And their 'experts', the climate change deniers, will appear on national television talk shows, and always they look so plausible, so believable.

Governments can see the political risks. It is easier for the opposition to make the case *against* action than it is for the government to sell the need for a new policy on carbon. Any policies to reduce carbon emissions would cause the price of electricity to increase sharply, a most unpopular side effect.

In Australia last year, when the government began to frame policies on a carbon reduction scheme, opposition grew. Doubts over the science were raised, and vested interests mounted a vigorous campaign to water down the proposed changes. In the end the government walked away from the issue – it all became too hard.

There will be other difficult decisions, many of them on science-based issues: water, energy, genetically modified organisms, the environment. Will governments also walk away from these decisions? Or will they tackle the problem head on, by involving, discussing and informing citizens?

This a challenging task. Most people are impatient, they want simple answers from scientists, and not long detailed papers. They want issues with an answer in black-and-white terms, and not qualified. They say: "Well *you* are the experts. You tell me what the situation is!" They use this information to come to a position.

Scientists cannot always provide a simple unqualified answer. On climate change, the best they can say is: "well, all the evidence, all our models support the idea that the world is going to get hotter and also dryer in some parts. It seems likely that this has been caused by the actions of people."

People find qualified answers frustrating. And when scientists appear to disagree on science, this adds confusion to their frustration. They do not appreciate the scientific method, the vigorous debates scientists have on new theories and ideas in order to test their validity and establish the truth of the matter.

From these introductory remarks, you can see there is a big job here for science communication.

Today I will talk the way science communicators are tackling this job, not in their day-to-day approaches to particular issues, but how they come together at an international level to debate the theory and practice of their profession. In some countries there are national organisations to enable similar discussions, and I will describe the formation of an Australian version. This had led on to a national discussion on the way these communication efforts should be managed, and I will give an Australian example of this.

So in the first part of my talk I will discuss the PCST Network, an international group which held its first conference in 1989. PCST stands for the "Public Communication of Science and Technology". What began as an informal network of researchers meeting to discuss issues of common interest, with a strong base in France and Spain, has grown now to have

a full international presence.

The PCST Network allows researchers and practitioners from different countries to exchange ideas; and in 6 weeks from now this process will continue when the PCST Network holds its eleventh international conference in New Delhi in India.

My second theme will be to discuss the way a national association of science communicators was created in Australia. “Australian Science Communicators” (ASC) was formed in 1994. The motivation was a feeling of isolation: science communicators had no way of discussing professional concerns, or seeking advice from colleagues, or learning new approaches and techniques. Essentially this was because there was only one communicator in each research unit and these individuals had little chance to meet colleagues.

The role of a national organization is similar to that of the PCST Network: to encourage the exchange of ideas and practices. It helps science communicators work more closely and bring combined skills to event organization.

My third theme is a recent review of science communication activities in Australia, with the aim of establishing ‘a national science communication strategy’. I understand these discussions might have particular relevance because your own report, the *National Strategy for Social Appropriation of Science and Technology*, will be launched at this conference.

The Australian exercise was commissioned by the Minister of the Department of Innovation, Industry, Science and Research. The problem it addressed was a lack of direction in science communication activities, and the failure of these activities to allow society to capture the benefits of scientific research as well as they might.

So I will move from international science communication to the national; and then focus on the nature of a national program, but all with a common thread of encouraging a society to use the ideas of its scientists.

1. The international PCST Network

The first PCST conference was held in France in 1989. It was an important milestone for science communication, an occasion where science communication ***practitioners*** (science journalists, editors, media officers, communication staff at museums and research organisations) were able to meet at an international level with people who worked on the ***academic and theoretical*** side of science communication.

Since then conferences have been held every two years:

Poitiers, France (1989)
Madrid, Spain (May 1991)
Montreal, Canada (April 1994)
Melbourne, Australia (November 1996)
Berlin, Germany (September 1998)
Geneva, Switzerland (CERN) (February 2001)
Cape Town, South Africa (4-7 December, 2002)
Barcelona, Spain (2004)
Seoul, South Korea (17-19 May 2006)
Malmo-Copenhagen, Sweden-Denmark (June 2008)
New Delhi, India (December 2010)
Florence, Italy (April 2012)

The first conference I attended was in 1994, in Montreal. The organising team was led by Bernard Schiele, an impressive and energetic specialist in science museums, and his event attracted about 450 delegates. The central theme of the conference was an international survey of science communication. 22 authors were commissioned to summarise the science communication activities in their country, and Schiele brought this all together in a book which stands as a document of record.

I was joint author of the chapter on Australia. It listed the participants in the public communication of science and technology in Australia, describing their activities, their budgets and their objectives.

The Montreal conference broadened the PCST Network beyond its French and Spanish origins; and the Network took a further step when it accepted a bid from Australia to host the 1996 conference. This geographical and cultural expansion accelerated a transformation of the Network into an international body.

At this time, it had no real structure: no constitution or rules, no membership fees, no formal processes. Decisions were made by the Scientific Committee, a group self-selected from people active and interested in the field.

It was a big decision to grant Australia the right to host the 1996 conference. Geographically Australia is a frightening distance from Europe: 24 hours flight. It has no great tradition of research and training in science communication, but does have a prominent national research organization, CSIRO – the Commonwealth Scientific and Industrial Research Organisation, like a super-university - with a strong tradition of science communication activities.

The Australian conference was a success. It attracted 360 registrants, including about 60 from overseas. It was the first time many of the local science communicators were able to discuss their work with people conducting research internationally.

The conference had a galvanizing effect on science communication in Australia. Horizons were expanded and new ideas came into play. The conference had a significant impact on the way science communicators thought about their work and their role in the workplace.

I joined the Scientific Committee at this time.

In 2005 PCST took a second big stride, with the decision to hold its first event in Asia, a PCST Symposium in Beijing. The next year the full conference was held in Seoul, and the PCST Network had become a truly international body.

A report on the Seoul conference showed the event drew 460 registrants. Just over half came from Korea, and Japan provided 69. The Seoul conference attracted 320 abstracts and 264 full papers from 38 different countries. There were both pre-conference and post-conference events, smaller scale discussions on a focused topic.

So far the Americas have not hosted a conference or a symposium (apart from Montreal in 1994). They remain the last frontier, but the PCST Network is hopeful that soon one country in the Americas will step forward and bid to host an event.

The Network is the major international forum for discussions on science communication. While the conferences have proved their value, there are areas for improvement. The Committee is working to generate stronger conversations between practitioners and researchers, and focus discussions on high-quality papers while still allowing younger researchers a chance to present their findings and experiences.

Over the last decade the Network became more organized. It has developed a process for nominating and electing members of the Scientific Committee, with a 6-year term of membership. The Committee has 25 members, drawn from 21 different countries, including Thailand, Germany, the UK, China, Mexico, Italy and Brazil. Colombia has been represented most ably by Lisbeth Fog, a Committee member since 1998.

PCST has a web site and a discussion list with about 800 subscribers. This is a free service – anyone can join and to post messages about events and publications, or ask questions or seek advice. It has established a process for selecting the location of the next conferences and a guide to the bidding process is on the PCST web site. In 2006 the Network introduced a degree of formality into its structure by electing a President.

The Network is constructed and maintained by volunteers. It has no subscriptions, no access to funds, and its formal structures are very simple. This has strengths as well as weaknesses. The strength lies in the fact that the Network draws together a community of scholars and practitioners, held together by a common interest in science communication and not bound by rules and regulations.

The weakness is that it has no funds to support conferences, web sites and discussion lists and other activities, and that it relies on the motivation of volunteers and individuals to run its activities. While the structures of the PCST Network are evolving, it has now built up a strong record of international conferences, and the discussions at these events have led to further activities.

These include books. *On a Human Scale* was the first. It features 17 different papers, practical solutions to science communication issues as presented to the Beijing Symposium. Registrants at the conference voted on the papers they found most valuable, and the authors of these papers were asked to revise them to a book format. Since then there have been other papers, other books.

The next conference is in New Delhi, in December this year. The 2012 conference will be held in Florence, in Italy; and the host country for 2014 will be selected at a meeting of the Scientific Committee in New Delhi.

I want now to turn to my second theme.

2. The national organization for science communicators in Australia

“Australian Science Communicators” (ASC) is a national organization for people interested in science communication. Incorporated in 1994, ASC now runs a website and an email discussion list which advertises events and publications, and allows members to promote media releases, to seek advice or express their point of view on contentious matters.

ASC organizes events and conferences which allow members and others interested in science communication to meet physically. Earlier this year it ran another national conference on science communication, and in 2007 hosted the international conference for science journalists in Melbourne.

Australians often have a strong presence at PCST conferences, giving papers and chairing sessions. This can be explained in part by the fact that the ASC network makes it easy and cheap to publicise the conferences.

ASC has about 450 members. Most of these people handle communication issues for research bodies or universities or museums, as public relations or media officers. Some are writers and editors or consultants; others work for the government in science policy areas. Others members working in research or teaching at universities. It includes scientists interested in communication.

Before describing the steps leading to the formation of ASC, I want to give you a picture of the average ‘science communicator’ in Australia. A survey conducted in 2008 by Jenni Metcalfe showed that:

1. About 60% of science communicators are female
2. Half of them work full-time
3. 80% have a science degree
4. One third had formal training in science communication

The most common activities were:

- Writing (94%)
- Editing (80%)
- Web development (70%)
- Partner/client/stakeholder liaison (61%)
- Event management (56%)

The majority agreed that science communication was now a respected profession in Australia. They also considered science communication was a different profession to public relations.

When science communicators were asked about what they enjoyed most about their job, they said:

- Translating science into laymen’s language for the general public
- Meeting interesting people, including interacting with researchers
- Finding out about stimulating ideas and new scientific advances
- The varied nature of the job of a science communicator, which often involved
- a great deal of creativity
- Seeing the general public, including children, gain enjoyment from science

When communicators were asked what they found most frustrating about their job, they highlighted the lack of:

- willingness by scientists to communicate
- resources, especially funding
- value put on science communication, especially by organisational managers
- appreciation by media representatives for the needs of science (for accuracy etc)
- recognition for science communication

So – how was ASC formed? What reasons did communicators give for wanting an organization? What steps did we go through to create the organization? What support did the organisers get from Government or other sources?

The story began when Jenni Metcalfe was asked to give a paper at the PCST Conference in Montreal. The paper was to be a summary of science communication activities in Australia – which organisations were involved, what communication activities did they execute, and how much were they spending on science communication. As she was working overseas at the time, she asked me to help.

The process involved making contact with organisations such as museums, universities, research bodies to find out what they were doing. As soon as I started talking to people with science communication roles in Australia, it became clear that they felt isolated and vulnerable.

"If only we had an organization so I could just *talk* to people in the business!" they complained. It was this reaction which led to the formation of a new organisation.

It's hard to realise just how isolated the communicators of the time were. Email was just appearing; science communication was an emerging profession; and apart from those working in CSIRO, communicators had little chance to meet or exchange views.

The first step was to call a meeting of people prominent in science communication. Twenty-four people attended - science journalists, media officers from research organisations or communicators from national bodies representing science and engineering. The meeting was at the National Press Club in Canberra on 3 February 1994.

The main issues discussed were:

- The aims and benefits of an organization
- The objectives
- Possible activities
- The membership (should it be limited to science journalists?)
- Funding

The group made one big decision, and that was to open up the new body to anyone wishing to join.

A working group was established to publicise the new organization and draft a constitution for discussion later that year. Letters inviting people to join as "Foundation Members" were

sent to all individuals and organisations with an interest in science communication. 375 people accepted the invitation, paying $US25 each.

Some organizations contributed seed funding: the Department of Industry, Science and Technology ($850); the Academy of Science ($500); CSIRO ($2,000); the Institution of Engineers ($1,000); and the Defence Science and Technology Organisation ($1000).

The first annual general meeting in September adopted the constitution, elected a committee, and Australian Science Communicators was born.

It has not always made easy progress. Debates have sometimes turned into arguments, regional branches would flourish and die, and organization issues such as managing the membership database and subscriptions proved persistent.

But the organization has been highly successful in its main purpose, of creating a community of science communicators. People throughout Australia know each other, can work together, seek advice, and exchange good ideas. It has allowed the running of events and meetings which would not have been possible without the links and the publicity machine ASC provides.

The ASC model has been exported successfully. Both South Africa and New Zealand have used the same approach to set up their own associations.

There is a website to learn more about ASC, at:

www.asc.asn.au

3. The development of a national science strategy

So far I have described the birth and formation of the international PCST Network, and a national organisation for science communicators. Now let me turn to the third part of my talk – the development of a national science strategy.

Australia has recently reviewed its science communication activities, with the aim of establishing 'a national science communication strategy' and giving science communication activities a greater sense of direction.

This had been identified as an issue in earlier government reports:

> *… existing science awareness activity required better coordination and refocusing of objectives, and … a higher priority needed to be placed on strategic leadership and policy formulation.*

The report of the review was launched in February 2010. The Chair of the Steering Committee stated in the preface that while she and her colleagues were encouraged by the breadth and diversity of science communication initiatives carried out by many organisations and individuals, she felt:

Australia requires a national strategy that will mobilise and connect such activity, which is largely uncoordinated and fragmented. Many Australians are yet to engage with the sciences in ways that will enable them to participate fully in a society which embraces the Australian Government's innovation agenda.

Australia has a large number of science communication activities, some funded by national and regional government, some by the universities or research organisations, and others supported by organisations including not-for-profit organisations, the Academies and industry. Most of these activities will be familiar:

- National science week
- Awards and prizes to recognise outstanding scientists, and create role models
- National campaigns to influence citizen behaviour on water use, the need for a healthy life-style, reducing energy consumption and so on
- Competitions and activities for school children, including extension training for highly talented students
- Events to encourage dialogue between scientists and industry
- Funding for organisations which promote science understanding to politicians

I want to give a quick picture of the report, its background, its contents and its recommendations.

Many national science communication activities in Australia are funded by a small national program called SCOPE, which spends $US4 million per year on 16 separate projects including:

- International Years (Biodiversity, Astronomy)
- Prime Minister's Prize for Science
- National Science Week
- The Australian Science and Mathematics Olympiads
- The National Youth Science Forum
- The Australian Science Festival

But over the years SCOPE had become an untidy collection of activities, funded on *an ad* hoc basis - there was no regular call for proposals, no formal application process, and no transparency in funding decisions.

When the Minister ordered a review of science communication, he set out his aims in a media release:

A National Science Communication Strategy will mean that the wonders of science will reach even further into the lounge rooms of Australian households.

A coordinated national approach to science communication will see much stronger results from a range of currently fragmented activities around the country."

The Steering Committee appointed by the Minister set the terms of reference for the review:

> *…to undertake an analysis of the existing science communication sector, conduct a program of consultations across Australia and develop a five-year plan in response.*

The final report released in February this year argues the case for an expanded and coordinated science communication effort, and made 15 formal recommendations. If Australia were informed by a national science communication strategy, the report said, it would:

- be inspired by and value scientific endeavour
- attract increasing national and international interest in its science
- critically engage with key scientific issues
- encourage young people to pursue scientific studies and careers

This gives a good idea of the motivation for the exercise.

At 104 pages long, the Report does not contain a cohesive plan, but is instead a cornucopia of ideas, a catalogue of issues and suggested solutions. One of the strongest messages to come from the consultation process was that "*no one at the national level was articulating the vision, goals, priorities and desired outcomes for communication across the sciences*."

So: what's new, what interesting and what's next?

The 15 recommendations are a mixture: the practical, the specific, the aspirational. They come across as uneven, probably because the review group was working on two tasks at the same time:

1. devising guidelines for a replacement program for SCOPE; and
2. the much grander task of trying to construct a new 'National Strategy for Science Communication' involving many participants, some well outside the Science Department's sphere of influence

Some recommendations are quite specific: retain the Prime Minister's Prize for Science, maintain funding for National Science Week. Others are less well-defined: recommendation 7, for instance, calls for an annual science and society forum to allow citizen input into decision-making and informing policy developments.

It is hard to begin to see how this might work. Who would be invited? What would they discuss, and what effect would the forum's decisions have on the priorities of universities and research bodies?

One interesting recommendation calls for "a strategic research and evaluation capability to design, target and review effective science engagement activities". Australia is good at devising innovative solutions to practical problems, but has shown less interest in developing the theory which should inform good practice. As in many countries, there is not a strong evidence base to support science communication activities.

I was disappointed the Report did not recognise the value of Australian Science Communicators. ASC provides the basic connective tissue which allows communicators to plan and organise other events.

The National Strategy aimed to address issues like better connection, coordination, and an end to fragmentation, but the authors of the Report chose to consign ASC to a minor role: "improving quality and professional standards in the area". It is an irony that the Minister chose to launch the Report at a national conference of ASC.

There is welcome recognition that the humanities and social sciences have a part to play in science communication, and can contribute to finding solutions and making them work. There are significant barriers to the two sides (humanities and social sciences; and the natural sciences) working together in Australia: issues of funding, culture and institutional structures all work against this.

The report is ambitious, going a long way beyond merely designing a replacement for SCOPE. It proposed a whole-of-government response to science communication. To be successful in this, its recommendations will need the support of the Government as a whole – and that will be a demanding hurdle to conquer. But its general aims are laudable: increased appreciation of science in Australian culture, better informed citizens making decisions on government directions, public confidence in the Government's investment in research; and a continuing supply of well-qualified science graduates."

The Government has yet to allocate substantial funds to science communication activities, and the future of the Report is not yet clear. Some progress has been made in that a number of sub-committees to turn the recommendations of the report into practice have been established and have submitted their recommendations to Government.

I began today by asking a series of questions: how can Government funds invested in research be realized by the country? How can new ideas be transformed into new industries, and generate employment? How can research in health, agriculture and the environment be translated into new practices?

In each case the answer involves science communication, and in describing activities at both international and national levels I have identified one mechanism which can help discover a path to answers and solutions.

Science communication has a strong role to manage the gap between science and citizens, and to help citizens deal with the "explosion of knowledge". It can encourage and inform community discussion on science issues, using mechanisms such as the media, science museums, science festivals, awareness campaigns and publications.

There has been a growing recognition of the importance of science communication. Fifty years ago the term 'science communication' was never used. Today, conferences, societies and journals are devoted to this field. Courses are taught and research is undertaken at universities, and 'science communication' has established a place, if not as a separate discipline, then certainly as a field of study.

Science communication is an essential link in unlocking the value of science to a society. The role of the communicator is to assist in creating a dialogue between scientists and society. It has to be a dialogue, because people have shown many times that they will not respond strongly if they are told, they want to have a say and to ask questions too. Such processes are essential to the successful social appropriation of science.

Thank you.

Toss Gascoigne was elected inaugural President of the PCST Network in 2006. He works at the interface between politics, science and the media. He served as Executive Director for the Federation of Australian Scientific and Technological Societies (FASTS); and the Council for the Humanities, Arts and Social Sciences (CHASS. He has co-authored studies on the attitude of scientists to the media, on the way journalists regard scientists, and on scientists commercialising their research.