

PUBLIC SCIENCE | STRENGTHENING SCIENCE TO  
IN CANADA | **PROTECT CANADIANS**



**SEPTEMBER 6-7, 2007**  
**HILTON LAC-LEAMY, GATINEAU, QUÉBEC, CANADA**

2007 SCIENCE POLICY SYMPOSIUM

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## Wednesday, September 5, 2007

6:00 pm – 10:00 pm

BEETHOVEN ROOM

### Wine and Cheese Reception

## Thursday, September 6, 2007

8:00 am – 9:00 am

MOZART FOYER

### Registration and Continental Breakfast

9:00 am – 9:15 am

MOZART ROOM

### Opening Remarks

*Michèle Demers, President,  
The Professional Institute of the Public Service of Canada*

9:15 am – 9:45 am

MOZART ROOM

### Keynote Address: Putting science to work for Canada!

*Dr. Pierre Coulombe, President, National Research Council*

Science and technology can shape the foundations of our collective abilities to address global challenges (climate change, resources and energy, health), the competitiveness of countries (quality of life, economic productivity, increased recognition of the importance of a knowledge economy) and the structure of competition in whole industries.

In his keynote address, Dr. Coulombe will explain how the National Research Council, today more than ever before, has an opportunity to stimulate the growth of world-class science and technology based industries, nurture ground-breaking technology clusters nationwide and contribute to large-scale, multi-disciplinary research and development. Our bottom line is all about putting science to work for Canada, not just for Canadians but for everyone!

9:45 am – 10:15 am

MOZART FOYER

### Refreshment Break and Poster Displays



THURSDAY, SEPTEMBER 6, 2007 (CONTINUED)

10:15 am – 12:00 pm

## Parallel Panels – Enhancing the Relevance of Public Science

### SESSION #1

#### BETHOVEN ROOM

### St. Andrews Biological Station as a case study in governmental marine science: Past, present and future

#### GOVERNMENT/SCIENCE PANELIST

**Dr. Robert Stephenson**, *Research Scientist, Marine Fish Division, Fisheries and Oceans Canada*

The St. Andrews Biological Station (SABS) offers a 100-year case study in the development and delivery of public marine science in Canada. This paper synthesizes information and lessons learned regarding the relevance of public science from the historical literature and from the views of current employees at Canada's oldest federal marine research institute.

An evaluation of the current situation (recent decade) at SABS highlights a number of issues facing science in the public sector generally. There has been ongoing attention to 'relevance', debate about public good versus private good, ongoing need to enhance interaction with academia, conflict between need for targeted (relevant) science and need to obtain outside funding for science, complexity of government, and numerous challenges associated with fiscal restraint. International agreements related to the marine environment, recent Canadian legislation (e.g. *Species at Risk Act*, *Oceans Act*), and the rapid recent evolution of management have placed increasing demands but have created an exciting and challenging landscape for public marine science.

Looking ahead, it is interesting to ask what the legacy of the St. Andrews Biological Station (and of public science) will be? This will be shaped in large part by evolution of strategies for science and technology that include decisions on the balance between public and academic science, on what is considered private vs public good, on long term data monitoring, and on the overall level of funding of public science.

### Environmental prediction: Empowering Canadians to manage their future

#### GOVERNMENT/SCIENCE PANELIST

**Mark Cantwell**, *Environmental Prediction Secretariat, Environment Canada*

The relative speed and significance of environmental change to the global commons is arguably greater today than in any period of recorded history. Knowledge about such change in advance is required in order to better adapt and/or mitigate the impacts to and from humanity's complex integrated economic, social, and environmental systems. Fortunately, advancements over the last decade in science and technology as well as inclusive participatory approaches to collaboration may now be brought together to produce more useful predictions of likely or conditional states of these complex systems. The implications for developing and harnessing this predictive capacity may be enormous benefits to humanity by allowing more informed and integrated decision-making concerning the protection of the natural world and the enhancement of human health, safety and prosperity. Yet these advancements in S&T and governance are only now catching the attention of government, industry, and civil society around the world.

In keeping with the Symposium's Mission for sparking discussion about the state of public science in Canada and to map a path toward producing the best science and public policies, this session will discuss the nature of environmental prediction – its definition, scope, and potential benefits. The presentation will propose a strategic approach to enhancing EP and its usefulness in Canada by setting out objectives, principles, and processes in a Canadian context. It will present a non-traditional way for bringing together the S&T and decision-making communities to produce more useful knowledge about the future in order to better manage the cumulative risks and opportunities of a changing world.

### Learning and knowing our way to better land care

#### SCIENCE PANELIST

**Andrew Campbell**, *Managing Director, Triple Helix Consulting Pty Ltd.*

Knowledge is fundamental if we are to develop more sustainable ways of living on earth.

Three key ingredients are needed in order to design and implement more sustainable systems for producing food and fibre, for managing the natural resource base, and for conserving our natural heritage for future generations. People need to know what to do and how to do it, they need to have the commitment to do it and they need to have the capacity to put more sustainable systems and practices into effect. We need to invest in knowledge in order to make better decisions, to innovate and to learn as we go along.

Knowledge is a classic public good. Left to its own devices, the market will under-invest in knowledge, particularly in the environmental domain. Public science has always played a significant role in generating knowledge for sustainability and will continue to do so. However sustainability debates tend to be just that – debates. Sustain what? For how long? Over what area? For whose benefit? As judged by whom and how? These are all common and legitimate questions as societies come to grips with the challenges of living within their natural capital, while consumption of a finite planet continues to grow apace.

Sustainability science is inherently complex, contextual and contested. Stakes are often high, decisions often urgent, yet the science is often uncertain. How can we do better in building more constructive and durable interfaces between science, policy and management that help us to learn our way through these big, difficult social questions, and to bring the community along with us?

This presentation will explore these questions drawing on recent Australian experience.

### Multi-stakeholder research initiatives: Success through partnership and collaboration

#### GOVERNMENT/SCIENCE PANELIST

**Janice Zinck**, *Manager, Mine Waste Management Program, Natural Resources Canada*

Sustainable development cannot occur without an integrated effort on the part of government, industry and the public. Similarly, many environmental and natural resource-based challenges can be effectively addressed through a cooperative approach linking science with policy, researchers with users. Natural Resources Canada is a leader in cooperative research and has established several very successful multi-stakeholder initiatives. This presentation will use case studies to examine how the role of multi-stakeholder research can be used to address technical challenges and how the input of different interest groups can contribute to a common goal. Several examples will be presented including the nationally recognized Mine Environment Neutral Drainage (MEND) program and the Green Mines Green Energy initiative.

## Parallel Panels – Enhancing the Relevance of Public Science (continued)

### SESSION #2

#### MOZART ROOM

### Innovation Place: Converting science into economic impact

#### RESEARCH PANELIST

**Austin Beggs**, Director, Corporate Relations, Innovation Place

Innovation Place, as one of 25 science and technology parks in Canada, has been operational since 1980. Over the last decade Innovation Place has started to have significant economic impact on the economy of Saskatchewan. In this panel, the reasons for this success will be explored as well as the economic impact of other science parks in Canada.

### An independent and integrated approach to fisheries sustainability

#### NGO PANELIST

**Jean Guy d'Entremont**, Chair, Fisheries Resource Conservation Council

The presentation will cover the Fisheries Resource Conservation Council's role in bringing science and industry together under the four major elements of sustainability. Mr. d'Entremont will also cover the importance of collaboration between traditional knowledge and science.

### Tearing down walls and building bridges: Updating Canada's infrastructure for R&D delivery

#### GOVERNMENT/POLICY PANELIST

**Dr. Gordon Neish**, Director General, Bioproducts Science & Innovation, Agriculture and Agri-Food Canada

This presentation will address the subject of federally-led approaches to alternative science delivery models aimed at improving integration and collaboration among public and private sector research performers (including the federal and provincial governments, academia, and for-profit and not-for-profit private sector organizations) as a means of more effectively addressing those national economic, social and environmental goals that would benefit from S&T solutions. The recently announced \$145 million Agricultural Bioproducts Innovation Program will be used as a case study of a work in progress.

### A case study of public-private collaboration in aquaculture: Investigating policies, incentives, and value creation

#### ACADEMIC PANELIST

**Kate Hoye**, University of Ottawa

This presentation discusses findings from a case study investigating a formal public-private partnership between a public research laboratory and an aquaculture firm in a depressed regional economy. Lessons drawn from this example of public science in the food industry are: 1) that this form of public-private partnership has significant potential to create social and economic value; 2) that attempts by the federal laboratory and publicly-funded granting agency to track the value of partnership activities rely on inappropriate indicators (e.g. patent counts in a field in which patents are largely irrelevant); and, 3) that the federal laboratory in this research collaboration failed to encourage scientists to engage in these types of collaborative research projects.



THURSDAY, SEPTEMBER 6, 2007 (CONTINUED)

10:15 am – 12:00 pm

## Parallel Panels – Enhancing the Relevance of Public Science (continued)

### SESSION #3

#### DELFOSSÉ ROOM

#### The role of science in public policy: Higher reason, or reason for hire?

##### ACADEMIC PANELIST

*Dr. Jim Gerrie, Cape Breton University*

The traditional vision of the role science should play in policy-making is of a two-stage process of scientists first finding out the facts, and then policy-makers making a decision about what to do about them. We argue that this two-stage process is a fiction and that a distinction must be drawn between pure science and science in the service of public policy. When science is transferred into the policy realm, its claims to truth get undermined because we must abandon the open-ended nature of scientific inquiry. When we move from the sphere of science to the sphere of policy, we pick an arbitrary point in the open-ended scientific process, and ask our experts to give us the answer. The choice of the endpoint, however, must always be arbitrary and determined by non-scientific factors. Thus, the two stages in the model of first finding the facts, and then making a decision about what to do, cannot be clearly separated. The second stage clearly affects the first. This conclusion will have implications about existing scientific policy institutions. For example, we advocate that the environmental assessment process be radically overhauled, or perhaps even let go. It will be our position that ultimately a better model for the involvement of scientists in public policy debates is that of being participants in particular interest groups (“hired guns”), rather than as supposedly unbiased consultants to decision-makers.

#### Optimizing protection of human health and animal resources from emerging hazards

##### GOVERNMENT/POLICY PANELIST

*Dr. Judith Bossé, Vice-President, Science Branch,  
Canadian Food Inspection Agency*

Globalization increases the pace and movement of goods and people. In addition, climate change modifies the Canadian environment in a way that allows the survival of new hazards previously unknown to Nordic countries. These realities result in the emergence of new or re-emerging hazards threatening Canadians and Canadian resources. It is currently estimated that 80% of emerging infectious diseases affecting humans are of animal origin.

Science plays an increasing role in allowing governments to synergize the actions for early identification of emerging threats, increased capacity for response, decreased turn around times for confirmation of exposed and/or infected individuals/sub-groups, while optimizing the use of public funds and maintaining public confidence.

Since the first outbreak of a highly infectious avian influenza virus in domestic poultry in 2004, and in preparation for a potential introduction more serious than human zoonotic agents such as the H5N1 Asian strain of AI, the Canadian Food Inspection Agency (CFIA) and Other Government Departments (OGDs) have deployed a series of scientific approaches aimed at minimizing the impact of future incursions. These approaches include the use of modern diagnostic tools, increased real time communication abilities, optimization of current federal/provincial/academia containment laboratories and broadening the expertise of highly qualified personnel from those communities which contribute to the enhanced protection of Canadians and their animal resources.

#### Science and sustainable fisheries management in DFO

##### GOVERNMENT/SCIENCE PANELIST

*Dr. Peter Shelton, Research Scientist, Fisheries and Oceans Canada, Aquatic Resources Division*

Sustainable management of Canada’s marine capture fisheries is in the long-term interests of Canadians. This can best be achieved by making use of scientific information in a structured decision-making process within government. DFO claims to be a science-based agency yet science has had a weakening role in the decision-making process over the last two decades. Structured science-based decision-making processes have been designed which could incorporate objectives, risk and the precautionary approach, but these have only rarely been implemented and decision-making has become largely ad hoc and sub-optimal. In this process publicly funded science is used selectively and decisions emphasize short-term benefits to industry rather than long-term public good. This trend is reinforced by the Carty entrepreneurial approach in which research should pay for itself through user-pay schemes and partnerships with industry. This model is flawed with respect to science in federal agencies such as DFO. Costs have already been prepaid with public money. The expectation is that research will be conducted that produces results which will be used in an objective manner by government to make better decisions consistent with long-term public good. Diminished and selective use of science in the decision-making process combined with a de-professionalism trend in public service and bureaucratization of the research process have combined to weaken the integrity of DFO science. Although cost of research to support sustainable fisheries management is moderate relative to value of the resource, it is not clear that Canadians are well served by the current approach. Suggestions are made with regard to improving the role of science in DFO and increasing value to Canadians through sustainably managed fisheries.

12:00 pm – 1:15 pm

#### MOZART ROOM

#### Lunch

## Parallel Panels – Improving the Profile of Public Science

### SESSION #4

#### BEETHOVEN ROOM

### Science communications for real democracy

#### GOVERNMENT/SCIENCE PANELIST

**Carole Brodeur**, Senior Advisor in Science Promotion,  
Agriculture and Agri-Food Canada

"I'm a science communicator." "A what?" "I explain in French and English what scientists do." "Ahh..."

It's hard to defend as a position when it doesn't have a status (BI, CO, IS, VET, EG, etc.) or an easy definition. And yet, in public science AND for the public, science communicators are an essential interface – oil for the gears – the right hand of democracy.

In 2007, the government's message asking us to trust that they know what they're doing just doesn't cut it anymore. Change is happening at breakneck speed and, more than ever, the public wants to understand and be involved in government decisions. To do this, it is more necessary than ever to have a grasp of new and complex concepts.

On one hand, interaction between researchers and the public is unavoidable in this day of blogs, debates and web sites. In fact, search engines keep track of the frequency of site changes, which means that a site that has to wade through dozens of approval layers will never appear in search results. On the flip side, any blogger's site will appear in the top results and may therefore influence public opinion without any foundation in fact. Researchers definitely need experienced science communicators capable of facilitating communication with the public and avoiding blunders, while keeping the communication lines open. Since science communicators have no aversion to science and are not afraid of it, they are capable of fielding the public's occasionally emotional questions and answering them competently. They can raise the debate to a level where facts are clarified and decisions can be made to everyone's satisfaction.

### Getting the science message out

#### GOVERNMENT/POLICY PANELIST

**Robert Laliberté**, Director, NRC Communications & Corporate Relations,  
National Research Council Canada

Pitching science to media is no easy task. Messages need to be clear, concise, concrete and hard hitting. The benefits of the science must be immediate and significant for media to pick up a story and run with it. Journalists love headlines such as "New Cure for Cancer". Their job is to sell newspapers, but our job is to sell science. This is no easy sell. In science, project results can take years to surface. In some cases, results are earth shattering to the science community, but are far less appealing to the public at large. There are issues of interpretation, and the scientist who can't simplify the science to make it meaningful for the non-scientists among us. So how does one attract media to stories with weak legs? Unknown results? Or stories mired in technical detail? How do you get media to break down your door? Mr. Laliberté tackles these questions and more in his presentation entitled "Spinning Science".

### The right to understand scientific urgency

#### MEDIA PANELIST

**Véronique Morin**, Science Journalist,  
Past President of the Canadian Science Writers Association

There is no arguing the fact that, today, something scientific is often a mass media headline. Just think of climate change or emerging diseases, which alone make news on a daily basis. Despite the urgency of current major scientific issues, newsrooms are still ill-equipped for scientific coverage. Few of them even have reporters assigned to the 'science beat'. Véronique Morin, a scientific journalist for more than 20 years, talks to us about the reasons for this situation and its repercussions.

### SESSION #5

#### MOZART ROOM

### Surprise me: Injecting the art of storytelling into science

#### MEDIA PANELIST

**Tim Lougheed**, Science Journalist and President,  
Canadian Science Writers Association

People in a position to communicate or promote science often feel obliged to do so in some formal way, reflecting the highly structured format of scientific publication, thereby offering standardized, predictable accounts. Consequently, the best that can happen to these discussions is that they wind up in highly specialized media "ghettoes", but more often they simply vanish into the data smog that grows thicker around us every day. What is invariably missing is the element of surprise, the essence of good storytelling and the vital ingredient for piquing an audience's curiosity and holding its attention. Let us consider what makes for surprise in science and technology, and what therefore makes for a good story.

### Building public trust in gene therapy: The role of the media

#### MEDIA PANELIST

**Meriem Maza**, Science Journalist and Radio Host, Chevening Scholar

Since the 90's, gene therapy has raised as much hope as concern in the public. This is why the relationship between gene therapy and the public has never been a harmonious one. Many scientists believe that public concerns about gene therapy are simply based on misunderstandings and lack of scientific information and these scientists often adopt a 'deficit theory' about the public, assuming that the public lacks scientific knowledge. However, public opinion research in Europe showed that lack of information about genetic engineering does not simply translate as rejection of it. Also, a US survey, showed that the general attitudes toward biotechnology is positive. Social researchers concluded that the public lacks of moral acceptance and trust which explains the difficult relationship between gene therapy and society. There is therefore an urge to find ways to generate a public trust towards gene therapy. When engaging in such an enterprise, it is important to understand the reasons of this lack of trust. It might be interesting to try to find these reasons within the media coverage of gene therapy, since the media remain a major source of knowledge for the public about the subject. It is known that the media play an important role in shaping public opinions and attitudes but scientists who became active media actors have also a great influence on building this public trust. By examining some of the media attitudes and the behaviour of some of the most renowned gene therapy scientists vis-à-vis the major events in the chronology of gene therapy, this presentation attempts to explain the reasons for this lack of public trust in gene therapy and opens a debate on whether we should really build this trust.

### Targeting the Message – Maximizing the Public Impact of Science Communication

#### COMMUNICATIONS PANELIST

**Anton Holland**, Senior Vice-President, Operations, and Director,  
Science Communications, NIVA Inc.

So much of what scientists do has an impact on our daily lives, yet most people remain largely unaware of how scientists use their funding, and how their work affects us. Excellent science communication is critical to ensuring that members of the public understand current scientific issues that affect them on a daily basis and are able to determine when scientific research adds value to their lives. As science communication helps citizens make informed decisions concerning issues that involve a wide range of subject areas, effective science communication results from understanding target audiences and developing the best approaches to meeting their specific information needs.



THURSDAY, SEPTEMBER 6, 2007 (CONTINUED)

1:30 pm – 2:45 pm

## Parallel Panels – Improving the Profile of Public Science (continued)

### SESSION #6 DELFOSE ROOM

#### Pressing matters: Putting public science on the agenda

MEDIA PANELIST

*Jenny Manzer, Journalist*

When the organizers of this conference approached me to speak at this symposium, they told me that they wanted to open up discussion on how to strengthen the role of public science in society. At the time, a five-part series I'd written on Canada's drug safety system had just been published in the *Ottawa Citizen*, so I guess they figured I'd know something about this topic – and I thought I did, too.

As a former clinical writer for a medical newspaper I had written hundreds – probably thousands – of articles about important breakthroughs made by public scientists. It was only 7 a.m. in Victoria when we had our conference discussion, so it took me a few minutes to realize that the organizers were talking about public scientists *outside* of academe.

Surely, I'd written some stories about what goes on in government labs? I vaguely recalled that the few times I'd tried to track down scientists working for government, they usually weren't eager to talk. So, I started to consider, why aren't public scientists in the public eye? What are the obstacles, and how can we overcome them?

This talk will cover some practical ways to get working journalists interested in what goes on in your lab and how to deal with them once you've gotten their attention. I'll also look at the consequences of increased awareness of public science, both the potential benefits and the potential sticking points.

#### University research and the media: A few ideas for raising the visibility of researchers in the media

ACADEMIC PANELIST

*Julie Martineau, Prsident, Association des  
communicateurs scientifiques du Qubec*

What innovative means can universities come up with to raise the visibility of their researchers in the media and reach the general public? This presentation will look at a few university success stories in Quebec and elsewhere in the world.

How can we narrow the gap separating scientists and journalists? This presentation will address a few ways of thinking about this question.

Lastly, the presentation will also look at potential collaboration between subsidizing organizations, academia and science recreation organizations to make scientific research more accessible to the general public.

#### Is federal science important: Who should care, and how should we tell them?

GOVERNMENT/SCIENCE PANELIST

*Dr. Alex Bielak, Director, Science and Technology Liaison,  
Environment Canada*

Canada is a major power in the production of environmental research articles with federal organizations contributing nearly 40% of the Canadian output between 1995 and 2004. Although Federal S&T is key for protecting and advancing Canada's public interests, over 60% of Canadians say they have too little information about the impact of science and research on Canadian society. Therefore communicating the value of public science should be top of mind in the daily work of all of Canada's science-based departments.

However, scatter-gunning a receptive public with science "messaging" via the media and/or the internet is not enough to ensure that public good science is understood and ultimately gets into the hands of those who can use it. This is particularly true given significant declines in numbers of science journalists on staff in the major mass media, and the proliferation and segmentation of the media. A case for more selective targeting of audiences with information pertinent to their needs, and the need for specialized knowledge brokering units, will be made and illustrated by a number of case studies.

2:45 pm – 3:15 pm

MOZART FOYER

#### Refreshment Break and Poster Displays

THURSDAY, SEPTEMBER 6, 2007 (CONTINUED)

3:15 pm – 4:30 pm

MOZART ROOM

## Plenary Panel –

### Building Support for Public Science in Canada

This panel will bring together senior executives from three (3) different federal departments with strong science components to discuss how to build support and how it can be used to better protect Canadians.

#### Natural resources science and technology: Building on our strengths

PANELIST

*Cassie Doyle, Deputy Minister, Natural Resources Canada*

Natural resources and energy research are areas of national interest, from both an economic and environmental perspective. Natural Resources Canada, through its policies and S&T, works with its partners and stakeholders to encourage innovation and discovery so that Canada can build a sustainable national competitive advantage. The Department focuses on what it does best: S&T that impacts economic development, supports environmental responsibility and addresses the safety and security of Canadians.

#### Excelling as a science-based regulator

PANELIST

*Carole Swan, President, Canadian Food Inspection Agency*

The Canadian Food Inspection Agency (CFIA) believes that public science is a valuable tool for public good. The Agency uses science to safeguard food, animals and plants, to enhance the health and well-being of Canada's people, environment and economy.

As much of the CFIA's work takes place behind the scenes, the public is not always aware of the importance of science in the Agency's work. Through an aggressive recruitment and outreach strategy, the Agency hopes to attract more scientists who will both help develop strong science-based policy and communicate the value of science to Canadians.

### Federal science: Making the invisible visible

PANELIST

*Michael Horgan, Deputy Minister, Environment Canada*

Unless you are a chiropractor – or need the services of a chiropractor – you probably never think about your skeleton. But you rely on it every day to hold you upright. Science, and in particular, federal science, is like your skeleton. It's the framework that underpins a great deal of the government's policies, programs, and services, but it's not a function that is noticed or attended to by the general public. Unless, of course, things go wrong. Despite the fact that roughly two-thirds of Environment Canada's staff and budget are devoted to science and technology, recent public opinion research found that only two percent of Canadians identified "conducting scientific research" as a role that Environment Canada plays in serving the Canadian public.

Does it matter that the public doesn't know that science supports the functions they value? Does it matter that they don't know that much of that science is carried out by the federal government? It's hard to value what you don't see – ask your chiropractor. Clearly, Environment Canada, and the Government of Canada more generally, needs to communicate more strongly the role of sound science as basis of its decisions, services, and programs for Canadians. It also needs to highlight the significant intramural scientific and technical capacity that supports those decisions, services, and programs.

Communicating the value of public good science should take many forms. We need better performance measures for government science. We need to tell people about the science we do and how it contributes to the services they do see and value. We need to get science into the hands of users in order to build a strong "user community" that can speak to the need for our "science services". And we need to get citizens into science to build literacy and capacity, to empower them to use science, and to build support for science as a core function of the business of government.

4:30 pm

### Close of Day One Symposium Proceedings



THURSDAY, SEPTEMBER 6, 2007 (CONTINUED)

6:00 pm – 9:00 pm

MOZART ROOM

## Symposium Evening Gala

6:00 pm – 6:30 pm

Cocktails

6:30 pm

Dinner

7:30 pm – 8:30 pm

GUEST SPEAKER



### **Evan Solomon, CBC Television Broadcaster, Journalist and Author**

Two time Gemini award winning writer and broadcaster Evan Solomon spends his professional life exploring the world of innovation, advances in technology, changing business paradigms, and creative approaches to managing and solving the complex challenges of sustainability in the 21st century.

A long-time print and broadcast journalist, Evan is the co-host of the two weekly news and current affairs shows CBC News: Sunday and CBC News: Sunday Night.

He is also the host of the Gemini award winning CBC Newsworld show about ideas in print called HotType. For four years he was the host of the Gemini award-winning show Futureworld, which explored the latest developments in technology and innovation. He also produced and hosted a series called The Change Makers, and a series for PBS in America called Masters of Technology. Solomon was the co-founder, and for eight years the editor-in-chief, of *Shift* magazine, an award-winning international magazine about technology and culture. Most recently, he co-founded The Ingenuity Project, a dynamic new series that gathers the best and brightest minds from around the world in order to generate new solutions to the most pressing issues of our time. As part of this project, Solomon is the co-editor and writer of the best-selling book *Fueling the Future: How the Battle Over Energy Is Changing Everything*, which was nominated of the National Business Book of the Year in 2004 and the National Science Award in 2004. He is also the co-editor and writer of *Feeding the Future: From Fat to Famine, How to Solve the World's Food Crisis*, released in 2005.

Solomon's insightful views dispel many of the myths and hype not only surrounding the digital world but human progress in general – presenting a unique, realistic picture of where things now stand, and where they may be headed.

# Friday, September 7, 2007

7:30 am – 8:30 am

MOZART FOYER

## Registration and Continental Breakfast

8:30 am – 8:40 am

MOZART ROOM

## Opening Remarks

**Gary Corbett**, Chairperson, 2007 Science Policy Symposium, Vice-President,  
The Professional Institute of the Public Service of Canada

8:40 am – 9:00 am

MOZART ROOM

## Keynote Address: The dwindling influence of federal departments in environmental sciences: A 39-year retrospective

**David Schindler**, Professor of Ecology, University of Alberta

In 1968, I joined the Freshwater Institute, a new institute within the Fisheries Research Board of Canada, an internationally-renowned organization that managed Canada's fish stocks. It was an efficient organization run by scientists, with little bureaucracy, little influenced by politicians. The newly-formed Institute recruited some of the best senior and junior scientists internationally. The group had international effects on policies for managing the Great Lakes and other freshwaters of the world. It also had major impacts on graduate education in limnology and fisheries, by providing interdisciplinary environments that were lacking in most of Canada's small universities.

Four years later the Fisheries Research Board was transformed into a civil service organization. The Freshwater Institute was first transferred to Environment Canada, then the Department of Fisheries and Oceans. Bureaucracy increased several fold. Recruitment of new scientists was restricted to Canadians. Communications became tightly controlled by federal ministers and their managers. The scientists who had directed the Fisheries Research Board were replaced by career bureaucrats, who often had no scientific experience in the departments that they were expected to manage.

Since that time, decreasing funds for research, declining salaries, restrictions on recruitment, and more and more tightly controlled public communications have rendered these organizations less and less effective. Today, they have little influence on science or public policy. Decisions on environmental management became increasingly for political, rather than scientific reasons. Most of the internationally-renowned scientists have retired or left for better working conditions in universities. They have not been replaced by scientists of similar calibre.

In my presentation, I shall recount some of the events that have led to the declining science and scientific influence of Environment Canada and the Department of Fisheries and Oceans, and for my own reasons for leaving the Civil Service. I will offer some suggestions on how these organizations might be re-cast to resume their previously important role in understanding and managing the Canadian Environment.

9:00 am – 10:30 am

MOZART ROOM

## Plenary Panel – An International Perspective on Science and Policy

International colleagues will share best practices and lessons learned from their experiences in science and policy.

### Developments in UK science policy

INTERNATIONAL SCIENCE POLICY PANELIST

**Professor Ben Martin**, SPRU, Science and Technology Policy Research,  
University of Sussex

Professor Martin will outline some of the key developments on UK science policy over the last 10-15 years, what was driving them, and what effects they have had.

### The application of science to the development and implementation of policies on avian and pandemic influenza: A view from the United Nations Headquarters

INTERNATIONAL SCIENTIST PANELIST

**Dr. David Nabarro**, Senior United Nations System Coordinator  
for Avian and Human Influenza

How can science inform policy in relation to a threat to Canadians that is – at the same time – a global threat? The first focus will be on the role of science in technical, institutional, economic and political dimensions of policy within Canadian institutions. The second focus must be on the application of science to influenza issues within a number of different countries. The third focus will be on options for establishing scientific agendas and multi-centre research initiatives within an intergovernmental forum (eg the World Health Organization) and the challenges of ensuring adequate finance for this science. The fourth focus will be the potential value of inter-governmental agencies in leading the strategic application of science to global issues in international health and development – and the importance of organizational synergy, interdisciplinary working and a focus on results as basic principles for effective inter-disciplinary working. The final focus will be on the difficulties with ensuring this strategic synergy in practice: the opportunities that will be realized if we do better and the risks we all have to face if we are not able to do so.

### Science policy: An Australian perspective

INTERNATIONAL PROFESSIONAL ASSOCIATION PANELIST

**John Vines**, Chief Executive Officer, Association of  
Professional Engineers, Scientists and Managers, Australia

The presentation will outline the science policy development mechanisms in Australia and identify the policy priorities currently in place in Australia and likely policy initiatives to address emerging issues. The paper will also outline a "foresighting" study used to inform the policy development process.

10:30 am – 11:00 am

MOZART FOYER

## Refreshment Break and Poster Displays



FRIDAY, SEPTEMBER 7, 2007 (CONTINUED)

11:00 am – 12:30 pm

## Parallel Panels – Building Support for Public Science

### SESSION #7

BEETHOVEN ROOM

#### Public geoscience: Examples of the benefits of sharing practical, relevant knowledge

GOVERNMENT/SCIENCE PANELIST

**Dr. David Boerner**, Director General, Central and Northern Canada Branch, Geological Survey of Canada, Natural Resources Canada

Sharing new knowledge is a critical means of turning limited resources into economic, environmental and societal gains. However, such benefits can only accrue if the ideas and knowledge are widely accessible, the ideas are relevant to resolving existing challenges and those receiving new ideas are capable of exploiting them.

To illustrate, consider the example of how public policy objectives can be achieved through furnishing public geoscience information. The occurrence of mineral deposits, hidden groundwater aquifer resources or earthquake hazards can only rarely be observed directly and the accessible evidence for such determinations is generally hugely limited. Hence, it becomes essential to add constraints through robust scientific paradigms to make robust, testable predictions. For example, the public knowledge that certain specific, rare minerals are associated with the geological processes that emplaced diamonds at the earth's surface can be combined with an understanding of ice flow directions from glaciations to identify trails to hidden diamond deposits. When this concept was made publicly accessible, the private sector made large investments in diamond exploration in Canada resulting in substantial new wealth for Canada's north.

While just one example, generating public geoscience knowledge related to minerals has been remarkably successful suggesting that, on average, one dollar of public geoscience investment leverages direct mineral exploration industry investment of \$5, and eventual in-ground value exceeding perhaps \$125. Similarly, although more complicated to value economically, environmental and societal benefits also result from the public geoscience by providing the information required for establishing stewardship over groundwater resources, reducing risk from natural hazards, or helping to protect the environment and human health. While many examples can be marshaled to support the case for supporting public science, it is important to recognize that more is required than just the mere creation of novel ideas or paradigms.

Ensuring the ideas remain publicly accessible, the relevance of the knowledge and the existence of the societal capacity to exploit the knowledge are equally important, although sometimes given less prominence. In short, rather than relying on a strategy of hope, purposeful steps need to be taken to ensure that new, relevant ideas that make a difference are created and that the capacity to use the ideas exists.

#### Building support for public science in Canada: A science policy ethic

POLICY PANELIST

**Dr. Marc Saner**, Executive Vice-President and Director of Assessments, Council of Canadian Academics

In my paper, I will apply a lesson learned from environmental ethics to the context of science policy. The protection of an entity – be that the natural environment or the scientific enterprise – will only take place once it is considered by decision-makers to represent a value. A practical issue arises, however. If an entire system is judged to represent value, then how does one arrive at day-to-day decisions, which often will only affect part of the system or, worse, will benefit one part while harming another?

Half a century ago, Aldo Leopold proposed *The Land Ethic*, which provides criteria to distinguish those actions that are right from those that are wrong when dealing with the natural environment. His deceptively simple prescriptions have stood the test of time, both in academic philosophy and in applied environmental conservation.

In close analogy to Leopold's system, I will argue that it is possible to adjudicate right from wrong actions by focusing on a small number of necessary and sufficient criteria. The emerging overarching ethical system not only provides an ethic for the broad field of science policy, it is also applicable to the parts within. In practice, it provides a foundation to justify the continued support of the scientific enterprise as an end-in-itself and a moral framework for decisions on public science.

#### Impact of urbanisation on inter-tidal invertebrates examined using field and lab experiments: The case of Halifax Harbour

GOVERNMENT/SCIENCE PANELIST

**Dr. Jocelyne Hellou**, Research Scientist, Organic Chemistry, Fisheries and Oceans Canada

Studies regarding the environmental state of Halifax Harbour go back a few decades. However, research on the presence of organic contaminants and potential toxic effects on biota are recent. Our investigations have covered the concentrations and fingerprints of many chemicals in sediments and in inter-tidal mussels along with health indicators of the latter. A link was demonstrated between the presence of raw sewage discharges and stressed mussels, as indicated by the lipid content, condition indices, gonad development, sex ratio, survival time in air, and several biochemical markers of mussels' fitness. Since sediments represent a sink for hydrophobic chemicals, and a sentinel benthic organism was not widely available throughout the harbour, the behavioural response of a model amphipod was examined in the laboratory to assess the quality of that habitat. These exposures established that amphipods preferred pristine sediments, and avoided different proportions of surface harbour sediments mixed with reference sediments. An escape response was also observed with mud snails exposed to harbour sediments. Contaminants measured in sediments, mussels and/or amphipods included: polycyclic aromatic hydrocarbons (PAH) derived from combustion and fossil fuel sources; a faecal marker; a hormone; metals; a pharmaceutical and industrial products. More impacted mussels and amphipods accumulated higher levels of PAH, also representative of the cocktail of lipophilic substances found near sewage discharges. Our data along with earlier studies of the water circulation and currents were used in the assessment of the location of new sewage treatment plants. The tools used to assess this ecosystem's health proved useful but need further refinement in order to protect this and other aquatic environments for future generations. Continued study of ecosystem recovery in Halifax Harbour during the next decade due to improved waste management practices represents a timely opportunity to showcase a successful application of integrated science with obvious benefit to the wider public.

## Parallel Panels – Building Support for Public Science (continued)

### SESSION #8 MOZART ROOM

#### Enhancing global capacity in the surveillance, prevention, and control of chronic diseases: Seven themes to consider and build upon

##### GOVERNMENT/SCIENCE PANELIST

**Dr. Bernard Choi**, Senior Research Scientist, Public Health Agency of Canada

**Rationale:** Chronic diseases are now a major global health problem not only in developed but also in developing countries. Although chronic diseases are non-communicable at the disease level, they are readily transferable at the risk factor level. With increasing human progress and technological advance, the global epidemic of chronic diseases will become an even bigger threat to global health.

**Methods:** Based on their own experiences and publications, and literature review, the authors contributed ideas and working examples to help enhance the global capacity in chronic diseases surveillance, prevention and control. In particular, new non-traditional, innovative ideas and solutions were sought.

**Major Results:** Ideas and working examples to help enhance the global capacity in chronic disease surveillance, prevention and control were collected, and grouped under seven themes, concisely summarized under the acronym "SCIENCE" – Strategy, Collaboration, Information, Education, Novelty, Communication, and Evaluation.

**Major Conclusions/Implications:** The art of "SCIENCE", and especially the new non-traditional innovative ideas that the authors have experienced or read about in their work, can help enhance the global capacity in chronic disease surveillance, prevention and control. They can help achieve the new World Health Organization global goal of reducing chronic disease death rates by two percent annually, generate more new ideas, and ultimately bring global chronic diseases under greater control.

#### Independent scientific advice

##### SCIENCE PANELIST

**Dr. Michael Borgas**, Scientist, Marine and Atmospheric Research, Commonwealth Scientific and Industrial Research Organization, Australia

Modern governments face issues that need independent scientific advice. This is essential for good evidence-based policy making. How this occurs today is often not transparent, is clouded by vested interests, or is simply wrongly understood. For example, it is important to know the difference between academic freedom, scientific freedom, scientific excellence and independent science. The latter is an important public function which requires discipline, a commitment to socializing and sharing of science, long term continuous validated and shared data, and underpinned with technical excellence. It emphasizes duplication, open minds, open review, and the building of social capital like trust. Its resource base needs to be free from vested interests. In contrast, modern science-excellence emphasizes a ranking of individuals based on novelty, recognition from peers and financial backers, and publications or patents not available to the public. While science excellence and independence often go hand in hand, these dual aspirations require different kinds of nurturing. The history of CSIRO is an interesting illustration of the interaction between government and independent scientific advice. This talk discusses Science-in-Government and argues for the renewal of public institutions, based on a mission for scientific independence. This would be a valuable and effective way to socialize science for human sustainability.

#### Invasive alien species of beetles from Northern Asia-Pacific Region: Proactive work through early detection and international collaboration

##### GOVERNMENT/SCIENCE PANELIST

**Dr. Vasily Grebennikov**, Research Scientist, Canadian Food Inspection Agency

The problem of Invasive Alien Species (IAS) has received significant attention from the federal government. This is reflected in the 2005 budget, which provides \$85 million over a five year period to minimize the risk of IAS to the Canadian environment, economy and society.

Invasive alien species of phytophagous beetles pose a major threat to Canadian plant resources. These beetles arrive in Canada from abroad, become established, and attack trees and other plants causing significant economic losses. Having no natural enemies, they out-compete native species and rapidly increase in number of individuals. Asian Longhorn Beetle (*Anoplophora glabripennis*) and Emerald Ash Borer (*Agrilus planipennis*) are the most widely publicized among the recently established IAS of beetles.

Many of the recent IAS originate from Asia, particularly from the People's Republic of China, Canada's second largest trading partner (after the USA). China has between 5 and 10 thousand species of phytophagous beetles, the majority of which are potentially invasive in Canada. The main challenge is that many of these species are poorly or not at all known, and, therefore, cannot be reliably identified when intercepted, or found in Canada.

A capacity-building program is implemented to recognize and identify phytophagous beetles from the Northern Asia-Pacific Region posing a risk to Canadian plant resources. This includes sampling the phytophagous beetles in their native habitat for morphological and DNA studies. Voucher specimens are deposited into the Canadian National Collection of Insects, the largest national reference source in entomology. The program has strong links with the scientists in the region, mainly in China, thus utilizing their existing research capacity. We intend to train at least one scientist from the region at the post-doctoral level through the Visiting Fellowship program to ensure an ongoing synergistic relationship with our international partners. As a result of this program we will enhance the capacity of CFIA to identify IAS of phytophagous beetles. This will increase the CFIA's efficiency in carrying out its mission in safeguarding food, animals and plants to improve the health and well-being of Canada's people, environment and economy.



FRIDAY, SEPTEMBER 7, 2007 (CONTINUED)

11:00 am – 12:30 pm

## Parallel Panels – Building Support for Public Science (continued)

### SESSION #9 DELFOSSÉ ROOM

#### Building stronger science – Policy links: Common sense for common purpose

##### ACADEMIC PANELIST

*Dr. Arthur May, President Emeritus, Memorial University*

Scientific research is undertaken in government to inform public policy, to support regulation and to add to the store of human knowledge (usually in areas of particular interest). Some research is performed for special reasons such as national security. Governments also fund most university research, and significant amounts in the private sector.

To understand what we do and why we do it, we must understand and accept the continuum of “fundamental-mission oriented-applied” – the route from discovery to application. There should be a presence across the spectrum, though the vast bulk of research in government should be mission oriented.

Scientists in government will have less freedom than those in universities, and more than those in the private sector, though this should not imply less freedom to publish or otherwise communicate scientific results (except in narrowly defined areas). Scientists who have an interest in interpreting science for public policy should be encouraged and supported, and brought fully into the public policy process, permanently in some cases.

Scientists in government should not become public champions of the application of their findings (having published them). In my view this is one of the fundamental restraints of being employed by government, and those who do not accept this restraint should not continue in government service.

#### Integrated federal S&T responses to national challenges: A blueprint for action

##### GOVERNMENT/SCIENCE PANELIST

*Helen Joseph, Director, Oceanography and Climate Branch,  
Oceans Science – Canadian Hydrographic Services Sciences*

In September 2005 a group of scientists from every federal science-based department met for 10 days to identify national challenges facing Canada that would benefit from an integrated scientific response. They proposed steps to support a culture of science and technology (S&T) integration within Canada. After this report was delivered a more detailed plan was developed. This plan provides a blueprint to develop integrated responses to national challenges. This document outlines a four-phase multi-step process to develop those components needed to respond to any challenge and maps how to set them in place to construct a fully-functioning, dynamic federal S&T engine to serve Canadians in responding to challenges.

Regardless of the form of the funding and governance model, the objective is to support a culture of integration amongst the various S&T players. Lessons learned from other integration initiatives show us that an effectively integrated plan holds to the following principles:

- a well-defined vision and goal statement;
- flexible, rationally-allocated funds;
- champions at senior levels;
- transparency through inclusion of all stakeholders;
- simple, logical, and flexible governance and management mechanisms;
- strong and regular communications;
- a long-term perspective and continuity;
- accountability mechanisms; and,
- rational pace.

There are three key components of an effectively integrated federal S&T response to national challenges:

1. Integrated knowledge and information and its dissemination.
2. Integrated management of infrastructure and capacity.
3. Integrated delivery of S&T.

These three components are inter-dependent: effective delivery of science cannot happen without the other two, and knowledge and information management and governance should not exist without the goals of supporting the science delivery. This proposal does not seek to provide specific technical or scientific answers to each challenge identified in the *Beyond the Horizon* workshop or in other fora. Rather it is a blueprint as to how to achieve better integration of S&T to develop a program to meet challenges faced by Canadians.



FRIDAY, SEPTEMBER 7, 2007 (CONTINUED)

11:00 am – 12:30 pm

## Parallel Panels – Building Support for Public Science (continued)

SESSION #9 (CONTINUED)

**DELFOSSÉ ROOM**

### Science as a foundation for decision-making

GOVERNMENT/POLICY PANELIST

**Dr. Wendy Watson-Wright**, *Assistant Deputy Minister,  
Fisheries and Oceans Canada*

Science and technology contribute substantially to Canada's economic performance as well as to its social development. Whether it is the private sector, academia, government or civil society, S&T is central to the ability of organizations and individuals to reach their goals and fulfill their responsibilities.

A strong science and policy relationship is essential in a complex world where the role of government and its ability to exert its influence is increasingly important. Strong linkages exist:

- where policy is well informed by relevant science;
- where science is being undertaken to answer key policy questions;
- where science informs policy of emerging science-based issues; and,
- where policy asks the right questions of science.

Government must put in place appropriate mechanisms to bridge the gap that sometimes exists between policy and science as well as within the federal science community. Included are process tools, input mechanisms (advisory bodies and networks), environmental scans, bridge builders (advisors and brokers) and engagement (outreach and consultation) strategies.

At DFO, the creation of advisory bodies such as an external Science Advisory Council and an internal Science Management Board have been instrumental in putting science on the right track. Both of these advisory groups have representatives from the DFO science community.

The presentation will discuss a few of the many important initiatives the Department of Fisheries and Oceans (DFO) has undertaken to ensure that the right science is done at the right time and that science and policy efforts are aligned. As well, reference will be made to the Federal S&T Enterprise Framework, which provides a picture of S&T with outcomes organized around five priorities or domains – Environment, Health, Energy, Economy, and Security and Defence. Developed by the federal ADM S&T Integration Board, the Enterprise Approach offers excellent potential to strengthen the linkages between S&T and policy.

Water and the Environment: The theme for this group is water and the environment. The presentation includes concrete examples where DFO works with federal science and other partners to address the cross cutting government priorities and issues that are of importance to the people of Canada.

United Nations Convention on the Law of the Sea (UNCLOS): The integral role for science in ensuring that Canada is able to meet its commitment to the United Nations Convention on the Law of the Sea (UNCLOS) is an ideal example of policy and science working hand in hand.

Aquatic Invasive Species: Aquatic invasive species have already been responsible for significant devastation of some native fish species and habitats as well as some wild and cultured fisheries in Canada. DFO participates in joint research projects and advises both within and outside the department on policy implications.

Mitigation of Seismic Noise in the Marine Environment: Research has focused on the impacts of seismic survey operations on fish, invertebrates, marine turtles and marine mammals. Knowledge gained from this research was used to develop a Statement of Canadian Practice on the Mitigation of Seismic Noise in the Marine Environment.

12:30 pm – 1:45 pm

**MOZART ROOM**

## Lunch

2:00 pm – 3:00 pm

## Parallel Panels – Outlining a Vision for Public Science in Canada

Choose one of three facilitated discussions.

### 1 – Enhancing the Relevance of Public Science

**BEETHOVEN ROOM**

### 2 – Improving the Profile of Public Science

**MOZART ROOM**

### 3 – Building Support for Public Science

**DELFOSSÉ ROOM**

3:00 pm – 3:20 pm

**MOZART FOYER**

## Refreshment Break and Poster Displays

3:20 pm – 4:00 pm

**MOZART ROOM**

## Comments and Reactions to Looking Ahead

4:00 pm

**MOZART ROOM**

## Symposium Closes