SCICOMM96

Delegates Manual

10th - 13th November 1996

Copland Theatre Complex, The University of Melbourne, Australia
Hosts: The University of Melbourne and CSIRO Australia

DELEGATES MANUAL

The University of Melbourne
November 11 - 13, 1996

WELCOME

Dear Delegate,

The University of Melbourne and CSIRO Australia, hosts of SCICOMM96 are happy and proud to welcome you to this, the fourth in the series of international conferences in the Public Communication of Science and Technology. The conference will examine the problems that prevent a sound public understanding of the technological changes and scientific issues that increasingly affect the daily lives of people around the world. It aims to identify how communicating science and technology to the public can be improved and developed.

Conference topics will include the public perceptions of and concerns about science and technology, the conflicts and pressures now placed on scientists to communicate their knowledge to the public, the effective dissemination of information on risk and hazard, and the use of new technologies to openly pursue issues in science and technology in the global environment.

Speakers from diverse backgrounds will discuss the current status of public communication of science and put forward ideas for change. As a delegate you will be able to explore and develop strategies in your particular branch of science communication - whether it is journalism, education, public relations, museums and so on - during the panel discussions and workshops. The conference program provides many opportunities for the informal exchange of information with your international colleagues.

On behalf of the International and Local Scientific Committees and the Organising Committee I encourage your complete participation in this important conference so that your contributions may shed light on the problems of public understanding of science and so that the conference might be seen in the fullness of time as having been a stepping stone, a guidepost on the path to improved communication.

We appreciate the trouble that many of you have gone to, grappling with *the tyranny of distance* in coming to Victoria. We are sure that your efforts will be rewarded. This fair City of Melbourne offers a multitude of attractive features for hosting a major conference. We trust the many benefits to be found in this location will far exceed any inconvenience endured in getting here.

I look forward to meeting you during the conference.

Geoffrey N. Taylor

Chair, Organising Committee

CONFERENCE COMMITTEES

International Scientific Committee :

Professor John Durant,	Science Museum, London
Professor Pierre Fayard,	LABCIS, Universite de Poitiers
Mr Toss Gascoigne,	Executive Director, FASTS
Professor Winfred Gopfert,	Free University Berlin
Professor Bruce V. Lewenstein,	Cornell University
Mr Kenji Makino,	University of Tokyo
Ms Jenni Metcalfe,	ECONNECT
Professor Bernard Schiele,	University of Quebec
Professor Martin Yriart,	Centro de divulgacion Cientifica Technologica Y Ambiental, Buenos Aires

Local Scientific Committee:

Wendy Parsons	CSIRO, Chair
Fiona Barbagallo	Shell Questacon
Chris Bryant	ANU
Richard Eckersley	CSIRO
Jane Ford	SciTech
Toss Gascoigne	FASTS
Jenni Metcalfe	Econnect
Jenifer North	CSIRO
Sue Stocklmayer	ANU

Local Organising Committee:

Geoffrey Taylor	University of Melbourne Conference Chair
Ian Anderson	New Scientist, President ASC
Sally Beggs	CSIRO
Lindsay Bevege	Consultant
Brian Donovan	Telstra Corporation
Helen Goss	formerly New Scientist
Keith Hutchison	University of Melbourne
Bob Johnstone	Journalist
Mike Pickford	ASN, Pty Ltd
Barbara Pierscionek	La Trobe University
David Symington	CSIRO
Jan Werner	formerly CSIRO
Ann Westmore	Journalist, Vic ANZAAS Committee
Sally White	Ironbark Communications

PROFILES OF PLENARY SESSION CHAIRS

Monday 11 November

Dr Geoffrey Taylor

Associate Professor, School of Physics, The University of Melbourne

Following a decade of study and research work in the United States and Europe Geoffrey Taylor returned to Australia to take up a faculty position a the University of Melbourne in 1986. His speciality is high energy particle physics and he has worked at many of the major international centres in this field. His current work is centred at CERN in Geneva where he was recently an Associate, resident at CERN for 15 months. Current experiments include a search for evidence for neutrino mass via neutrino oscillations, and the ATLAS experiment the next generation frontier experiment to search for the Higgs boson, the particle believed to exist and to be responsible giving fundamental particles their observed masses.

Dr Taylor is the Associate Dean of Science (External Relations) at Melbourne, promoting the Faculty's programs to potential students as well as to the wider community - local, national and international. The development of the high energy physics program in Australia has also led to Dr Taylor's participation in the dissemination of scientific ideas to the public. His public lectures on Particle Physics and the Beginning of the Universe have been widely and enthusiastically received.

Tuesday 12 November

Dr Peter Pockley

Australian Correspondent for "Nature"

After Melbourne and Oxford Universities and a stint of science teaching, Dr Pockley started science programs on radio and TV for the ABC in 1964, presenting and producing over a thousand programs (including Australia's first satellite TV links with the rest of the world). Then, after one of the periodic bursts of anti-science by management and politicians which are again afflicting the ABC, he left for the University of New South Wales to set up its public affairs operation.

Peter Pockley kept his hand in science media as Australian Correspondent for Nature, work he resumed in 1996. From 1989 Peter entered the perilous life of an independent science writer and broadcaster, becoming Science Editor for The Sun-Herald until it dumped science and expanded astrology in 1995. Dr Pockley also set up the Centre for Science Communication at the University of Technology, Sydney, starting the series of Horizons of Science Forums for the media and running courses in communications skills for scientists. His consulting company, Science Communication Pty Ltd, operates under the registered name of SciComm!

Wednesday 13 November

Dr Robyn Williams

Presenter, The *Science Show*, Radio National

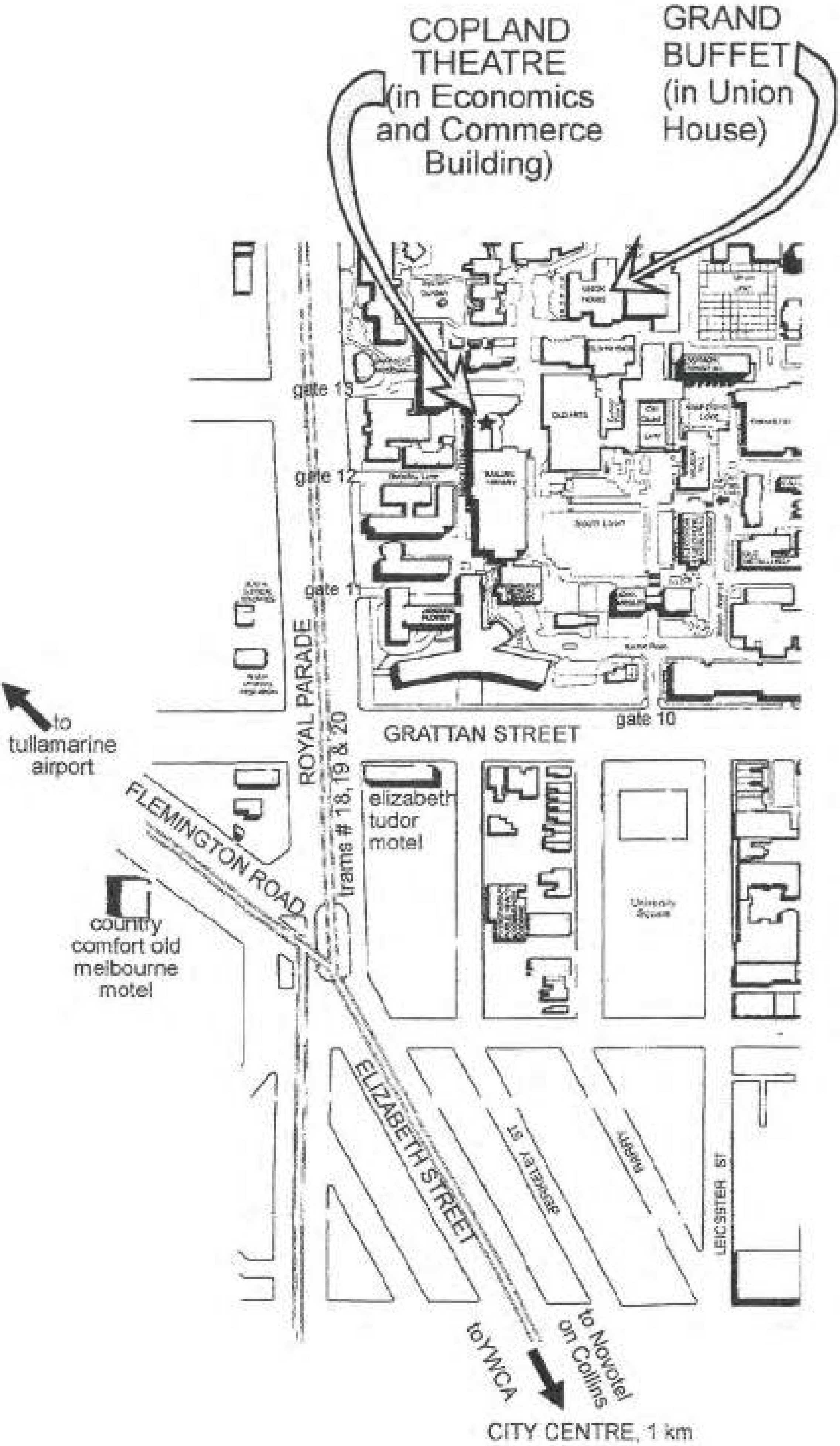
Robyn Williams, science journalist and broadcaster, has presented Radio National's *Science Show* since its inception in 1975.

In that time, the *Science Show* has established a large and loyal following from scientists, politicians and critics in both Australia and abroad. Robyn's sharp wit, keen sense of humour and ability to present science as an interest to just about anyone has contributed greatly to the program's popularity.

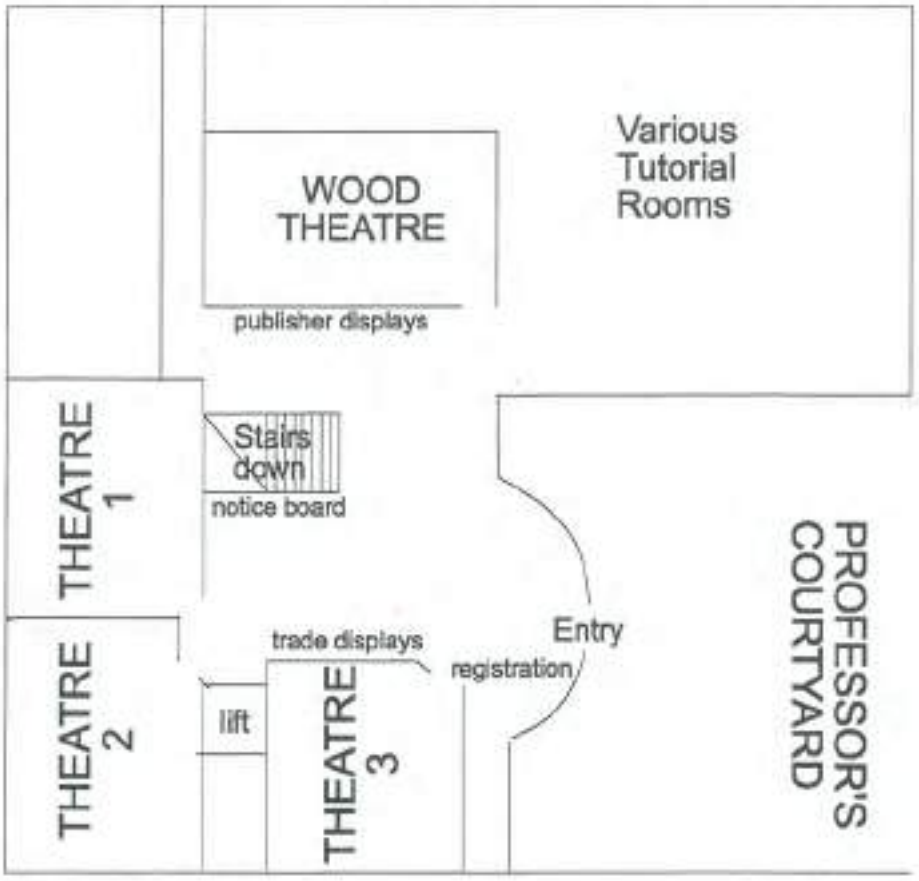
Robyn's natural talent for acting and his love of science has led to projects such as narrating the series *Nature of Australia*, appearing in *World Safari* with David Attenborough as well as guest appearances in *Dr Who, the Goodies* and *Monty Python's Flying Circus*.

Outside the ABC, Robyn has served in various positions including President of the Australian Museum, Chairman for the Commission For The Future, and President of the ANZAAS Congress in Brisbane.

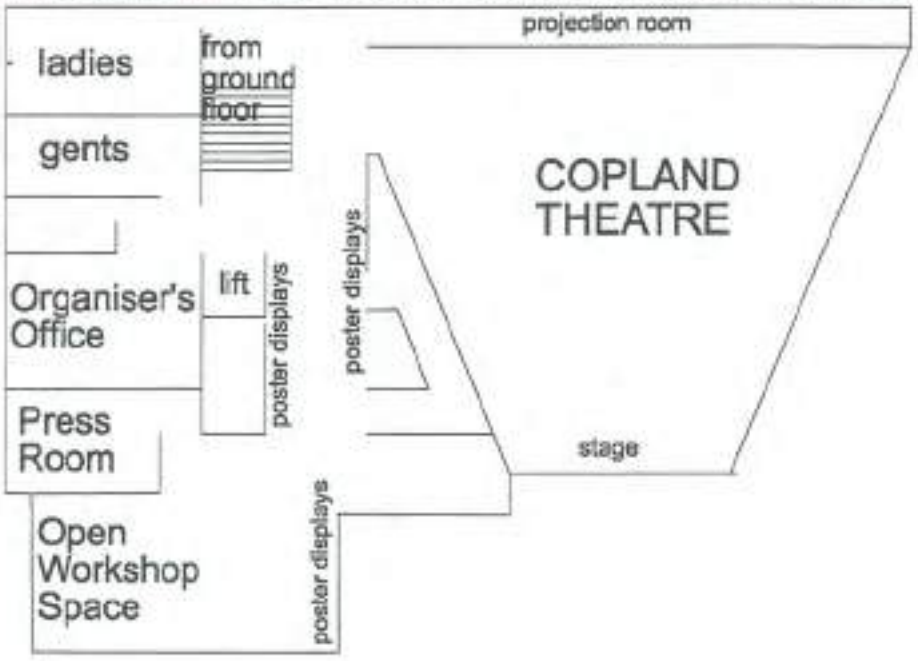
In 1993 Robyn was the first journalist elected as a Fellow Member of the Australian Academy of Science. He was also appointed AM in the 1988 Australian Bicentenary Honours list. The same year he received an Honorary Doctorate in Science from the Universities of Sydney, MacQuarie and Deakin.


COPLAND THEATRE (in Economics and Commerce Building)
GRAND BUFFET (in Union House)
gate 13
gate 12
gate 11
gate 10
ROYAL PARADE
GRATTAN STREET
to tullamarine airport
FLEMINGTON ROAD
trams # 18, 19 & 20
elizabeth tudor motel
country comfort old melbourne motel
ELIZABETH STREET
LEICESTER ST
to YWCA
to Novotel on Collins
CITY CENTRE, 1 km

GROUND LEVEL - ECONOMICS and COMMERCE BUILDING



DOWNSTAIRS in the ECONOMICS and COMMERCE BUILDING



MONDAY, 11 NOVEMBER - MORNING SESSION
IN THE PUBLIC EYE

8:55 Welcome

9:00am Opening address:
VICTOR McELHENY, Director, Knight Science Journalism Fellowships, MIT, USA. (Participation possible with the support of MIT)

9:30am Keynote Presentation:
JOHN DURANT, Professor of Public Understanding of Science, Imperial College, and Head of Science Communication, Science Museum, London. *"In the Public Eye - Setting the Scene".*

10:15am Three international perspectives:
MARTIN YRIART, Centre for Communication of Science & Technology, Argentina. *"Science in the Third World Media: An exotic luxury."*
PIERRE FAYARD, Directeur, University of Poitiers, France. *"Growing Specialisation and Community Needs: The Historical Project Of Public Communication of Science and Technology in Europe."*
RICHARD ECKERSLEY, Senior Strategic Analyst, CSIRO, Australia. *"Threat or Saviour? A Futures Perspective on S&T Attitudes."*

11:00am Morning Tea

11:30am **In the Public Eye** - concurrent workshops (See detailed listing below).
- Science and Anti-Science
- Planning Communication at the Scientific Research Project Level
- The Coverage of Science in the Popular Media
- Sharing the Big Ideas
- International Images of Science
- Communication and Language

TUESDAY, 12 NOVEMBER - MORNING SESSION
RISKY BUSINESS

9:00am Keynote Presentation:
BEN SELINGER, Australian National University, Australia. *"Risky Business - The Communication of Risk And Hazard."*

9:45am Risky Business - a case study:
Aspects of the Rabbit Calicivirus Project - How Well Did We Cope When Things Went Wrong?
Perspectives from:
NICK NEWLAND, Program Co-ordinator, ANZRCD Program, Australia.
LEIGH DAYTON, Science Writer, Sydney Morning Herald, Australia
GREG RAY, Managing Director, Timmins Ray Pty Ltd, Australia
IAN ANDERSON, Australian Editor, New Scientist

10:30am Morning Tea

11:00am **Risky Business** - concurrent workshops (See detailed listing below)
- Risk Assessment Principles for Evaluating Food Safety
- Community Involvement in the Chemicals Industry
- Towards a More Diological Approach to the Public Understanding of Biotechnology
- The Study of Science Communication
- Science is Fun
- Issues Management
- Student Perceptions of Risk

12:00pm A special Australian presentation from **MARY WHITE**, Consulting Paleobotanist, Australia

WEDNESDAY,13 NOVEMBER - MORNING SESSION
BUILDING THE GLOBAL CENTURY

9:00am Keynote Presentation:
IAN LOWE, Head, Science and Technology Department, Griffith University, Australia. *"Building the Global Century - a Participatory Model."*

9:45am Building the Global Century - a case study:
NALARKA GUNAWARDENE, Journalist, Sri Lanka *"Community Participation in Biodiversity Conservation."*

10:30am Morning Tea

11:00am **Building the Global Century** - concurrent workshops (See detailed listing below)
- Consensus Conferences
- Interactive Science Centres and Public Outreach
- Scientists and Students
- New technologies - the web
- Science Magazines and the Future

MONDAY, 11 NOVEMBER - AFTERNOON SESSION
IN THE PUBLIC EYE

12:45pm Luncheon Grand Buffet Hall round table light luncheon combined with ice breaker discussion sessions.

2:00pm Keynote Presentation:
BRUCE LEWENSTEIN, Associate Professor, Cornell University, USA. *"Conflicts and Pressures in Public Communication of Science and Technology."*

2:45pm In the Public Eye - a case study:
PETER CULLEN, Director, Co-operative Research Centre (CRC) for Freshwater Ecology, Australia. *"Communicate, Publish or Perish - Paradoxes in the Emerging Paradigms!"*

3:30pm Afternoon Tea

4:00pm In the Public Eye - concurrent workshops (See detailed listing below)

- Can you say that all again in 15 seconds?
- Gender and Scientific Communication
- Cooperative Strategies for CRC's
- Science beyond Scientists
- Developing science students' communication skills.
- ***Scientists in Film and Fiction*** (runs to 6:30 pm and open to public)

(5:30PM Australian Science Communicators annual general meeting.)

TUESDAY, 12 NOVEMBER - AFTERNOON SESSION
RISKY BUSINESS

1:00pm Luncheon Hamper luncheon with *POSTER PRESENTATIONS.*

2:00pm Keynote presentation:
GEORGE CARLO, Health & Environmental Sciences Group, USA (participation possible with the support of Pharma Pacific). *"Risky Business - The Role of Science in Creating And Solving Problems."*

2:45pm Risky Business - a case study:
SISTER AIDA VELASQUEZ, Director, Lingkod Tao-Kalikasan, Philippines. *"Ecologically Sustainable Development in the Philippines."*

3:30pm Afternoon Tea

4:00pm Risky Business - concurrent workshops (See detailed listing below)

- Science and Technology Talking to Government
- Science Communication for Sustainable Resource Management
- Partnership Approaches to Ecologically Sustainable Development
- Promoting Ecological Sustainable Development

5:30pm Wine Tasting - A sample of selected Victorian wines.

7:30PM Conference Dinner Grand Buffet Hall. Guest Speaker, **IAN PLIMER**, Head, Dept. of Earth Sciences, University of Melbourne, Australia.

WEDNESDAY, 13 NOVEMBER - AFTERNOON SESSION
BUILDING THE GLOBAL CENTURY

12:15pm Luncheon Hamper luncheon with *POSTER PRESENTATIONS.*

1:30pm Keynote presentation:
HIROKAZU NEGISHI, Canon R&D, Japan (participation possible with the support of Canon) *"Building the Global Century - The Challenges of New Technologies."*

2:15pm Keynote Presentation:

DONALD McDONALD, Chairman, Australian Broadcasting Commission. *"Technology and the Future of a Public Broadcaster in Communicating Science and Technology."*

2:45pm Afternoon Tea

3:15pm Building the Global Century - concurrent workshops (See detailed listing below)

- Science and TV
- The Industry Connection
- Science in Asia
- Innovative Science Communication

4:30pm Conference Perspective:
BERNARD SCHIELE, Convenor, 1994 PCST Conference, University of Quebec, Canada. *"PCST Conferences -Continuity Through Review and Preview."*

4:50pm Closing Address:
MALCOLM McINTOSH, Chief Executive, CSIRO, Australia.

5:30pm Official End of Conference Get Together. Bus trip to the Phillip Island Penguin Parade with a meal on the way.

In the Public Eye
Monday morning concurrent workshops
11:30am - 12:45pm

1. Science & Antiscience chair Peter Pockley	**2. Planning communication at the scientific research project level**	**3. The Coverage of science in the popular media: some case examples**
Open Workshop Space	Copland Theatre	Wood Theatre
Jeremy Evans, Bruce Lewenstein & Karina Kelly	*Jenni Metcalfe & Anne Leitch*	*Rosaleen Love& Ian Barns*
4. Sharing the Big Ideas:	**5. International Images of Science chair Wendy Parsons**	**6. Communication and language chair Chris Bryant**
Theatre 1	Theatre 2	Theatre 3
What research says about interactive science centres and the public understanding of science. *Michael Gore, Sue Stocklmayer & Leonie Rennie*	The development of science supplements in the European daily quality press *Pierre Fayard* Australian's Awareness and Understanding of Science and Technology - an Overview *Carmel Statham, (read by Judy Cunningham)* Japanese S&T Education *Hajime Nagahama*	Are we speaking the same language *Hugh Crone* The development of Aus "Fish Facts" *Gina Newton* A comparison of curriculum development for post graduate science communication programs in the USA, UK and Australia *Lesley Warner*

In the Public Eye
Monday afternoon concurrent workshops
4:00pm - 5:15pm

1. Can you say that all again in 15 seconds?	**2. Gender & Scientific Communication**	**3. Cooperative strategies for CoOperative Research Centres (CRCs) chair Cathy Simpson**
Theatre 3	Open Workshop Space	Theatre 2
Exploring the art of putting across complex scientific explanations simply and briefly for television *Alison Leigh & Ian Plimer*	*Sue Stockmayer, Leonie Rennie, Bev Dick & Helen McKernan*	Reviewing the effectiveness of an Australian CRC communication extension program *Don Alcock & Elizabeth Elenius* Unique challenges faced by CRC Communicators *Larissa Wilson* Exploring challenges to Communication in CRC's *Michelle Riedlinger*
4. Science beyond Scientists chair Richard Eckersley	**5. Developing science students' communication skills**	**6. Scientists in Film & Fiction**
Theatre 1	Wood Theatre	Copland Theatre
Public Duty or Pleasure *Gillian Pearson, read by Jeff Thomas* The epistemological significance of popularisation of science *Baudouin Jurdant* Science and Technology in Women's Experiences of Everyday Life *Tim Hardy* Analysis of Public Understanding and Concerns about Memory through a scientific frame *Elizabeth Bacon*	*Alex Radloff, Barbara de la Harpe & M Zadnik, presented by Alex Radloff*	*Peter Pockley, Ros Haynes & Nick Alexander*

Risky Business
Tuesday morning concurrent workshops
11am - 12pm

1. Risk Assessment principles for evaluating food safety	**2. Community involvement in the chemicals industry**	**3. Towards a more Diological Approach to the Public Understanding of Biotechnology**
Theatre 3	Tutorial Room 8	Theatre 2
Janet Salisbury	*Jim Smith*	*John Durant, Renato Schibeci & Ian Barns*
4. The Study of Science Communication	**5. Science is Fun chair Fiona Barbagallo**	**6. Issues management**
Copland Theatre	Open Workshop Space	Wood Theatre
Science communication as an academic discipline *Chris Bryant, Michael Gore & Sue Stocklmayer*	Learning: Focussing on the periphery - hazards in teaching science *David Demant* Science can be fun for everyone *Fiona Barbagallo* Making science fun for the public - it' a risky business. Danger - it may foster anti-science sentiment! *Andrea Horvath*	Managing an issue involving risk *Kerrie Mullins-Gunst*
7. Student Perceptions of Risk		
Theatre 1		
Year 12 Science students' perceptions of genetic engineering *Jenny Edwards* Science teachers' and scientists Understanding in relation to STS *Debra Tedman*		

Risky Business
Tuesday afternoon concurrent workshops
4:00pm - 5:15pm

1. Science and Technology Talking to Government	**2. Science Communication for Sustainable Resource Management chair Wendy Parsons**	**3. Partnership Approaches to Ecologically Sustainable Development chair Anne Leitch**
Theatre 3	Copland Theatre	Theatre 2
- case study and practical workshop *Toss Gascoigne, Lina Melero Nichele & Jenni Metcalfe*	State of the Environment reporting *Gina Newton* Promoting integrated pest management in Vietnam *Robert Huggan* A training game: Risk and adoption of rural innovations *Nancy Longnecker*	Astounding the skeptics, or, a partnership takes place *Therese Baribeau* Peddling landcares; the need for independent voices *David Mussared* The scientist as an environmentalist, ASTA's earthwork Environmental Program *Belinda Lamb*

4. Promoting Ecological Sustainable Development
Open Workshop Space
Sister Aida Velasquez

Building the Global Century
Wednesday morning concurrent workshops
11am - 12:15pm

1. Consensus Conferences chair: John Durant	**2. Interactive Science Centres and Public Outreach**	**3. Science and Students**
Theatre 3	Open Workshop Space	Theatre 2
Participatory Democracy: a translation analysis of the role of Consensus Conferences in formulating Information Technology practices *Alison Mohr* Communicating Innovatory Science - Government, Bureaucracy and the Political Paradigm *Arthur Brownlea* The role of participatory technology assessment in public decision making and public debate on science & technology - an evaluation of the Danish Consensus Conferences *Simon Joss* Plant Biotechnology - The New Zealand Consensus Conference Experience. *Peter Kettle, Rachael Perrett & Graeme King, Read by Graeme King*	The Questacon experience *Chris Bryant, Michael Gore & Fiona Barbagallo*	Pollinating Primary Science, Universities Communicating Science in Schools *Murali Nayudu, Meryl Ashton, Terry Murphy, Margaret Willis, Marilyn Hocking, John Vranjic & John Woodland*
4. New Technologies - The Web	**5. Science Magazines and the Future chair Ian Anderson**	
Theatre 1	Wood Theatre	
Virtual Reality in science communication on the WWW *Margaret Corbit, Simon Torok and Stuart Kolhagen*	New Scientist *Ian Anderson* The Double Helix *David Salt* "In the Public Eye" - Science in everyday life - producing the quarterly magazine Australiasian science. *Jennifer Wright & Brenda Tait, read by Jennifer Wright* 21.C Forum on future writing the public understanding of S&T *Ashley Crawford*	

Building the Global Century
Wednesday afternoon concurrent workshops
3:15pm - 4:30pm

1. Science and TV **chair Toss Gascoigne**	**2. The Industry Connection** **chair David Symington**	**3. Innovative Science Communication** **chair Wendy Parsons**
Theatre 3	Copland Theatre	Theatre 1
Comparative study of early AIDS reporting in Japan *Kenji Makino* Science in TV news in Germany *Winifred Goepfert & Utz Lederbogen* Science to the community via media *Jenni Metcalfe & Toss Gascoigne*	Use of brochures in communicating science based information to the non-specialist audience. *David Symington and Gerry Scheltinga* Policies and challenges for telecommunications - Australia, the World *Mark Sceats* Communication between Industry & Universities - getting it right *Jan Bitmead*	SCI FUN Roadshow *Alan Walker & Dorothy McMurrich* How effective is multimedia as a vehicle for public science communciation *Malcolm Paterson & Tom McGinness*

MONDAY, 11 NOVEMBER - MORNING PLENARY SESSION

IN THE PUBLIC EYE

Copland Theatre (Main Conference Hall)

1. Victor McElheny

Opening Address

The basic theme of my talk to a group of social scientists is to emphasize the need to look at the whole subject of science communication from the point of view of an audience that demands the information and uses it in its own way. Finding out the audience's level of information and interest is useful, but we have to go further and really study how people turn this information into attitudes and then into behavior, as in voting or buying. How does knowledge turn into behavior?

2. John Durant

In the Public Eye - Setting the Scene

3. Martin Yriart

Science in the Third World Media: An Exotic Luxury?

Science is a relative stranger in the Third World. In any given country, public communication on science and technology, and public understanding of science, depend on several factors. But the nature and quality of science and technology in that country is crucial, once the type of economy, the state of education, and the role of mass media are taken into account.

In many developing countries, there is very little or no scientific research. Science is thus an exotic product, a luxury. This situation is reflected by education and the media.

The prevalent image of science in education is of the encyclopaedic type. Science is a collection of facts and laws, more or less eternal and immutable. It is in the books, not the laboratory.

In may Third World media, science is something that happens abroad, far away, in rich industrial countries. It is spectacular and expensive. And it is rather unrelated with daily life. It deals with the Big Bang, atom smashers, super computers and the Nobel Prize.

From a cultural point of view, science competes with traditional beliefs. In a certain sense this is not a problem restricted to the Third World. And it may not be a problem at all, if it were possible to find specific places in culture to both science and beliefs.

But the real problem in the Third World is the perception of science in the power elites, where people have university degrees, read newspapers and travel abroad. Here local science is often viewed as a luxury, a waste of scarce resources, a non-priority, because its products can be easily imported from developed nations, or because it is supposed to be outside the economic reaches of a developing country.

Perceptions of science and technology are evolving in a not very favourable direction in the Third World. The industrial countries pressure to lift all barriers to international trade has recently produced an avalanche of consumer products that embody the popular image of technology, obscuring the role of scientific research.

Also satellite TV inundates homes with visions of science and science fiction concocted in the First World with the view of entertaining mass audiences. Science is gee-whiz: an Star Trek.

In any given day, you probably will not find a single local researcher talking about what he or she does in the laboratory and how. Education programs on science have only a token presence. Thus entertainment value and sensationalism prevail.

And this is reflected in the lack of interest in local research, something in the media

managers view, difficult and expensive to cover, that does not attract audiences. Thus they turn towards foreign materials, sometimes almost archaic, but glossy, inexpensive and pre-digested.

To summarise, in many Third World countries, particularly those of Latin America, science is an imported good, either in consumer products or mass media messages, because there is little or no indigenous scientific research or technology development, and very little encouragement for its popularisation.

4. Pierre Fayard

Growing Specialisation and Community Needs

Since science and technology are acting as major forces for the transformation of society, popularisation aims to fill the gap between specialists and non-specialists. By now, the importance of this political project is re-inforced by the current process of globalisation that actually destroys social, cultural and social links between the heterogeous components of society. Since the seventies in Western Europe : instead of putting the main focus on scientific contents, the new practices of PCST tend to lean on public demands to choose and to design both topics and strategies. Corporate and communication logics re-inforce that process between the ivory towers of scientific research and society. No longer the classical issues about the abilities of popularisation to translate or to betray science are going on. Leaving direct strategies, indirect models of acting use bottom-up approaches based on double step flow logics, to spread widely PCST and to rebuild the social and cognitive links between specialised and non-specialised areas.

5. Richard Eckersley

Threat or Saviour? A futures perspective on S&T Attitudes.

Public attitudes to science and technology are often characterised by ambivalence and contradiction. They are seen, at perhaps different levels and in different ways, as both a threat and a saviour. How people see the future may help to explain these attitudes, and the factors influencing them.

A futures perspective highlights the extent to which people see S&T in a broad social context. This context changes markedly between their expected and preferred futures; what they expect and want implies different scientific and technological priorities and needs. For example, they expect to see new technologies used further to entrench and concentrate wealth and power; they want to see S&T used to create closer-knit communities of people living a sustainable lifestyle.

Drawing mainly on a recent ASTEC Youth Partnership Study of youth views of the future, the paper will discuss people's hopes and concerns about S&T and how these both shape, and are shaped by, their broader dreams and expectations of the future. There are significant gender The paper will also consider several fundamental socio-cultural changes in western societies that could impact on attitudes to S&T.

MONDAY, 11 NOVEMBER - MORNING WORKSHOP SESSIONS

IN THE PUBLIC EYE

11:30am - 12:45pm (Locations as shown)

1. SCIENCE AND ANTI-SCIENCE
Open Workshop Space

Chair: Peter Pockley

a) JEREMY EVANS; MS KARINA KELLY; PROF BRUCE LEWENSTEIN,

Australian Science Communicators, NSW branch

"Anti-science"

What is "anti-science"? Is it the local astrologer or crystal healer or is it a general attitude alive and well in universities, the media and government departments? The time is ripe for scientists and science communicators to stop pointing the finger at an 'ignorant' public and take a look in the mirror. Do we need to reassess the way we teach science to students or communicate science to the public?

In this workshop, a panel of science communicators from Australia and overseas will offer their insights and the audience will be encouraged to participate in what promises to be a stimulating session.

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2. PLANNING COMMUNICATION AT THE SCIENTIFIC RESEARCH PROJECT LEVEL
Copland Theatre

a) JENNI METCALFE & ANNE LEITCH

The workshop will consider planning communication at the research project level, using planning communication software, a communication management workbook and demonstrations, examples and discussion. Topics covered include: identifying, understanding and prioritising stakeholders, setting objectives, choosing tactics, designing messages, incorporating evaluation, resourcing communication and implementing the plan.

In developing this workshop and software we were trying to find ways of streamlining and improving communication for research projects within two CSIRO Divisions. A series of workshops have been run in two CSIRO Divisions. These have been judged by the research staff to be effective in improving their communication planning and management skills.

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3. THE COVERAGE OF SCIENCE IN TH POPULAR MEDIA: SOME CASE EXAMPLES
Wood Theatre

a) ROSALEEN LOVE & IAN BARNS

This workshop will examine some examples of the way science is represented in the popular media. Rosaleen Love will consider what the world would be like if everything that was presented about science in the popular media was true. Ian Barns will discuss some examples of the way developments in contemporary genetics and biotechnology have been covered in science fiction movies, such as Jurassic Park, Alien and Blade Runner.

4. SHARING THE BIG IDEAS
Theatre 1

a) Michael Gore, Sue Stocklmayer & Leonie Rennie

What research says about interactive science centres and the public understanding of science

This panel presentation will invite participation and discussion on three themes.

1. Presenting to the public. Michael Gore

Science concepts are often portrayed out of context and sometimes very mathematically, particularly the 'big ideas' of physics. Michael will discuss differences between formal traditional presentations of science and informal contextual presentation.

2 The problems of prior experience. Sue Stocklmayer

Presenting the big ideas to the general public carries the attendant problems of prior knowledge and even misconceptions Sue will provide some suggestions for effective communication which take into account the most recent theories of learning.

3. Interactive science centres and current research. Léonie Rennie

Léonie will present an overview of visitor behaviour in interactive science centres. In particular, Léonie will discuss visitor interaction with exhibits and the kind of learning outcomes which might be expected. She will suggest some future directions for research in interactive science centres.

This panel presentation will report on four facets of research related to interactive science centres, and will invite participation and discussion on these themes.

1. Introduction: Research in the public understanding of science.: Chris Bryant

Implementing effective change in interactive science centres is difficult, because there are as yet few findings to guide exhibit designers and managers. Chris will discuss the present methodology related to exhibit design and to science shows such as the ubiquitous "Voltage show", and will outline the need for more focused research into the public perception of such events. Some suggestions will be made about possible research methodologies and important target groups.

2. The importance of context: Michael Gore

Science concepts are often portrayed out of context and sometimes very mathematically, particularly the 'big ideas' of physics. In this symposium, Michael will share some of his experiences in presenting science theatre to the public, with an emphasis on the theoretical basis for presenting science in a contextual framework. In particular, he will compare formal traditional presentation with informal contextual presentation and provide an analysis of differences.

3. The problems of prior experience: Sue Stocklmayer

Presenting the big ideas to the general public carries the attendant problems of prior knowledge and even misconceptions which, if not addressed, may hinder or prevent effective understanding. In addition, analogies, if used indiscriminately, may further confuse. In this symposium, Sue will address these issues primarily in the areas of physics and chemistry, and provide some suggestions for effective communication which take into account the most recent theories of learning. Implications for designing exhibits and presenting science shows will be discussed.

4. Summary: Interactive science centres and current research: Léonie Rennie

Léonie will present an overview of our present understanding of the response of the public when they interact with an exhibit, and of general visitor behaviour in interactive science centres. In particular, Leonie will discuss several aspects of research and will suggest future directions.

5. INTERNATIONAL IMAGES OF SCIENCE
Theatre 2

Chair: Wendy Parsons

a) Pierre Fayard

The development of science supplements in the European daily quality press

A survey of the development of press coverage of scientific and technical information in the main European dailies , reveals three major trends — a general explosion of coverage in the Community countries studied, an increasingly specialised body of science writers and, finally, a lack of control of the networks that communicate scientific information and ensure its recognition at an international level. Even though the subject matter is mainly international, science reporting in the daily press is still in fact a question of "jobbing" and expresses all the cultural diversity of Europe.

b) Carmel Statham

Australian's Awareness and Understanding of Science and Technology - an Overview

Delivered by Judy Cunningham

Australia is a nation with a population that is well-educated in science and technology and is comfortable with their use in everyday life, yet does not recognise or strongly support the role of science and technology in social and economic development. There does not seem to be a consensus that science and technology will play a major role in Australia's future. There is a disparity of views about science and technology according to gender, socioeconomic level and age and a disturbing lack of recognition among managers of the role of science and technology in research, development and innovation. Government, education and scientific groups throughout the nation are addressing this problem, although lack of cohesion in objectives remains a concern. Nevertheless, there is a high level of activity directed towards raising awareness and understanding of science and technology and evidence is emerging of the success of these activities.

c) Hajime Nagahama

Japanese S&T Education

The author introduces critical three projects and comments about them some impacts that will give to Japanese S&T education.

1. A promotion of S&T education by enactment of "Science an Technology Basic Act" and making out of "Science and Technology Basic Plan".

The section of "Promotion of Learning of Science and Technology" was established as a important part of the above Act and Plan. The section emphasises learning and understanding of S&T in school and out of school education as well as promotion of public relations an dissemination of knowledge of S&T.

2. A research project of S&T curriculum adjusting new paradigm of S&T an society.

A research group is now preparing a proposal for the Nonbusho Science Fund to make out a new curriculum system for S&T education titled "New Scientific Knowledge an Curriculum Development".

3. A movement of preservation and continuation of industrial heritage.

Recent years, a movement has been become actively that promotes to preserve and continue industrial technologies which supported the Japanese modernisation and high economic growth since the Keiji Restoration as a counter measure to meet de-industrialisation.

The above three projects are taken by persons and organisations concerned with S&T policy, industrial policy an educational policy as counter measures to meet the advance of globalisation of economy and industry. Every project is trying to adjust or convert from techno nationalism to techno-globalism. Therefore, according to the

success of failure, they will strongly effect the S&T power in future Japan. The author anticipates that the influence of these projects are more essential than that are expected now in general.

6. COMMUNICATION AND LANGUAGE

Theatre 3

Chair: Chris Bryant

a) Hugh Crone

Are we speaking the same language?

Scientific jargon is readily recognised by the science communicator, but a problem arises when a common term has different meanings for the scientist and for the public. "Chemical; drug; toxic" all are widely used words, but what is understood by them can be quite different; this difficulty will be explored.

b) Gina Newton

The Development o Australian Fish Facts

c) Lesley Warner

A comparison of Curriculum Development for PostGraduate Science

Communication Programs in English Speaking Countries.

In Australia the United Kingdom and Ireland the aims of the programs in their respective program and curriculum documentation appear, on the surface, to be congruent. The course content and expected outcomes, however, do not necessarily reflect this commonality.To some extent this is a reflection of pragmatism, the interests and agenda of individuals may be reflected in the content or the mode of offering (distance vs on campus) and availability of resources such as exploratoria will limit even the most inventive curriculum designer.

In spite of this there do seem to be some real underlying differences between the three countries when their courses are scrutinised. I would argue that these differences are related to the cultural and political differences between them.

The case of the USA is of special interest. I have been unable to discover any specific Science Communication course as such. I hope that they will come to light at this conference.

MONDAY, 11 NOVEMBER - AFTERNOON PLENARY SESSION

IN THE PUBLIC EYE

Copland Theatre (Main Conference Hall)

1. Bruce Lewenstein

Conflicts and pressures in public communication of science and technology.

Public communication of science and technology (PCST) is usually justified for one of three reasons: the need for "practical" science literacy, for "civic" science literacy, or for "cultural" science literacy. Tension among these goals is the first set of conflicts that shape PCST.

To address these goals, the PCST community has developed a complex set of relationships among various actors. Though science communication is often presented as a linear process (science develops knowledge, which is then disseminated through various means), detailed analyses produce a more complex, web-like picture of science communication. Tensions between the idealized, linear model of science communication and the more realistic web-like model are another major source of conflict in PCST.

A varied set of actors is involved in PCST--scientists, journalists, educators, public information officers, etc. Each group has its own professional culture, constraints, goals, and resources. Once again, conflicts among these varied actors provide a major source of tension in PCST.

Given all these tensions, how is anything accomplished? Traditionally, science communicators have focused on "improving" the public understanding of science. Too often, that goal has translated simplistically into "better appreciation of the benefits that science provides to society." A more complex, nuanced type of PCST had emerged in recent years--one that respects the value and robustness of scientific knowledge, but one that also acknowledges the deep interaction between social forces and the production of scientific knowledge.

By helping members of the public understand that complexity, science communicators help the public acquire contexts and frameworks into which to fit specific bits of scientific knowledge they need for practical or civic goals.

Thus the challenge for science communicators is to listen to their audiences, understand the social contexts in which they seek information about science and technology, and then use the audience's perspective to shape what and how information is produced. Listening to the audience is not a simple process of audience surveys, but instead a deep willingness to allow the audience to fundamentally shape what we, as communicators, communicate about. Yet, at the same time, we must not confuse listening to the audience with allowing the audience to dictate what we say or don't say. Science and technology are not democracy, yet they serve and enhance democracy. We must contribute to that service and enhancement.

2. Peter Cullen

Communicate, Publish or Perish - Paradoxes in the Emerging Paradigms!

There are increasing demands on scientists to communicate their work to both the general public, and to the prospective users of the research as funding becomes more competitive. Some scientists enjoy this work and are gifted in it. Others are less gifted, and so we may have good scientists taking time from research and using it being mediocre communicators. In the agricultural/natural resource areas in particular, Governments have withdrawn support for extension services and demanded the scientists themselves pick up this role The assumption that the research scientist has either the communication skills or the ability to put research into the real

world context in which a knowledge user operates needs examination.

The CRC for Freshwater Ecology has developed a strategic communications plan which clarifies our communication objectives with particular audiences. This strategy is important since there are many opportunities to invest time and money in communications activities, and we need to ensure value for our investments. The CRC employs a Communications Manager to work with scientists to develop cost-effective means of transferring the knowledge generated by research. We have learned, as have others, that the interface between these two professional areas can be a prickly one. Scientists are often concerned about their lack of power in the communication process, and deeply concerned about being misrepresented. Some so fill their communications with qualifiers as to make the message meaningless. Strategies being developed within the CRC to reduce these problems will be outlined. These include building a trust with the communications staff and a respect for the professional values they add to our work. We have achieved this by demonstrating the value added in terms of clarifying messages and audiences, and removing some of the fears of the unknown. It also involves the wisdom to decide when to decline an opportunity to communicate. This becomes simpler once objectives are thought through.

MONDAY, 11 NOVEMBER - AFTERNOON WORKSHOP SESSIONS

IN THE PUBLIC EYE

4:00pm - 5:15pm (Locations as shown)

1. CAN YOU SAY THAT AGAIN IN 15 SECONDS?
Theatre 3

a) ALISON LEIGH & IAN PLIMER

Exploring the art of putting across complex scientific explanations simply and briefly for television

A certain amount of mistrust exists between scientists and the media. TV journalists are looking for simple -brief - straightforward explanations, without caveats and provisos. Scientists are reluctant to reduce complex research into simple, jargon free "yes and no" answers. This workshop will endeavour to find the common ground.

It will explore the art of putting across complex scientific concepts in simple layman's terms for television, and in brief.. It will include excerpts from some of the more successful - and maybe some not so successful, depending on the willingness of the scientist concerned, perhaps, a demonstration interview with a willing scientist.

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2. GENDER AND SCIENTIFIC COMMUNICATION
Open Workshop Space

a) SUE STOCKLMAYER, LEONIE RENNIE, BEV DICK AND HELEN MCKERNAN

Gender & Scientific Communication

In this interactive panel presentation, recent findings related to gender and scientific communication will be discussed. Relevant topics to be covered in the workshop include perceptions of science, the importance of multicultural views, and the importance of science in context. Gender issues for consideration by science communicators specifically will be addressed.

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3. COOPERATIVE STRATEGIES FOR COOPERATIVE RESEARCH CENTRES (CRCS)
Theatre 2

Chair: Cathy Simpson

a) DON ALCOCK & ELIZABETH ELENIUS

Reviewing the effectiveness of an Australian CRC communication extension program

The area that the nominated workshop session will cover is:

research institutions primarily, but will also include

government agencies and industry and commercial interests

The $3 billion Cooperative Research Centres program has been hailed as Australia's most innovative and ambitious applied R and D scheme in the last decade. Yet more and more centres are realising that however smart their science, their science communication has been poor, if not completely lacking. For many CRCs communication and extension of research results, either for public good or commercial benefit, is a low priority, with many centres

allocating a pittance to science communication. Some centres give the job of information transfer and interactive communication with stakeholders to staff who lack skills, knowledge or experience in these specialised areas. Others, apart from a glossy brochure and annual report, don't allocate a communication or extension budget at all.

One of the better publicised Cooperative Research Centres, for Ecologically Sustainable Development of the Great Barrier Reef (CRC Reef Research Centre), with a well funded and managed communication and extension program, has recently undertaken an independent review to evaluate its communication performance. The review assessed the impact of extension and training activities with internal CRC stakeholders; considered the effectiveness of the management and activities of the extension and communication program; evaluated the organisational culture and resource levels which enhance or detract from achieving program goals and strategies; and identified new opportunities for the future.

The review, undertaken by the environmental and science communication company Econnect, gives an insight for other CRCs and collaborative research programs into improving interactive communication with stakeholder groups, and distributing research results to scientific, education, management, policy, media and user groups.

The case study presentation and workshop will examine an innovative, marine science communication network and the implications of a first-ever evaluation into a CRC's communication and extension program.

b) LARISSA WILSON

Unique challenges faced by CRC Communicators

c) MICHELLE RIEDLINGER

Exploring Challenges to Communication in CRCs

abstract:

Cooperative Research Centres are unique to the Australian scientific landscape. CRCs include various combinations of university, public sector and industrial research institutions and groups. Relationships within CRCs can extend across institutional, cultural and geographic boundaries. Communication strategies are essential in maintaining these relationships and reinforcing identification with CRCs. These strategies are also important if CRCs are to have distinct identities. Although the communication challenges presented in this paper can be found in other organisations, the number and combination of these challenges are characteristic to CRCs. Alternative and innovative communication strategies must be sought to address these challenges and to highlight the benefits associated with CRCs.

4. SCIENCE BEYOND SCIENTISTS
Theatre 1

Chair: Richard Eckersley

a) GILLIAN PEARSON

Public Duty or Pleasure

paper to be read by Jeffery Thomas

There has been considerable growth in public understanding of science activities in the UK since the Bodmer Report in 1985. The report addressed its final words to the scientific community "Learn to communicate, be willing to do and consider it your duty to do so".

This paper discusses the attitudes and opinion of research scientists and engineers to taking part in public understanding of science activities. Results from two surveys are presented.

One survey was carried out at an event in set 95 (the UK's National Week of Science Engineering an Technology) which involved 168 scientists from the University of Bristol

taking their research work into a shopping mall in Bristol for 2 days.

The results show that whilst most of the scientists took part because they were told to by senior colleagues, after the event almost all (94%) wanted to take part again mainly because they had found the experience most enjoyable. Not only did the event benefit participants in improving presentation skills an enhanced morale, it also proved to be a good team-building exercise both within individual departments and within the University as a whole.

There were some unexpected benefits from taking part - research groups gained new ideas for projects, volunteers to take part in current research were found on several stands, some important contacts were made and several departments gained useful posters, videos an other equipment for more routing public an academic exhibitions.

A second survey was conducted with a group of scientists from the Medical research Council Radiobiology Unit asking them about their experience in communication to the public. Three quarters of the 87 staff who responded had been involved in some such activity and despite the high number that had done so initially under some sort of obligation, most enjoyed it and would happily do it again. Of those that had no experience in communicating science to the public the most common reason for non-participation was not lack of time, money or recognition but that no opportunity had arisen. What would encourage them to become involved? Simply being asked.

b) BAUDOUIN JURDANT

The epistemological significance of popularisation of science

Traditional views of popularisation of science take for granted the idea that it aims at transmitting important scientific results to lay people. Whatever the reasons of such educational intentions (democratic rights to information, vindication of public financial support, propaganda for more funds, humanitarian concern, etc.), the didactic efficiency of popular presentations of science seems to be extremely low.

Various surveys aiming at the assessment of public understanding of science have lead to pessimistic conclusions in the United States as well as in Europe.

Various studies on the rhetoric of popularisation of science have shown that the didactic dimensions of the texts were to be understood more as a way to comply to the *regles du genre* than to transmit scientific knowledge to lay people. The question, therefore, which must be asked is : What is the purpose of the popularisation of science if it is not inspired by educational purposes ?

In order to answer this question, we must remember that popularisation of science was historically initiated from within the scientific community itself. Thus, one must look at what benefits scientists might obtain through popularising their own work to lay audiences.

The hypothesis of this paper is that scientists have a direct epistemological interest in popularising their knowledge even though they may not be aware of it. Discoveries and innovative works in science are intimately connected with some change in the perspective that scientists have on their object of study."Perspective" should be understood here as a very general term referring to either a new technological device, a new paradigm or sub-paradigm, a shift in the conceptual approach, etc... The problem is that the results obtained through such changes of perspective are connected with technical or conceptual particularities of the perspective itself. Peer scientists can, most of the time, reconstruct the legitimacy of the perspective, but as long as the results are understood within the frame of the perspective involved, claims concerning their correspondence to realities may remain suspicious.

In order to base the "reality" component of such results, it might appear necessary to suppress perspective in their assessment. This suppression would lead to what has been called "a perspectival objectivity", is spontaneously present in the pragmatic use of everyday language, the language of common sense, that is, a language that can make sense without having to refer its propositions to the perspective of the speaker.

Popularisation of science might just do precisely that : get rid of the scholarly perspective on scientific results in order to give them meaning without the limitations associated with the non-easily accessible perspective of the scientist. Scientific statements are introduced into ordinary language at different educational levels in order to blur their perspectival significance.

The end-result of such a linguistic operation would allow scientists to make legitimate claims on their right to propose new definitions of that very same reality we all live in. For reality, to be what it is, must be the same for all. It presupposes unity and universality, independently of the cultural diversity entailed in the various ways human beings see it.

c) **Tim Hardy**

Science and Technology in Women's Experiences of Everyday Life

This paper examines generalised conceptions of science and technology, and their inter-relationship, constructed by four women who differ substantially in age, family situation and workforce participation. Their contrasting conceptions of science and technology are linked to discourses of gender, personal development, ageing, and religious belief. These case studies are part of a larger qualitative study of individuals' everyday experiences of science and technology in housework, paid work, health, leisure and transport.

d) **Elizabeth Bacon**

Analysis of Public Understanding and Concerns about Memory through a scientific frame.

Popularization articles about memory were analysed with a scientific tool, the MIA questionnaire, used to evaluate metamemory (the individual's knowledge of memory). The tool was applied as an analysis frame to the content of the articles. Interesting information was obtained about the newspapers and their readers, about popularization and memory.

6. DEVELOPING SCIENCE STUDENTS' COMMUNICATION SKILLS
Wood Theatre

a) **Alex Radloff, Barbara dqe la Harpe & M Zadnik**

presented by Alex Radloff

We describe why and how we modified a traditional undergraduate communications course into a learner-centred student conference. Participants will be able to discuss issues relating to the development of communication skills, view a video and teaching materials, and consider how they could adapt and use the 'communication-in-context' approach

7. SCIENTISTS IN FILM AND FICTION
Copland Theatre

a) **Ros Haynes**

Scientists in film and fiction

Surveys of public attitudes to science and scientists indicate that scientists are seen in highly stereotyped forms, most of them unfavourable. A major factor in the creation of these images is the literary tradition, and more recently, films - the way scientists have been presented as characters from the medieval alchemists to the computer experts and physicists of contemporary literature. These depictions have not only reflected the writer's opinions of science and contemporary scientists, but have, in turn, influenced society's image of the scientist and the public response to science

itself. Five major stereotypes have recurred with varying frequency, and the origin and significance of these will be discussed, together with the effect which they have had on contemporary attitudes to science.

b) NICK ALEXANDER

Scientists in film and fiction

Scientists are by nature diffident and cautious. Successful film or television usually needs to be bold and daring. In the early days of television, the few scientists who braved the air-waves were often scorned by their colleagues as "show ponies " or crude popularisers. These people were the exceptions and this served to reinforce the public perception of scientists as the back-room white-coated boffins. But now the wheel has turned. Driven by the need for the research dollar, scientists are out there presenting themselves in a new light - friendly, communicative, socially concerned....and often female.

c) PETER POCKLEY

Australian Correspondent for *Nature*

Scientists in film and fiction *the media*

All of the stereotypes of the scientist so clearly delineated by Rosalynn Haynes in her book are evident in today's media, reinforcing the reluctance of scientists to "go public" but also reflecting their endemic lack of appreciation of how those outside their professional milieu think of them. Scientists now acknowledge their dilemma but, instead of confidently doing their own thing in public, they are calling primarily on intermediaries (far exceeding the small, and dwindling, numbers

of full-time science specialists in the mainstream media) who think they are expected by their "clients" and employers to purvey a glittering image of research in the pursuit of prestige and dollars. A danger is that few of the well-publicised claims of "breakthroughs" materialise and the stereotypes are reinforced. Scientists are curiously reluctant to make direct contact with the media managers. As a result, they have become the targets of private, deep-seated scepticism by those who rationalise their inability (or laziness?) to cope with a science-dominated world and implicitly reject any obligation to science and its broader public understanding in the return for the media industry riding on the back of successful application of research. By restricting the range of reporting and the scope of commentary about science, media managers - and the government by strangling the ABC - are perpetrating ignorance as a virtue

TUESDAY, 12 NOVEMBER - MORNING PLENARY SESSION

RISKY BUSINESS

Copland Theatre (Main Conference Hall)

1. Ben Selinger

The Communication of Risk and Hazard

"Don't put Pedestrian Crossings in front of old age pensioner homes - after all, every fatality saves public money".

"Most publicly funded medical expense occurs during the last year of life - most of the expensive high-tech equipment is tied up for the least benefit".

How many more examples are needed to show that scientific rationalism/economic rationalism do not drive human decision making? Just as well.

What ethicists and quantitative risk assessors can do for us, is to make sure we see all the issues in risk assessment. But they do not provide solutions; nor can they make our decisions.

For over two decades, 'Issues Management Gurus' have provided the equivalent of 'ASX' financial assessments for predicting the probable public consequences of risky business; and sold these to government and the big end of town.

Welcome, Science Communicators; your tardis is yet to arrive from the 1950s. Who cares a damn if the earth goes around the sun?

2. Nicholas Newland, Leigh Dayton, Greg Ray & Ian Anderson

Aspects of the Rabbit Calicivirus Project - How Well We Cope When Things Go Wrong (Perspectives)

(Joint Abstract)

The Australian and New Zealand Governments have been supporting assessment of a biological control (rabbit calicivirus) that has the potential to kill feral rabbits swiftly without affecting any native animals.

Assessment of the virus commenced in 1989 and included three years of laboratory testing. In March 1995 field trials started on an island off southern Australia. In October 1995 the virus escaped to the mainland. Over the next 5 months it spread sporadically to all mainland States.

The escape of the virus pre-empted the planned lengthy period of public consultation during 1996 before the proposed release date in 1997. The project's proponents and the media had to react quickly to communicate to the public just what the risks of the situation were.

This is a complex case involving many facets of science and risk communication.

3. Mary E. White

Painting the Big Picture

Palaeobotany, Palaeontology, Palaeogeography, Geology and Plate Tectonics are mostly outside the scope of general readers. When they are woven together to tell the story of co-evolution of a continent and it biota through geological time they create a big picture which catches the imagination and gives perspective, Tracing the history of Australia through such a synthesis becomes a journey of discovery. One starts to see the present-day continent in which we live in a different way, having travelled with it from it's misty beginnings. Many of the environmental problems which are manifesting themselves as a result of 200 years of our management of the land can only be explained, and hopefully rectified, when we know the continent's ancient history.

TUESDAY, 12 NOVEMBER - MORNING WORKSHOP SESSIONS

RISKY BUSINESS

11:00am - 12:00pm (Locations as shown)

1. RISK ASSESSMENT PRINCIPLES FOR EVALUATING FOOD SAFETY
Theatre 3

a) JANET SALISBURY

A common perception in the general community is that the main risks in the food supply today are artificial food additives, new processing methods and chemical contaminants. This perception is fueled by popular writings on the subject but it may be at odds with the reality. This workshop will not attempt to determine the strength of the evidence on either side of this debate but will explore issues relating to the way risks associated with food ingredients, additives and contaminants are reported

2. COMMUNITY INVOLVEMENT IN THE CHEMICALS INDUSTRY
Tutorial Room 8

a) JIM SMITH

Community involvement and awareness of the activities of Australia's chemical industry is important for both companies and society. Companies need it to learn the community's requirements for their long term licence to operate. The discussions can also assist with decisions on appropriate business activities that contribute to Sustainable Development to meet society's needs. The objectives, approach and status of "Responsible Care", the chemical industry initiative to progress the above goal, will be discussed. Examples of community involvement will be explored.

3. TOWARDS A MORE DIOLOGICAL APPROACH TO THE PUBLIC UNDERSTANDING OF BIOTECHNOLOGY
Theatre 2

a) JOHN DURANT, RENATO SCHIBECI & IAN BARNS (SEPARATE PAPERS)

(Common abstract:)

The purpose of this workshop will be to discuss some recent examples of more interactive and dialogical approaches to the surveyings of public attitudes to developments in biotechnology. The workshop will be in two parts. First, Professor John Durant will discuss the use of 'consensus conferences' in Europe and the UK as a way of actively involving members of the general public in debates about controversial developments in science. He will focus in particular on the first UK National Consensus Conference on Plant Biotechnology which was organised by the Science Museum and held in London in November 1994.

In the second part of the workshop, Renato Schibeci and Ian Barns will discuss the use of computer based data bases in the context of dialogical focus groups as a way of exploring the attitudes of interested publics in Australia to recent developments in gene technology, including the Flavr SAvr tomato and gene therapies for genetic diseases such as cystic fibrosis.

4. THE STUDY OF SCIENCE COMMUNICATION
Copland Theatre

a) Chris Bryant, Michael Gore, Sue Stocklmayer, Questacon & ANU

Science communication as an academic discipline or a risky business

This position paper will address the increasing international interest in the emerging theoretical discipline of Science Communication. The Australian National University has had in place since 1988 a graduate diploma program, and more recently a Masters and Doctoral program in Science Communication which has attracted high calibre students since its inception. Where are these students headed, and what is the future of the discipline? Participants in this workshop will be invited to assist in defining the boundaries and explaining the role of science communication in the tertiary context. A special consideration will be given to the problems of scientists within the university in communicating about their research.

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5. SCIENCE IS FUN
Open Workshop Space

Chair: Fiona Barbagallo

a) David Demant

Learning: Focusing on the periphery - hazards in teaching science

The paper takes a sometimes humorous but always ironic look at the process of learning. It endeavours to arouse the sympathy (empathy) of the communicator for the poor unfortunates who are the receivers of our communications.

Learning is a constructive process whose outcome is the gradual growth and addition of new meanings and understandings. The learner's conceptual framework is not replaced; it gradually changes. Each learner views "objects" and data differently. To understand learning, we must understand the learner as well as the material to be learned. The understanding of the receiver of information is not the same as that of the person who wishes to convey a message or story.

Often the learner's understandings of data are regarded as "peripheral" - they do not "see' what we want them to see! But that is where the learner is! We ignore these "peripheral" understandings at our peril.

After the presentation, the author hopes that discussion will bring out the common feature of all communication whatever it is - the need to consider the audience.

b) Fiona Barbagallo

Science can be fun for everyone

The Shell Questacon Science Circus travels around Australia presenting science demonstration shows to schools. The style of presentation has not been designed to "teach" the audience but to promote a positive image of science, scientists and science careers. Examples of a demonstration show and feedback received from teachers and students will be presented.

c) Andrea Horvath

Making 'science fun' for the public - it's a risky business! Danger - it may foster anti-science sentiment!

Things that go 'pop, whistle, fizz and bang in the day' is the agenda for those who make science fun for the public. What is the image of 'science' constantly portrayed here? Are we giving the public a pounding of an overly dramatised romantic vision of what science is, how it works, and what it does? This is not public awareness of science, it is subtle cultural mythology making....but it's so much fun. The assumption is that fun science makes you smile - well naturally you'll support it! But this can raise unrealistic expectations of science and may foster anti-science

sentiments. We can combat this without being a fun-buster.

6. ISSUES MANAGEMENT
Wood Theatre

a) KERRIE MULLINS-GUNST

Managing an issue involving risk

Many issues have potential to become crises which can cripple large or small organisations if not identified early and managed successfully. Issues represent both threats and opportunities for an organisation and may arise internally or out of any dimension of the total environment in which an organisation exists. Frequently, issues contain some dimension of scientific or technological risk which is often poorly understood in the community. However, regardless of the level of understanding, all issues exist in an emotional context which colour community reception of relevant information. This workshop will explore the communication of science in the context of an issue.

7. STUDENT PERCEPTIONS OF RISK
Theatre 1

a) JENNY EDWARDS

Year 12 Science students' perception of genetic engineering

Do year 12 science students readily support genetic manipulation when they are helped to understand it better? Or does greater understanding actually strengthen existing apprehensions and awaken new ones?

Many Australian high schools have introduced genetic engineering into senior chemistry or biology courses. Unfortunately, few high school science teachers have training in the area and the materials required for practical lessons are well beyond most school science budgets. Recognising this, the Green Machine Science Education Centre (a collaborative venture between CSIRO Education Programs, the CRC for Plant Science and the ACT Department of Education) in Canberra has developed workshops for senior high school students and teachers which incorporate hands-on laboratory based experiments as well as presentations on the theory, applications and issues raised by genetic engineering. These workshops have travelled to CSIRO Science Education Centre in Darwin, Adelaide, Sydney and Townsville.

If an education in science is to provide knowledge of science, experience of the process of scientific method and an understanding of the social, cultural and ethical implications, of science then gene technology is an area rich in possibilities.

A number of studies have been conducted world wide (Australia included) on public attitudes to, and understanding of, gene technology. Most of these surveys have involved random adult samples. In this study, young people with a background in science were surveyed to ascertain whether they held similar views. At the same time, the effects of the CSIRO Science Education Centre "Gene Technology in Action" Workshops on students' understanding of, and attitude to this new field of science were also investigated.

Using pre- and post-visit questionnaires Year 12 science students' major misconceptions and concerns about genetic engineering were identified and changes of attitude resulting from further education in the area were assessed. The results of this study will be described in this paper.

b) DEBRA TEDMAN

Science teachers' and scientists Understanding in relation to STS

This paper reports a study conducted in South Australia in 1995 with the aim of measuring the STS views and

understandings of senior secondary science students, teachers and scientists. The views were collected by using both a scaled VOSTS questionnaire adapted for use with Australian students, and structured interviews.

TUESDAY, 12 NOVEMBER - AFTERNOON PLENARY SESSION

RISKY BUSINESS

Copland Theatre (Main Conference Hall)

1. George Carlo

Science, Politics and Public Policy: Taking the High Road to the 21st Century

Public policy decision making in regard to science has essentially evolved over the past fifty years in response to various technological advances and crises. At this point in the evolution, it is necessary to employ a public health paradigm to facilitate decision making based on science and the public health rather than regulatory, legal, and economic needs. Historical evidence demonstrates that it is necessary to employ a pure public health paradigm in order to adequately address the different needs of the various stakeholders, including members of the government, industry, media, and the general public.

2. Sister Aida Velasquez

Secretariat for an Ecologically Sound Philippines

Science Communication in Promoting Ecologically Sound Development

Ecologically Sound Development (ESD) has to be accepted by people all over the world, otherwise there cannot be such a development. One can appreciate how big an undertaking it is in enunciating its principles and influencing people to practice them.

Depending on their priorities, those in Science and Technology can either hasten or prolong the global undertaking for people to observe and respect the limits of the Earth to sustain humans.

The paper briefly traces the spread the of the principle of ESD in the Philippines. Using two cases, lessons on effective science communication of ESD principles and practices are drawn.

The first case deals with the experience of helping the public make a stand on the construction and operation of the Bataan Nuclear Power plant. Under restrictive conditions of martial law in the Philippines, information as to how a nuclear reactor works, the hazards of the low-level and high-level radiation to health, life and environment, the demands of permanent disposal of radioactive wastes and of a decommissioned nuclear facility were simplified and disseminated widely throughout the country.

Questions of safety arising from the geologic characteristics of the site , the presence of nearby volcanoes, and the frequency of earthquakes were included in the information campaign.

Deep down, people especially in the rural areas, feel a strong bond with nature. In this case, scientific information sharpened the sense of survival of many Filipinos and helped them make their stand and struggled for it.

A point is made on the need to consider the global context of inequity in which ESD principles and practices are being promoted. A question is posed: What is the social responsibility of science and technology in this whole situation?

The second case is that of a series of ecological orientation seminars which Lingkod Tao-Kalikasan, an NGO, started in 1988. The seminar -workshop presents to community leaders the gravity and implications of the ecological crisis and the urgent necessity of working together for Sustainable development.

The ecosystems - their functions and state of degradation - are explained to the participants. Also global warming and depletion of the ozone layer and their consequences.

The participative way by which these topics are developed to link them with stewardship of creation and the need to live in harmony with the Earth is described. And the importance of the Philippine Agenda is cited.

ESD is based on the harmonious relation of humans with the Earth. Suggestions on what and how science can communicate to foster and reinforce this are made. A pitfall in the use of scientific method of regarding nature as an object and no as a subject to relate with, is pointed out. Also the need to be conscious of this.

The paper ends with a challenge to scientists and science communicators to listen and learn from the Earth not only to be able to communicate ESD creatively and effectively but more, to be better in touch with themselves.

TUESDAY, 12 NOVEMBER - AFTERNOON

POSTER SESSION

1:00pm - 2:00pm (Lower Level, Copland Complex)

a) Ellen Cooper

American Association for the Advancement of Science

EurekAlert!

EurekAlert! (http: //www.eurekalert. org) is a comprehensive online service offering the latest in science and medical research news from major research providers around the world. Developed by the American Association for the Advancement of Science, EurekAlert! Features a password-protected area with embargoed information from *Science, JAMA, Astrophysical Journals, the Proceedings of the National Academy of Sciences* and more.

Science On-Line

Science On-Line (http: //www. sciencemag. org) is *Science* magazine's presence on the World Wide Web. Visitors find many resources from an enhanced, full-text version of the magazine itself (free access until January 1, 1997) to such special features as Science Now, the day's hottest news and Science's Next Wave, a career advancement forum for young scientists

Strong demographic and economic growth is causing increased demand for university science education. Advertised science jobs had doubled for Auckland in 1995 compared to 1993. The Faculty of Science, University of Auckland has introduced a number of innovative generic (Bsc) and targeted (Btech) degrees in response to the increased demand.

a) Peter Martin

External Communication at Project Level in a Research Institution

Many scientific research organisations present the research project as the basic work and management unit. In reality many of these may become split into discrete sub-projects with quite different funding sources and aims, and from a communications point of view deserve separate treatment. In providing assistance to researchers in identifying their audiences and how best to reach them, communications support staff at the CSIRO Division of Water Resources have developed the simple procedure of the Project Communication Plan.

b) Barry Sanders

Sharing modern physics

Modern Physics, which includes the intellectually challenging subjects of quantum theory, special and general relativity, nuclear and particle physics, and chaos theory is considered difficult by the most undergraduate physics students so what hope to the nontechnical members of our society have of grasping the subject? I have been developing methods for teaching wave-particle duality, the measurement paradox in quantum theory, the essence of special relativity, and other topics in such a way that a general audience can understand the basic ideas and feel satisfied with their knowledge without becoming suffocated by jargon, mathematics, or technical issues, whilst remaining loyal to the unadulterated principles of physics.

c) Ms Katrina O'Mara

Interpretive theatre techniques in science and technology centres.

Interpretive theatre techniques have been used in Interactive Science and Technology Centres (ISTCs) since the early 1970s, yet little research into the effectiveness of theatre techniques in an ISTC setting has been conducted. Much of the existing knowledge is a result of what has been described by Stephenson (1991) as "professional view" and is highly anecdotal in nature. Scitech Discovery Centre, Western Australia's only ISTC, uses a 150 seat theatre as the setting for demonstrations to both school and public visitors. Two distinct styles of demonstrations, those classed as "affective demonstrations", which have the primary entertainment function and "effective demonstrations", which serve a primary educational function, have evolved at Scitech in its eight year history. This paper will discuss the educational outcomes of science demonstrations as an interpretive theatre technique in ISTCs.

TUESDAY, 12 NOVEMBER - AFTERNOON WORKSHOP SESSIONS

RISKY BUSINESS

4:00pm - 5:30pm (Locations as shown)

1. SCIENCE AND TECHNOLOGY TALKING TO GOVENRMENT
Theatre 3

a) **Toss Gascoigne & Jenni Metcalfe**

Case Study and Practical Workshop

Do scientists have a role in affecting the course of governments? Are they prepared to voice opinions in controversial areas? Even though the experiments may not be complete?

How should they go about helping set government policy?

The session examines five strategies for scientists, against a case study example:

1. The media

Everyone reads or watches the media. Politicians make decisions on what they see on television news, and ask questions in the House on what they read in the paper. Use the media as one arm of your strategy, to open doors, help forge alliances, get your issue talked about. Employing media to advantage requires imagination, lateral thinking and deft footwork. Use experts to advise you. How do you write and distribute a media release? How do you contact journalists? How do you stop them from getting things wrong?

2. Personal representation

Go and talk to government. Make an appointment to see the relevant minister - or you may have to be satisfied with one of their staff (each Federal minister has half a dozen staff members). Precede the meeting with a letter setting out the agenda, and keep the discussions simple. Follow the meeting with a letter summarising the main points and the agreements and actions reached. Try to be helpful. Don't overwhelm them with problems without being able to offer a solution. Don't have more than two (or perhaps three) members in your deputation. Don't ask for too much. Rehearse your story (particularly the beginning).

Ministers like to help but they are driven by many conflicting pressures. Do some homework so you know a little about them, including where their electorate is and what their interests are. (Minister for S&T Peter McGauran lists his as horse-racing, ballet and international law.) Remember that to be effective, the contact has to be on-going.

3. Forum for bureaucrats

Bureaucrats are highly influential in the formulation of policy, so make sure they are well-informed. Invite a dozen bureaucrats to a briefing session, a discussion led a spokesperson from your group. Identify the right government departments and the appropriate people within those departments. Working out who the best people are will require some preliminary work. Invite them to visit an experimental site, or to a convenient meeting place for a two-hour discussion. Bureaucrats have to fit into structures and programs, so in framing your opening remarks, think about what is going to be useful to them. Keep it simple, and allow plenty of time for their comments and questions. Offer yourself as a resource of ideas, because successful lobbying depends on maintaining day-to-day contacts.

4. Allies and networks

Small groups are generally easy to ignore, so find other groups which agree with you on a particular issue and are prepared to make joint representations. Alliances and networking are one of the keys to successful lobbying, so get organisations like the National Farmers' Federation and the Australian Conservation Foundation on side. Make up a joint delegation to discuss the issue with the Minister. These alliances

cannot be forged overnight, so start building the links early.

5. The grassroots

Maintain regional and grassroots links so that other people can complement your work with local action. Ministers respond to groups they see as having good community support rather than simply a well-organised office in Canberra.

2. SCIENCE COMMUNICATION FOR SUSTAINABLE RESOURCE MANAGEMENT
Copland Theatre

Chair: Wendy Parsons

a) Gina Newton

State of the environment reporting - an important communication tool

State of the Environment (SoE) reporting is an important component in achieving the National Strategy for Ecologically Sustainable Development. In September Australia's first independent national State of the Environment Report was released (Australia: State of the Environment 1996). The report was prepared by over 200 of Australia's key scientific and other environment experts. The framework for the 1996 SoE Report and the process of its development have provided many insights into the best practices for future SoE reporting. State of the environment reporting provides a powerful information tool for decision makers about our environment. This type of report will greatly enhance and facilitate multidisciplinary communication about environmental issues, for example between lawyers and scientists, or town planners and engineers. The SoE Report focuses attention on the important issues that need addressing and highlights gaps in knowledge. These findings can feed into areas such as management decisions, research priorities, policy formulation and legislation. The SoE Report is also an essential first step in the development of the 'first generation' of national environmental indicators. This will be a complex research and communication exercise requiring input and implementation from a diverse array of stakeholder groups. The environment continues to be an important issue for the community and Australians are becoming increasingly involved in environmental monitoring projects (e.g. Landcare, Waterwatch). The SoE Report provides access to accurate information and increases public understanding which is vital for a successful monitoring process. Australia: State of the Environment 1996 is designed to disseminate information on the current status of Australia's environment to as broad an audience as possible. A detailed communication strategy was developed to achieve this. Both the process of SoE reporting and its communication value will be discussed.

b) Robert Huggan

Promoting integrated pest management in Vietnam

c) Nancy Longnecker

A training game: Risk and adoption of rural innovations

The paper describes a training workshop, "Risk and Adoption of Rural Innovations". The workshop has been developed by staff and students at the Cooperative Research Centre for Legumes in Mediterranean Agriculture and incorporates a simulation game. It is designed to help professional advisers better understand their clients and researchers better understand the decision making of people who use their research results.

Agricultural production is a risky business by its very nature. The potential of new technology and innovations produced by agricultural research is not always obvious to the farming community. Professional advisers are a critical link between agricultural scientists and primary producers. Advisers must adapt new knowledge from research to the information requirements of farmers.

The simulation game used in this workshop is a good way to improve understanding of farmers' decision making about adopting new technologies. As such, it is a useful learning tool for advisers who deal directly with farmers and with scientists who hope that their research efforts will be adopted by the farming community

3. PARTNERSHIP APPROACHES TO ECOLOGICALLY SUSTAINABLE DEVELOPMENT
Theatre 2

Chair: Anne Leitch

a) THERESE BARIBEAU

Astounding the skeptics, or, a partnership takes place

The mission of the Biosphere, Canada's newest Ecowatch Centre is to inspire citizens to actively protect and conserve water. To do so, an Ecowatch Network which involves various sectors (science, industry, schools, NGO's, etc.) fosters the cross-fertilization of scientific and popular knowledge. Theoretical framework, systemic approach, concrete examples, scientific communication and ethics are some of the topics discussed.

b) DAVID MUSSARED

Peddling landcare; the need for independent voices

Landcare is an internationally important Australian movement, aimed at addressing natural resource degradation through local action. The movement has a strong emphasis on community campaigning, but often poor internal communications — despite a proliferation of communication channels and a flood of information.

Attempts to remedy the problem so far have usually involved adding to the quantity of landcare information in circulation, not improving its quality. Communication channels have become clogged with redundant material, to the extent that information overload has become a significant problem for many landcare participants.

A major cause of the problem is that most communication channels are built around programs run by State and Federal Government bureaucracies. As such they have inherited the public service's self-censoring communication traditions. Usually 'communication' in landcare is a thinly disguised euphemism for 'propaganda'. Often it seems that everyone is talking, but no-one is listening.

In the interests of all stakeholders (community, government and researchers) there is now a pressing need for independent voices in landcare, and for professional, critical communication channels. There are also important lessons to be learnt for communicating sustainability messages more widely.

The presenter believes that for science communication to be credible and to succeed, it must go beyond being a 'propaganda' or 'community education' exercise. In the end — as with any good journalism — at least some science communication should be answerable to its audience, not just to its sponsors. But the presenter also knows only too well how hard this is to achieve in practice.

c) BELINDA LAMB

The scientist as an environmentalist, ASTA's earthwork Environmental Program

In the mid 1980s, the then Australian Broadcasting Commission (ABC), through its program Earthworm, sought to acknowledge the importance of encouraging young Australians, both primary and secondary age school students, to take an interest in their local environment. For a time, Earthworm ran a low key awards program with the same name.

Although the Program proved successful to a degree, it was decided, in consultation with the Australian Science Teachers Association (ASTA) to approach the Federal Government for support. ASTA, the professional association representing

teachers of science in primary and secondary schools around Australia, and run largely by the volunteer efforts of its members, saw the program, in an expanded form, as providing an opportunity to develop the scientific and reasoning skills of students, and to give a scientific perspective to the identification of environmental issues as well as emphasising the involvement of local communities in sustaining the environment.

ASTA believes that the Earthworm Environmental Awards program continues to provide a unique catalyst to students and schools around Australia to participate in innovative, collaborative projects which address key environmental issues, develop their scientific learning and reasoning skills and enhance their ability to work in a team role.

The practicality of the program is evident in the sheer breadth of initiatives it encourages. It makes participation possible for any student, from those involved in distance education, members of a small rural school, or students at a large metropolitan college in a concrete jungle, whether attending government or non-government schools.

A key factor in the ongoing success of the program over and above continued governmental support has been the preparedness of a wide diversity of industry and organisational sponsors to continue to lend their name and support in kind to the program.

ASTA believes that the Earthworm Environmental Awards program plays a unique role in environmental education in creating a broader public awareness of environmental issues, largely through the voluntary efforts of its members around Australia; the enthusiasm the challenge of participation in the program generates in students; and the partnerships established with industry, government and the education sector.

4. PROMOTING ECOLOGICALLY SUSTAINABLE DEVELOPMENT
Open Workshop Space

a) Sister Ma. Aida Velasquez

Promoting Ecological Sustainable Development

WEDNESDAY, 13 NOVEMBER - MORNING PLENARY SESSION

BUILDING THE GLOBAL CENTURY

Copland Theatre (Main Conference Hall)

1. Ian Lowe

Building the Global Century - A Participatory Model

2. Nalaka J Gunawardene

Community participation in biodiversity conservation: a Case Study:

The importance of the local community's involvement in in-situ conservation of biodiversity, including the management of protected areas, is now widely recognised. Not only park managers an authorities, but also scientists engaged in the further study of biodiversity an environmentalists keen on conserving its acknowledge the vital role played by the community.

The case study looks at how a project to study and preserve the rich biodiversity of Ritigala, one of Sri Lanka's isolated Dry Zone Forests, has involved the local community as key partners in the exercise. Ritigala represents an environmental success story where community intervention, organisation and mobilisation have been used effectively to resolve a conflict for resources and to conserve a habitat with high biological diversity.

Ritigala, close to Anuradhapura on the Dry Zone plains of Sri Lanka, is he highest isolated hill in the country. Its complete isolation and the way it rises sharply from the surrounding flat country give it an imposing appearance. Because of its geology and micro-climate, Ritigala has evolved as a forest habitat harbouring a high degree of biodiversity - dozens of medicinal plants, other flora and fauna. Much of this biodiversity has been endangered in recent years due to illicit timber felling and unsustainable extraction of non-timber products. Although it was declared a protected area - a Strict Nature Reserve - by the island's Wildlife Department back in 1941, the authorities could do little to stem the mounting population pressures on the habitat.
In 1994, a local community organisation and a research Institute dedicated to the study and promotion of indigenous medicine partnered to evolve a community based approach to resolving the resource conflicts in Ritigala. The main objective was to enhance the role of the community in the management of the Reserve and the natural resources in the buffer zone. With support from government agencies and academics, these two organisation designed and implemented a community-based resource management (SBRM) project which involved 1,400 families living in 14 villages surrounding the strict Nature Reserve. The project included a comprehensive package including community education, strengthening of community organisations, sponsoring of studies/research on specific management issues, promoting collaboration between community organisations and government/local government institutions, and supporting economic development and environmental initiatives.

These activities have, over the past three years, helped reduce pressure on the forest - and revitalised the community at the same time. The community started playing an active role and decided to undertake planning an implementation of the CBRM project. The scientists have been bale to communicate basic concepts of biodiversity an impress upon the people some of the less tangible concepts such as watershed management function of trees. The paper will discuss some of the basic scientific concepts communicated, and how they were received by the community, which, though rural in character, has an adult literacy rate of 83 per cent.

The paper will be based on the following context related to biodiversity and

environment: Sri Lankans have a 2,000 year tradition of managing protected areas - one of the world's first sanctuaries was declared by a Lankan king in the 2nd century BC.

Sri Lanka is classified as one of Asians "hotspots" with a high concentration biodiversity for a unit area of land Sri Lanka has designated 14% of its land as protected areas, but government agencies in charge are severely constrained by a lack of funds and personnel, and by outmoded conservation strategies which leave out local people

Sri Lanka's forest cover, which was 44% of the land in 1956, was reduced to 20% by 1992. Pressure for land and demand for forest resources continue to fuel further deforestation, one of the island's major environmental problems.

WEDNESDAY, 13 NOVEMBER - MORNING WORKSHOP SESSIONS

BUILDING THE GLOBAL CENTURY

11:00am - 12:15pm (Locations as shown)

1. CONSENSUS CONFERENCES
Theatre 3

Chair: John Durant

a) ALISON MOHR

Participatory Democracy: a translation analysis of the role of Consensus Conferences in formulating Information Technology practices

Part 1: Indicate aim of research; to describe and evaluate the role of Consensus Conferences in Information Technology policy-making through the application of the "translation" model invented by French Sociologists, Bruno Latour and Michel Callon, and followers - already applied in a number of different fields of policy making (industry, HIV/AIDS< transport).

Part 2: Will describe the origins and evolution of the notion, practice and processes of Consensus Conferences: where, when, how, why they appeared; how many areas they have covered; and how they have changed. Situate them as a new kind of lay input into policy-making, and as an attempt to coordinate lay and expert opinion. A new form of democracy through the legitimisation of the policy process.

Part 3: Describe the "translation" model: its elements, importance and the fields of policy making to which it has been applied, and why it looks like a useful analytical device to better understand the nature and function of Consensus Conferences. Identify the various acts/networks employed and negotiated in the policy process. Mr Peter Kettle

The New Zealand "Talking Technology"

b) ARTHUR BROWNLEA

Communicating Innovatory Science - Government, Bureaucracy and the Political Paradigm

1. Jean Elshtain believes "nothing is exempt from the political definition, direction and manipulation". Science communication into the arena of bureaucrats and politicians represents an inevitable step into political definition, direction and manipulation.

2. For politicians and bureaucrats science, especially innovative science, communicates an ISSUE to be managed more than a technical insight adding to KNOWLEDGE. For them, science communication is not a neutral disinterested process, but rather a political process designed to influence patterns of resource allocation and human behaviour, including decision-making.

3. For those who plan these things, communicating innovative science becomes an active transport process, recognising political gradients an administrative structures as parameters of communication outcomes. This is summarised as the POLITICAL PARADIGM.

4.The political paradigm, with regard to communicating innovatory science, has a number of internal hypotheses, all subject to challenge.

4.1 Administrative docking (or CONNECTION) is problematic. The department or branch for which the innovative science will become an issue of core business is not always clear e g genetic manipulation could have docked with any of three departments, namely health, environment or industry. It was located in Administrative services for politically pragmatic reasons.

4.2 Departmental rivalries or overlaps lead to plural framing of the issue(s). Each departmental framing states an interest in the issue(s) raised by the innovative science. This creates INTERCONNECTION. Interconnection can facilitate, frustrate or flummox discourse and the transmission of ideas. Under the influence of differing political and public perceptions and pressures, different departments have used their mandates to get involved, framing the issue accordingly. For the Department of Industry, genetic manipulation could be framed, along with biotechnology, as a source of investment, trade growth and employment creation; for the Department of the Environment, genetic manipulation was a potential risk to environmental sustainability; for the Department of Health and the NHMRC, genetic manipulation was a therapy for debilitating diseases of genetic origin. Ad there were others interested eg the National Food Authority, who could have framed genetic manipulation as a food additive that needed labeling.

Proponent interest or lobby groups also engage in rival framing to convey a perspective that helps their cause eg RCD is framed as a simple agricultural an veterinary chemical for registration and use to bypass the block on a national release.

Opponent lobbyists frame the same virus as a threat to native species, or animal cruelty.

So, in a political paradigm, framing is used to communicate, in paraphrased form, not so much the content of the innovation but its meaning in an issues-oriented bureaucracy.

4.3 For bureaucrats, innovative science presages reform on some scale, and reform is a difficult process.

Difficulty is increased as the conceptual complexity of the innovative science increases. Failure to communicate this conceptual complexity may result in conflict and strained relationships between interest groups, government and proponents. Difficulty is increased, again, if the experimental procedures challenge value systems, and if uncertainty about the products poses threats to safety, well-being, environmental sustainability or perhaps are considered to be unnecessary. The link between scientific content and the issues is also problematic. Paraphrased content may result in some distortion at worst or simply a loss of information at best. Under these circumstances, dispute, dislocation and complaint are more likely to emerge. Finally, difficulty could come about if the procedural arrangements for assessing impacts and managing risks and providing advice on directions and ongoing public liaison are not clear.

In addition, to the advice provided through the science communication they will undertake their own meta-analysis of the issues. subsequently, they will advance particular theories of impact, interpret the responses of interest groups (eg. the results of the call for comments of the RCD Release) and express views on underlying motivations behind interest groups, including the scientists themselves (eg the fear of human infection from RCD releases when the USA researchers were at risk of losing their funding).

Therefore, the way innovative science is communicated into bureaucracy will influence the way bureaucrats develop and apply their own political definitions, directions and manipulations. Some definition of the public interest with respect to the innovative science will emerge. Science communication, within the political paradigm, must be interpretable against public interest safeguards. There may be a need to regulate activities. Choice ranges from self-regulation, industry regulation or general regulation. From these they will develop their concepts of reform, the models they will use to mange it, and the practical arrangement for administering appropriate regulatory procedures.

4.4 The framing activities in innovative science communication for different bureaucratic groups is further mirrored in developing different frames for the separate states and their political contexts. This is a challenge if a nationally coherent and consistent approach to further developments is desired. GMACs experience is illuminating.

4.5 The more challenging the innovative science, the more procedurally just the consultative and decision-making activities must be if ongoing subversion is to be

avoided and informed acceptance of decisions is the nurtured.

c) **Simon Joss**

An evaluation of the Danish Consensus Conferences

This paper considers the role of participatory forms of technology assessment (TA) in public decision-making and public debate on science and technology.

The development of the Danish TA programme over the last 15 years exemplifies the shift away from a purely expert-oriented assessment system focusing on the analysis of consequences of technological innovation, and towards a more open assessment system featuring a variety of social groups involved in public discourse on the shaping of future science and technology. As such, it reflects an increasingly critical view of scientific and technological determinism.

The most prominent vehicle of this new form of TA in the Danish context is the consensus conference (CC). Thirteen have been organised to date on a variety of topics, such as genetic engineering and information technology. A key element of a CC is a citizen panel which hears evidence from experts and assesses, from its perspective, the subject under consideration. The principal aims are to make contributions to parliamentary decision-making and to public debate. Thus, CC reports are presented to Members of Parliament, the media and the general public. CCs are organised by an independent Board of Technology which emerged as the key TA institution in Denmark.

This paper presents the findings of a study of the impact of CCs on the Danish Parliament and Danish public opinion. The study includes:

* in-depth interviews with five Members of Parliament from across the party-political spectrum (October 1994-June 1996);

* a questionnaire-based survey of Members of Parliament (October 1995-March 1996);

* two questionnaire-based random-sample opinion-polls of the Danish population (n=1000 each; August and October 1995).

The paper shows how CCs have influenced individual Members of Parliament, internal party-discussions, parliamentary debates, and the course of overall parliamentary TA. Furthermore, the paper reports on the impact of CCs and the topics discussed on Danish public opinion, with particular focus on a recent CC on gene therapy.

The study provides insights into how Members of Parliament perceive:

* science and scientists;

* the nature of the interaction between the scientific community, the general public, and decision-makers; and

* the (potential) role of participatory forms of TA as a contribution to policy-and decision-making.

The study emphasises the importance of taking the wider cultural contexts of participatory TA into account.

A number of countries have begun to hold Danish-style CCs (Great Britain, the Netherlands, New Zealand, Norway), and others are considering introducing them.

This study will help facilitate the assessment of the potential value of participatory forms of TA in different national contexts.

a) **Peter Kettle, Rachel Perret and Graeme King**

Plant Biotechnology - the New Zealand Consensus Conference Experience

New Zealand held it's first consensus conference in August 1996. The Talking Technology Conference on Plant Biotechnology arose in response to a perceived need to bridge a widening credibility gap between the public and the science community. The outcome demonstrated that an informed lay panel can provide invaluable insight into public views on complex technical subjects. We believe Talking Technology Conferences will become established as an important

element in New Zealand society to enhance public understanding of technical issues and gain insight into public perception of issues. The intention is to establish a charitable trust in association with the Consumers' Institute to facilitate future conferences.

2. INTERACTIVE SCIENCE CENTRES AND PUBLIC OUTREACH
Open Workshop Space

a) CHRIS BRYANT, MICHAEL GORE & FIONA BARBAGALLO

The Questacon experience

Questacon is Australia's National Science and Technology Centre. In this workshop, the theoretical framework and practical methodology of Questacon's traveling "Science Circus" will be presented as a case study of a public outreach program. Recent research findings, related to public perceptions of such programs and the role of members of the circus, will be presented. These will provide a basis for debate on the theme of effective public outreach, and workshop participants will have the opportunity to share their own experiences. In the tradition of such programs, active participation will be encouraged! This workshop will be of particular interest to conference participants who are interested in the effective outreach operations of interactive science centres and science museums.

3. SCIENCE AND STUDENTS
Theatre 2

a) MURALI NAYUDU, MERV ASTON, JOHN VRANJIC, JOHN WOODLAND, MARGARET WILLIS, MARILYN HOCKING AND TERRY MURPHY

Pollinating Primary Science, Universities Communicating Science in Schools

In this workshop the outcome of a new and exciting approach to science communication involving collaboration between Universities and Schools (using BISACT, Biological Sciences in ACT Schools - science outreach programme) will be reviewed from both the classroom and University perspective, with short papers, whole group discussions and "hands on" activities.

Long Abstract

"Scientists are people with glasses that do experiments and blow up rooms".

"Scientists live in their own world and are different to normal people".

Similar views were expressed often by Australian school children when asked to write about what they thought of Scientists. This exemplifies the "ivory-tower image" of scientists, and the inaccurate perception in general of science in the community. Higher education institutions such as universities can play a significant role in breaking down this image and promoting science. In 1990 we developed a science outreach program in biology which offers support to the existing School Science curriculum from teachers and researchers at University. This program called BISACT (Biological Sciences in ACT Schools) hopes to change perception of science and scientists, of school children . This program explores basic concepts in biology that are relevant to every day living (eg. endangered species, genetic engineering and greenhouse effect). The program runs for one school term in Australia , which is about 10 weeks. Over 20 schools and 3000 school children have now taken part in the program. The success of the program can be seen by the large number of schools who have requested the BISACT program to return to their school every year. In this workshop we describe this new approach to Science communication involving collaboration between Universities and Schools, using BISACT as a case study. The outcomes of this new and exciting approach to science communication will be reviewed from both

the classroom and University perspective's, with short papers, whole group discussions and "hands on" activities.

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4. NEW TECHNOLOGIES - THE WEB Theatre 1

a) MARGARET CORBIT, SIMON TOROK & STUART KOLHAGEN

Virtual Reality in science communication on the WWW

Common topic, separate presentations

(Common abstract:)

Interactive examples of the innovative ways communicators are using the WWW will be presented in this workshop (not recommended for those prone to motion sickness!). Technology has progressed to the stage where a book, a science centre and a science laboratory can be explored over the Internet.

CTC (http://www.tc.cornell.edu) has developed an online science book, Explorations, incorporating 3D files based on scientific data as illustrations. Immersive technologies, which allow the lay viewer to fly into and through files using computers, were used in the science book and a WWW-based museum exhibit.

The NSTC (http://freenet.actein.edu.au/Questacon) has developed an online science centre incorporating immersive technologies. Visitors can explore exhibitions, participate in research or download activities.

CEM (http://www.enmech.csiro.au) has developed an interactive science lab and an online science soap opera. The former enables researchers to access CEM's atmospheric models to solve wind flow problems and the latter aims to promote science using a photo serial on the WWW.

As a part of its mission, the Cornell Theory Center (CTC), one of four U.S. supercomputing centers funded better by the National Science Foundation, communicates information about research conducted using its resources (hardware, software, and staff expertise) through a variety of media at several levels of technical detail (http://www.tc.cornell.edu). This work includes production of CTC's 1996 online science book, Explorations.

In the transition to online publication, we aimed to retain the graphic appeal of previous hard copy books while experimenting with leading-edge Web technologies. This meant that our development of Explorations was not constrained by the limitations associated with reaching the broadest audience possible. Instead, we attempted to balance new technologies and compatible hardware early on, and we focused the technical development of the publication at mid-level machines in this group, developing for an upcoming release of Netscape, which was the browser with the biggest share of the audience. In effect, we targeted the technology and the audience together.

Our biggest stretch in creating Explorations was incorporating 3D files based on scientific data into the site as illustrations for two of the feature stories. We wanted to allow the lay viewer to fly into and through files previously accessible only to the experienced researcher. The CTC scientific visualisation group is expert in 3D visualisation and deeply involved in leading-edge development of immersive technologies for such applications as interactive molecular modeling and 3D imaging for medical diagnosis. The concept of incorporating such files (translated into the virtual reality modeling language [VRML] format for viewing on the Web) into an online publication was attractive and a logical extension of the graphic features of the World Wide Web that had not been implemented at CTC.

I will first present a brief overview of immersive technologies (i.e., the technical options for viewing 3D files interactively using computers) and the current status of VRML technology. Then I will demonstrate our first efforts using VRML and discuss the obstacles to such Web-based applications, along with other issues currently being addressed by our group. Finally, I will report

on our most recent application of VRML--a remote Web-based museum exhibit for the Milton J. Rubenstein Museum of Science and Technology in Syracuse, New York--and end by presenting some ideas for improving the application of VRML for the communication of science.

5. SCIENCE MAGAZINES AND THE FUTURE

Wood Theatre

Chair: Ian Anderson

a) **IAN ANDERSON**

New Scientist

b) **DAVID SALT**

The Double Helix

c) **JENNIFER WRIGHT**

Jennifer Wright & Brenda Tait

presented by Jennifer Wright

"In the Public Eye" - Science in everyday life - producing the quarterly magazine Australiasian science.

Australasian Science is a quarterly magazine which explores science and technology in everyday life. The editor and manager of the press will share their experiences with production of the magazine which has been published by the University of Southern Queensland. Brenda Tait will describe the evolution of the magazine from its inception in 1980 in regional Queensland including the production transition from traditional methods to electronic publishing. Jennifer Wright will outline experiences and advantages of working with researchers, students and young writers to bring science to the general public. Tips for authors, common editing problems and feedback from readers' surveys will provide practical and useful information. will provide useful information.

d) **ASHLEY CRAWFORD**

21.C Forum on future writing the public understanding of S&T

WEDNESDAY, 13 NOVEMBER - AFTERNOON PLENARY SESSION

BUILDING THE GLOBAL CENTURY

Copland Theatre (Main Conference Hall)

1. Hirokazu Negishi

Canon R&D Japan / University of Essex

We humans are quite diverse and yet alike. All these diverse talents comes from our

brain; the host of our mind and the source of our wisdom. However, we feel that forging us humans into a global society requires better usage of these diverse talents.

To achieve this goal, it is not enough to carry on the current state of cohabitation of talents on this planet. Something important is still missing.

Science and technology are the logical expression of our wisdom. As they grow more prominent in our society, their influence on our lives also grows. Unfortunately,

logical approach tends to create only visible solutions to visible problems. However, we have a power called intuition, the other expression of our wisdom to cover the invisible aspect. Sadly, the two talents, especially the world class logic and intuition are rarely shared in a single individual. More over, from a global point of view, means to manifest logical wisdom (Mega-Science and High-Technology) is concentrated on to limited regions of the globe, whereas intuitive wisdom could be applied worldwide.

Recent discoveries have given us a glimpse of the inner workings of our brain. Although, the scientists studying the brain say that their level of knowledge is still in the medieval era, it is believed that the source of our wisdom is based on the network in between different brain cells, not the presence of the brain cells themselves. In case of the Global Century, the advent of the Internet has began to overcome the separation of talents, making it possible for anyone to communicate with everyone, which was impossible before as a lot of tangible barriers hindered such a networking.

The Internet may be part of "the missing ingredient" and resembles to our brain network which will formulate the Global Century's wisdom. However, the Internet can only take the horse to the river. Whether the horse wishes to drink at all is an entirely different question. Technology alone can not overcome the mental barriers separating two talents. In case of the brain, "will" to live better come to play as it is the driving force for the networking. Equally, in case of the Global Century, the "tsu-shin" concept, proposed by the late Dr. Hajime Mitarai, promotes communication between hearts and minds, and may provide the rest of "the missing ingredient".

1. Donald McDonald

Chairman, Australian Broadcasting Commission

The role of a public broadcaster in communicating science & technology

1. Bernard Schiele

Universite de Montreal

Continuity through review and preview

1. Malcolm McIntosh

Chief Executive, CSIRO

Closing Address

WEDNESDAY, 13 NOVEMBER - AFTERNOON WORKSHOP SESSIONS

BUILDING THE GLOBAL CENTURY

3:15pm - 4:30pm (Locations as shown)

1. SCIENCE AND TV
Theatre 3

Chair: Toss Gascoigne

a) KENJI MAKINO

Comparative study of early AIDS reporting in Japan

We have to realise the serious situation of AIDS in Japan, because of high infection rate of hemophilia patients infected by the using of unheated blood products during the early years of the AIDS epidemic. Responsibilities of bureaucrats of the Ministry of Health and Welfare, pharmaceutical companies of blood products and medical doctors related are going to be discussed in the Court. How did the mass media in Japan report those situations at that time? What kind of responsibilities should mass media have then? I will mention some important points about these issues.

b) UTZ LEDERBOGEN

Winfried Goepfert and Utz Lederbogen

Science in TV news in Germany. Different approaches in presenting science to the public in private and public TV channels.

Science news hardly receive attention in TV news. But when science is reported in TV news bulletins, what kind of science and what image of science and scientists is portrayed?

Are there differences between the image of science in private and public TV channels?

This paper is part of a joined European study in which research groups of 7 European countries tempted to analyse the science reporting in private and public channels during the same period.

c) JENNI METCALFE & TOSS GASCOIGNE

Incentives and impediments to scientists communicating through the media

What encourages scientists to communicate their work through the media? What incentives and rewards - for themselves, their programs, their organisations - does the media offer? And on the other hand, what discourages scientists from using the media? Are they adequately trained? Do they receive sufficient support from their organisations, in terms of logistics and recognition? How have they coped with the pressures of going public?

Little research has been carried out in Australia on exploring the attitudes of scientists towards using the media as a mechanism of communicating their research.

This paper gives a report of both qualitative and quantitative research on the views and attitudes of scientists to communicating through the media in Australia. The opinions of one hundred and eighty scientists were sought through focus groups and through direct questionnaires.

The conclusion was that there is wide variation in the use of the media by scientists. Some use it as a central part of the funding and technology adoption processes, where it complements other mechanisms for communication. Others are frightened of the media, and perceive it as a threat rather than an opportunity. They see little value in the media (which they and their colleagues know is going to distort science anyway), and feel hemmed in by the constraints of time and commercial confidentiality. They know there is little point

in working with the media because it is at best tolerated in their organisation and certainly not taken into account in promotion cases.

A cultural change is required before scientists will make more use of the media. It has to become an accepted, rewarded, recognised and legitimate activity, encouraged at the highest levels and actively promulgated through their organisations. Media Skills courses can play their part in making scientists more comfortable with the media experience, but a larger part lies in making policy and administrative changes which can help to move the scientific culture towards more influential modes of communication.

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2. THE INDUSTRY CONNECTION
Copland Theatre

Chair: David Symington

a) David Symington & Gerry Scheltinga

Use of brochures in communicating science based information the non-specialist audience.

In this paper the authors will report on an investigation into the production of brochures about the application of science, with particular reference to the use of images, for people who are not science specialists. A number of communicators, in both government and industry organisations, involved in such activity were interviewed about the processes which they followed in the development of brochures

b) Mark Sceats

Policies and challenges for telecommunications - Australia, the World

Last year he chaired the ASTEC Future Needs 2010 study which produced a report "Surf's Up: Alternative Futures for Full Service Networks in Australia", so has a broad knowledge of both the Australian and international scene, including policies. The study covered social, economic and educational issues, as well as technology and the science which underpins it.

At present the Australian Government (and the previous Government) is making policy decisions on telecommunications without the benefit of advice from people who are leaders in the development of technology. Advice is coming predominantly from economists. It is vitally important that the advances being made in the technologies which underpin telecommunications, including photonics, is known by those developing policy, and those who decide policy. The role of the media in informing decision makers is also vital. A further need is to communicate Australia's R&D capacity in telecommunications technology to industry, including SME's. Telecommunications is one of Australia's fastest growing industries, and to keep a competitive edge internationally, must feed upon the innovation coming out of universities, CSIRO and Cooperative Research Centres.

c) Jan Bitmewad

Communication between Industry & Universities, - getting it right

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3. INNOVATIVE SCIENCE COMMUNICATION
Theatre 1

Chair: Wendy Parsons

a) ALAN WALKER & DOROTHY MCMURRICH

SCI FUN Roadshow and Powers of Ten

The SCI-FUN Roadshow, run by a team from the Faculty of Science and Engineering at The University of Edinburgh, takes interactive science, talks and workshops to areas remote from existing science centres throughout the UK.

The corridors of the Department of Physics and Astronomy at the University of Edinburgh have been brought to life by a photographic exhibition of the Powers of Ten. Alan Walker now offers a touring lecture entitled the Powers of Ten which complements the SCI-FUN Roadshow at many of its events.

b) MALCOLM PATERSON & TOM MCGINNESS

How effective is multimedia as a vehicle for public science communication

This workshop offers a strongly participatory session looking at the use of multimedia in public science communication. Some projects/products aim to deal with particular issues (eg Genetic engineering), others aim to be a stimulus for increasing public awareness and comprehension. But are they effective and how far do they go? Where could they be improved? What are the strengths and limitations of the medium?

Delegates will look at some products together, then discuss their merits and drawbacks. The discussion will be moderated in a structured way, posing questions and highlighting issues which delegates will then discuss. Where available, public survey data will be presented for discussion to help give the session a quantitative baseline.

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