

# The 9<sup>th</sup> International Conference on Public Communication of Science and Technology (PCST-9)

## ▶▶ PROGRAM & ABSTRACT BOOK

17~19 May 2006 COEX, Seoul, Korea

**“Scientific Culture for Global Citizenship”**

The 9th International Conference on Public Communication of Science and Technology (PCST-9)





**Korea Science Foundation, which is the driving force of Science Culture in Korea, with the vision “A global leader in science culture, creating Public Understanding of Science together with the people.”**

Science Culture means an advanced culture where science has merged with our lives and thus forms the basis of rational thinking and behavior. It is also a keyword of the 21 st century, and can dramatically improve our quality of life.

The dream of the Korea Science Foundation is to lead Korea into the forefront of Science Culture. We conduct various programs, knowing that we are planting the seeds of science, nurturing them to grow into mature and healthy trees. We endeavor to foster an environment where people can fertilize and water the ground of Science Culture to enable saplings of science to grow into large trees and together form a beautiful forest.

A joyful world where all citizens think freely in such a forest of science, share a healthy dialogue and live abundant lives! Beautiful Korea covered with a wonderful forest of Science Culture! This is the goal of the Korea Science Foundation.

[www.pcst2006.org](http://www.pcst2006.org)

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## Congratulatory Remarks



Attendees from around the world! I welcome all of you participating in the 9th International Conference on Public Communication of Science and Technology which will be remembered as a meaningful occasion in the history of science communication worldwide.

Speaking for the Korean government, I would like to warmly welcome everyone in the field of science and technology who are visiting Korea to participate in this international conference taking place for the first time in Asia. Entering its 9th year, PCST has overcome barriers between nations, allowing scientists and the public around the world to share the importance of science communication. It has established itself as an international arena of debate for discussing expedient communication methods between science and society.

Now, more than ever before, we live in an environment closely related to science and technology. The future of mankind will also grow and develop within their enormous influence. Specialist groups no longer have monopoly over science and technology. Instead, science and technology have become part of life and culture expanding to and utilized by the general public in a natural way. This is one of the reasons why the Korean government is investing a great deal of effort in preparing efficient ways for science and society to communicate with each other, and for science and technology to approach the public. Therefore, I believe it is very significant and encouraging that a conference where science communication specialists from around globe gather together to share the importance of communication and to search for more efficient communication methods is taking place in Korea.

At the Seoul conference, the focus will be on global issues facing us today, and reflections will be made on the consciousness that we need to possess as world citizens to solve such issues, and on science culture. Despite the short three-day schedule, I sincerely hope that effective methods of science communication will be brought forth through passionate debates among worldrenown science culture specialists and science engineers. In addition, I also hope that 'PUR-Korea 2006' that is taking place in conjunction with the conference will also act as an arena for achieving mutual understanding between researchers and the public.

I would like to compliment the organizing committee and everyone who worked so hard to make this event a success, and I would also like to wish all the attendees good health and prosperity.

*Kim Woo-Sik*

Dr. Woo-Sik Kim  
Deputy Prime Minister and Minister of Science and Technology

On behalf of the Local Organizing Committee of the 9th International Conference on Public Communication of Science and Technology (PCST-9), I would like to extend my heartfelt welcome to the distinguished speakers, the renowned specialists and guests from home and abroad. It is indeed our honour to have all of you with us at this important conference.

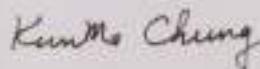
Public communication of science and technology is critical in a world thoroughly interwoven with science and technology. I do believe that the PCST conference in this year, which is the first one ever held in Asia, will contribute to strengthen the communication among scientists, engineers, the public and society. The link among practitioners, researchers and community leaders is the most important in developing the knowledge-based society.

With 'Scientific Culture for Global Citizenship' as its theme, this conference is comprised of many sessions: four plenary-, twenty-two parallel-, four joint- and two special-sessions. These sessions will cover various topics such as Informed Citizen, Scientific Contribution & Communication to Global Problem Solving, Societal & Educational System in Diverse Culture, Indicators of Public Engagement with S&T, etc. I would like to take this opportunity to extend my appreciation to various Korean organizations in co-organizing several sessions: the Korea Association for Research in Science Education, the Korean Federation of Women's Science and Technology Associations, the Korean History of Science Society, the Korean Science Reporters Association, Korean National Commission for UNESCO and the Korean Academy of Science and Technology. It is my hope for this conference to facilitate the development of sustainable future by promoting the exchange of experience and ideas of participants in this important area.

Finally, I would like to express my sincere gratitude to all speakers, distinguished guests and participants for their enthusiasm and devotion to the conference. I would also like to thank PCST Network Scientific Committee members and Local Organizing Committee members, in addition to staff members of PCST-9 Secretariat, for providing unlimited time and valuable efforts for the preparation of this conference.

I do sincerely hope that all participants from abroad will have a pleasant experience during their stay in Korea.

Thankyou.



Dr. KunMo Chung  
President of Local Organizing Committee of PCST-9  
President of The Korean Academy of Science and Technology



## Local Co-Chairs' Welcome



**Dr. Doesun Na**  
*Co-Chair, Local Organizing  
Committee of PCST-9*



**Prof. Haksoo Kim**  
*Co-Chair, Local Organizing  
Committee of PCST-9*



**Prof. Hasuk Kim**  
*Co-Chair, Local Organizing  
Committee of PCST-9*

### **Dear Colleagues:**

It gives us great pleasure to welcome you to Seoul and to the 9th international conference on Public Communication of Science and Technology. This conference has been held biennially since the first meeting was held in 1989 in Poitiers, France. We are honored to be the co-chairs for this prestigious and internationally recognized conference.

The main theme of the 9th PCST (PCST-9) is **Scientific Culture for Global Citizenship**, emphasizing scientific literacy for enhancing global citizenship and scientific contribution to solving global (citizens') problems. There will be four Plenary sessions and six Parallel sessions in addition to the Poster sessions. The topics of the Plenary sessions are "**Why Scientific Culture for Global Citizenship**", "**Communicating Science to the Public**", "**Nexus of High-Tech and Society**" and "**Present and Future of PCST**". We are also fortunate for us to have PUR-Korea 2006 (Public Understanding of Research-Korea) held during the PCST-9 meeting in the same meeting venue so that people can participate in both events.

During the meeting, the first Great Service Award will be presented to Prof. Jean Marc Levy-Leblond, who was selected by the PCST Award Committee for his contribution to PCST activities. Two Junior Awards will be presented to Mr. Germana Barata (Brazil) and Ms. Ziao Li (China), respectively, based on their abstracts. In addition, ten Travel Awardees were selected to help them attend the meeting.

A total of 250 papers (320 Abstracts) will be presented during the next three days. We hope these will facilitate the sharing of ideas on how science communication may improve the scientific culture for global citizenship.

We wish this meeting will be beneficial to all participants, not only in the matter of science but also for personal friendships. Please make yourselves comfortable and enjoy the spring of Korea.

Thank you.

## PCST Network Chair's Welcome

AFTER BARCELONA...

WELCOME TO SEOUL!

On behalf of all members of the Scientific Committee of the Network on Public Communication of Science and Technology, we would like to extend a warm welcome to this PCST-9 Conference to be held in Seoul.

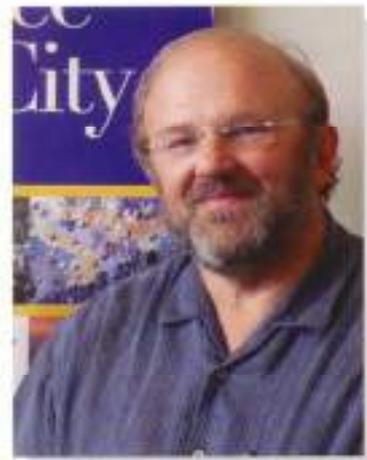
It is the first international Public Communication of Science and Technology (PCST) Network ever to stage in an Asian country, South Korea. Cultural diversity is one of the basic values of human knowledge. The fact is that there is much to be learned from each other. To exchange our experiences and knowledge and to successfully transmitting our values all over the five continents, has always been the PCST philosophy since the network was born in Poitiers (France) in 1989. It is important for all of us to be aware that scientific knowledge is universal and we should not forget it.

This is why the work of the Public Communication of Science and Technology (PCST) international network on the communication of science and the transmission of scientific knowledge in all its forms - through education, the media, museums, and specially with the PCST Conference is of such value.

After Barcelona's 2004 "Scientific Knowledge and Cultural Diversity" now is time for "Scientific Culture for Global Citizenship" in Seoul 2006. A new opportunity for all the people working in public communication in science and technology to learn about each other experiences and challenges, always with a social, multidisciplinary and multicultural view... Always with an open mind!

I am sure that PCST-9 will be a new bridge between science and society at a global level.

Lets enjoy it!



**Prof. Vladimir De Semir**

*Chair, PCST Network (2004-2006)*

# About PCST-9

## » Overview

<b>Title</b>	The 9th International Conference on Public Communication of Science and Technology (PCST-9)
<b>Theme</b>	Scientific Culture for Global Citizenship
<b>Dates</b>	Pre-Conference: 14-16 May, 2006 Conference: 17-19 May, 2006 Workshop: 20-21 May, 2006
<b>Venue</b>	Pre-Conference: Ramada Plaza Jeju, Jeju, Korea Conference: COEX, Seoul, Korea Workshop: COEX InterContinental Seoul, Seoul, Korea
<b>Host</b>	Korea Science Foundation The Korean Academy of Science and Technology
<b>Organizer</b>	PCST-9 Local Organizing Committee
<b>Sponsors</b>	Ministry of Science & Technology Ministry of Culture and Tourism Korean National Commission for UNESCO Korea National Tourism Organization

### [PCST Network]

The International Network on Public Communication of Science and Technology (PCST) is a network of individuals from around the world who are active in producing and studying PCST. The PCST network sponsors international conferences, electronic discussions and other activities to foster dialogue among the different groups of people interested in PCST, leading to cross-fertilization across professional, cultural, international and disciplinary boundaries.

### [Theme Specification]

#### I. Main Theme: "Scientific Culture for Global Citizenship"

##### **Specification 1**

What is the essence of a scientific culture? It is in the "informed citizen" and in helping people to participate actively in the policy decision-making process of a science-driven society. PCST should and can discuss how to enhance the public's scientific literacy, which results in a scientific culture and global citizenship that are internationally shared.

##### **Specification2**

We live in a dangerous world plagued with global problems such as earthquake, global warming, population overgrowth, lack of energy resources, weapons of mass destruction and terrorism. The role of scientific culture is to enhance public awareness of the involvement of science in these problems, at physical, social, regional and global levels.

#### II. Sub-themes

- Informed Citizen: Theory & Practice (Theoretical Approach)
- Practicing Scientists: Key Actor for Global Citizenship (Actor Approach)
- Scientific Contribution & Communication to Global Problem Solving (Practical Approach)
- Societal & Educational System in Diverse Culture (Institutional Approach)
- PCST in the World and in Asia
- Dialogue between Tradition and Science
- Reaching the Opinion Leaders
- Nexus of High-Tech and Society
- Indicators of Public Engagement with S&T
- Science in Mass-media
- Science Discourse
- Science Museum or Science Center

## » Organization

### [ Local Organizing Committee of PCST-9 ]

#### President

KunMo CHUNG                      The Korean Academy of Science and Technology

#### Co-chairs

Doe Sun NA                      Korea Science Foundation  
 Hasuck KIM                      Seoul National University  
 Hak Soo KIM                      Sogang University

#### Members

Dae Whan CHANG              Mael Business Newspaper & TV  
 Hang-Sik PARK                Ministry of Science and Technology  
 Young Hwa CHO                Daeduk Science Town Association  
 Min Koo HAN                    Seoul National University  
 Ki Yoon KIM                    Korean History of Science Society  
 Beom Ki KIM                    Korea Association for Research in Science Education  
 Chung-Won CHO                National Science Museum  
 Ki Soo LEE                      Korean Science Reporters Association  
 Samuel LEE                    Korean National Commission for UNESCO  
 Wan Soo PYO                    YTN Broadcasting Company  
 Executive Secretary  
 Sook-Kyoung CHO              Korea Science Foundation

### [ PCST Network Scientific Committee ]

#### Chair

Vladimir DE SEMIR              Barcelona City Council & Pompeu Fabra University, Spain

#### PCST-9 Chair

Hak Soo KIM                      Sogang University, South Korea

#### Executive Committee

Pierre FAYARD                    Univ. of Poitiers, France  
 Toss GASCOIGNE                Council for the Humanities, Arts, and Social Sciences, Australia  
 Marina JOUBERT                Southern Science, South Africa  
 Bruce LEWENSTEIN              Cornell University, USA  
 Rick BORCHELT                 Johns Hopkins University, USA

#### Other Members

Massimiano BUCCHI              University of Trento, Italy  
 Paola CATAPANO                CERN, Switzerland  
 Donghong CHENG                China Association of Science & Technology, China  
 Sook-Kyoung CHO                Korea Science Foundation, South Korea  
 Michel CLAESSENS              European Commission, Belgium  
 Suzanne DE CHEVEIGNE        CNRS, France  
 Lisbeth FOG                      Colombian Association of Science Journalism, Colombia  
 Winfried GOEPFERT              Free University, Germany  
 Luisa MASSARANI                Fiocruz/Museum of Life, Brazil  
 Jenni METCALFE                E-connect Science Communication, Australia  
 Manoj PATAIRIYA                National Council for Science & Technology Communication, India  
 Hans Peter PETERS              Research Center Juelich, Germany  
 Bernard SCHIELE                University of Quebec at Montreal, Canada  
 Yuwanuch TINNALUCK            Science Writers and Publishers' Forum, Thailand  
 Brian TRENCH                 Dublin City University, Ireland

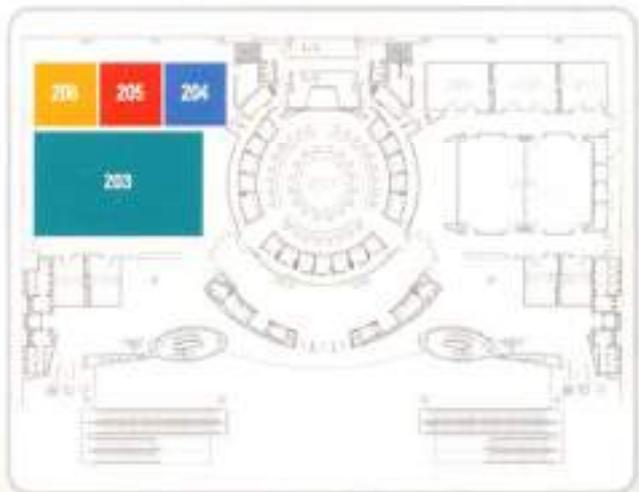
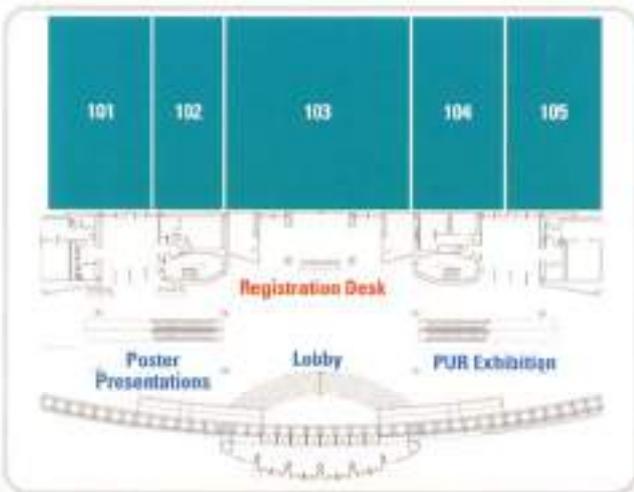
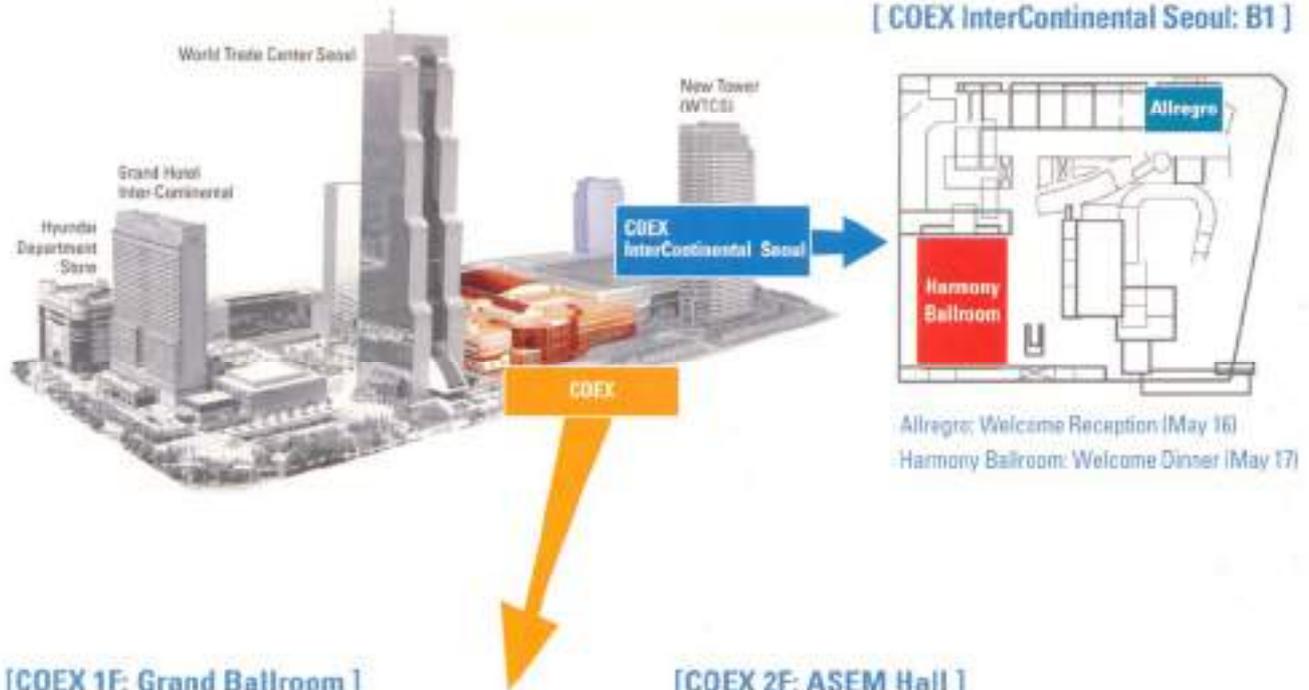
# About PCST-9

## » Program at a Glance

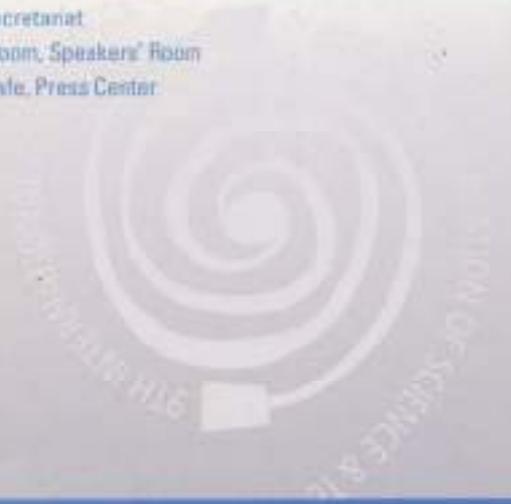
Program	Date	Venue
Pre-Conference	14-16 May, 2006	Ramada Plaza Jeju, Jeju
<b>Conference</b>	<b>17-19 May, 2006</b>	<b>COEX, Seoul</b>
Workshop	20-21 May, 2006	COEX InterContinental Seoul, Seoul

Time	Pre-Conference			Conference			Workshop	
	May 14 (Sun)	May 15 (Mon)	May 16 (Tue)	May 17 (Wed)	May 18 (Thu)	May 19 (Fri)	May 20 (Sat)	May 21 (Sun)
09:00		Pre-Conference		Opening Ceremony	Plenary Session II	Plenary Session III		
10:00				Break	Break	Break		
11:00				Plenary Session I	Parallel Sessions III	Parallel Sessions V	City Tour (Optional)	
12:00			Lunch & Poster PT	Lunch & Poster PT	Lunch & Poster PT			
13:00							Workshop	
14:00			Parallel Sessions I	Parallel Sessions IV	Parallel Sessions VI			
15:00								
16:00				Break		Break		
17:00		Registration		Parallel Sessions II	Conference Banquet (Optional)	Plenary Session IV		
18:00							Closing Ceremony	
19:00			Welcome Reception	Welcome Dinner				
20:00								

## » Venue: COEX Complex



Room 204: PCST-9 Secretariat  
Room 205: Preview Room, Speakers' Room  
Room 206: Internet Cafe, Press Center



# Daily Conference Program

Parallel Session
Poster Session
Joint Session
Special Session
PUR-Korea Session

## Tuesday, May 16

13:00-19:00	Registration ( <i>Grand Ballroom Lobby, COEX</i> )
19:00-21:00	Welcome Reception ( <i>Harmony Ballroom, COEX InterContinental Seoul</i> )

## Wednesday, May 17

08:00-19:00	Registration ( <i>Grand Ballroom Lobby, COEX</i> )						
09:00-10:00	Opening Ceremony ( <i>Grand Ballroom 102-103</i> ) - Opening Remarks: Dr. KunMo Chung, President of Local Organizing Committee of PCST-9 Prof. Vladimir De Semir, Chair of PCST International Network (2004-2006) - Congratulatory Remarks: Dr. Woo-Sik Kim, Deputy Prime Minister and Minister of Science and Technology - Welcome Remarks: Dr. Doesun Na, Co-chair of Local Organizing Committee of PCST-9 - Encouragement Remarks: Mr. Oh-Kab Kwon, Chairman of PUR-Korea 2006						
10:00-10:30	Break						
10:30-11:30	Plenary Session I: Why Scientific Culture for Global Citizenship ( <i>Grand Ballroom 102-103</i> )						
11:30-14:00	Lunch						
13:00-14:00	<b>WA7</b> Poster Session I ( <i>Grand Ballroom Lobby</i> )						
14:00-16:00	Code Place	<b>WB1</b> Room 101	<b>WB2</b> Room 102	<b>WB3</b> Room 103	Room 104	Room 105	<b>WB6</b> Room 203
	Name	Informed Citizen I	PCST in the World and in Asia I	Scientific Contribution & Communication to Global Problem Solving I	Sustainable Development & Sustainable Society	Communicating Nano to the Public	Interfaces between Sciences and the Korean Society (Organized by AHSS*)
16:00-16:30	Break						
16:30-18:30	Code Place	<b>WC1</b> Room 101	<b>WC2</b> Room 102	<b>WC3</b> Room 103	Room 104	Room 105	Room 203
	Name	Practicing Scientists: Key Actor for Global Citizenship I	Societal & Educational System in Diverse Culture I	Dialogue between Tradition and Science I	S&T in Vivo and in Silico	Talking Bio & Medical Research	From Science to Public (Organized by KOSFA*)
19:00-21:00	Welcome Dinner ( <i>Harmony Ballroom, Coex InterContinental Seoul</i> )						

## Thursday, May 18

08:00-17:00	Registration ( <i>Grand Ballroom Lobby, COEX</i> )						
09:00-10:00	Plenary Session II: Communicating Science to the Public ( <i>Grand Ballroom 102-103</i> )						
10:00-10:30	Break						
10:30-12:30	Code Place	<b>TA1</b> Room 101	<b>TA2</b> Room 102	<b>TA3</b> Room 103	Room 104	Room 105	<b>TA6</b> Room 203
	Name	PCST in the World and in Asia II	Science Education as Core-orientation (Organized by KARS*)	Informed Citizen II	Beyond Misunderstanding in Nuclear Power	From the Basic to Cutting Edge	Scientific Contribution & Communication to Global Problem Solving II / Indicators of Public Engagement with S&T
12:30-14:00	Lunch						
13:00-14:00	<b>TB7</b> Poster Session II ( <i>Grand Ballroom Lobby</i> )						
14:00-16:00	Code Place	<b>TC1</b> Room 101	<b>TC2</b> Room 102	<b>TC3</b> Room 103	Room 104	Room 105	<b>TC6</b> Room 203
	Name	Practicing Scientists: Key Actor for Global Citizenship II	Societal & Educational System in Diverse Culture II	Nexus of High-Tech and Society	Toward Space: Space Korea Project	Toward Digital Frontiers /Closing Session	Science Discourse/ Science Museum or Science Center/ Reaching the Opinion Leaders
16:30-22:30	Conference Banquet ( <i>Samcheonggak &amp; Chunggechun</i> )						

# Daily Conference Program

Parallel Session    Poster Session    Joint Session    Special Session    PUR-Korea Session

## Friday, May 19

08:00-09:00	Registration (Grand Ballroom Lobby, COEX)						
09:00-10:00	Plenary Session III: Nexus of High-Tech and Society (Grand Ballroom 102-103)						
10:00-10:30	Break						
10:30-12:30	<b>Code Place</b>	<b>FA1 Room 101</b>	<b>FA2 Room 102</b>	<b>FA3 Room 103</b>	<b>FA4 Room 104</b>	<b>FA5 Room 105</b>	<b>FA6 Room 203</b>
	<b>Name</b>	Informed Citizen III	Scientific Contribution & Communication to Global Problem Solving II	PCST in the World and in Asia III	Dialogue between Tradition and Science II	Societal & Educational System in Diverse Culture III	Bioethics and Journalism (Organized by Korean National Commission for UNESCO)
12:30-14:00	Lunch						
13:00-14:00	FB7 Poster Session III (Grand Ballroom Lobby)						
14:00-16:00	<b>Code Place</b>	<b>FC1 Room 101</b>	<b>FC2 Room 102</b>	<b>FC3 Room 103</b>	<b>FC4 Room 104</b>	<b>FC5 Room 105</b>	<b>Room 203</b>
	<b>Name</b>	Indicators of Public Engagement with S&T II (Organized by Prof. Martin Bauer)	Science in Massmedia	Societal & Educational System in Diverse Culture IV	Science Communication and Women (Organized by KOFAST*)	Informed Citizen IV	Risk Governance in Science and Technology (Organized by KAST*)
16:00-16:30	Break						
16:30-17:30	Plenary Session IV: Present & Future of PCST (Grand Ballroom 102-103)						
17:30-18:30	Closing Ceremony (Grand Ballroom 102-103)						
	<ul style="list-style-type: none"> <li>- PCST-9 Progress Report: Prof. Hasuk Kim, Co-chair of Local Organizing Committee of PCST-9</li> <li>- Awards Ceremony</li> <li>- Welcome to PCST-10 Speech</li> <li>- Farewell Remarks: Prof. Haksoo Kim, Chair of the PCST International Network (2006-2008)</li> </ul>						

## Saturday, May 20

08:30-13:00 City Tour (Changdeok Palace & Insa-dong)

- \* KHSS: The Korean History of Science Society
- \* KOSRA: Korea Science Reporters Association
- \* KARSE: Korea Association for Research in Science Education
- \* KOFWST: Korean Federation of Women's Science and Technology Associations
- \* KAST: The Korean Academy of Science and Technology

### Guideline for Presenters

#### \* Parallel Sessions and Joint Sessions

To ensure a smooth operation and to improve the communication between chairpersons and speakers, please attend the Preparatory Meeting to be held in the assigned session rooms. Please be seated in the assigned session room 20 minutes prior to the beginning of your session and introduce yourself to the chair.

#### \* Poster Sessions

Please enter the assigned session place 20 minutes prior to your session and introduce yourself to the chairpersons.

All presenters are requested to affix and remove posters on the appropriate dates and time.

Date	Code	Affixation	Removal
May 17 (Wed)	WA7	08:30-09:00	18:30-19:00
May 18 (Thu)	TB7	08:30-09:00	16:00-16:30
May 19 (Fri)	FB7	08:30-09:00	18:30-19:00

## Plenary Sessions

### » Session I: *Why Scientific Culture for Global Citizenship*

**Wednesday May 17 10:30–11:30, Grand Ballroom 102–103, COEX**



**CHAIR: Dr. KunMo Chung**  
**President, Local Organizing Committee of PCST–9**  
**President, The Korean Academy of Science and Technology, KOREA**

Dr. Chung is the President of The Korean Academy of Science and Technology, the focal point for international cooperation and information exchanges in Science Communication field. He is also taking charge of diverse occupations in academia and social communities.



**Dr. Koichi Kitazawa**  
**Senior Executive Director, Japan Science and Technology Agency, JAPAN**

*A Global Future Dream-New Method to Make Renewable Energy More Efficient*

Dr. Kitazawa, Senior Executive Director of the JST (Japan Science and Technology Agency), is keenly interested in motivating the academia-industry collaboration in local universities. Before, Dr. Kitazawa was a former professor of the University of Tokyo, Department of Superconductivity, Graduate School of Frontier Sciences, where he introduced the concept of "Moses Effect".



**Prof. Vladimir De Semir**  
**Commissioner for Scientific Culture, Barcelona City Council / Pompeu Fabra University, SPAIN**

*Citizens of the Knowledge Society*

Prof. De Semir, the President of the international network Public Communication of Science and Technology, is Commissioner for Scientific Culture in Barcelona City Council. He is also the Associated Professor of Scientific Journalism and the Director of the research centre Science Communication Observatory at the Pompeu Fabra University.



**Dr. Doesun Na**  
**Co-chair, Local Organizing Committee of PCST–9/President, Korea Science Foundation, KOREA**

*Scientists Open the Way to the Era of Global Science Culture*

Dr. Na, President of Korea Science Foundation, is one of the leading scientists in the field of biological sciences in Korea. She is a Fellow of the Korean Academy of Science and Technology. She has served as the president of several academic associations including Korean Society for Biochemistry and Molecular Biology. She was the founding president of Women's Bioscience Forum as well as the Korean Federation of Women's Science and Technology Associations. In recognition of these accomplishments, she has received several awards, including the Woman Scientist of the Year from the Ministry of Science and Technology of Korea (2004).

## ▶ **Session II : *Communicating Science to the Public***

**Thursday, May 18 09:00–10:00, Grand Ballroom 102–103, COEX**

**CHAIR: Prof. Haksoo Kim**

**Co-chair, Local Organizing Committee of PCST-9/Sogang University, KOREA**

Prof. Kim, Dean of College of Communication at Sogang University, occupies several positions in Science society, such as Co-chair of Citizens' Coalition for Scientific Society. He was appointed as member of the Korean government's National Science & Technology Council. He has published numerous articles and three books in Korea. Notably, he was awarded Order of Science & Technology Service Merit, Woong-bi Jang, from Korean government in 2001.



**Dr. Martin Bauer**

**Reader, Social Psychology and Research Methodology, London School of Economics, UK**

*Communicating Science to the Public: The Importance of Critical Public Attitudes*

Dr. Bauer was born and educated in Switzerland. After studies in Psychology and Economic History (University of Bern and Zurich), he moved to London to do his PhD in Social Psychology (LSE, 1993). Before joining the faculty of the London School of Economics in 1995, he was a Research Fellow at the Science Museum in London. He regularly works and teaches in Brazil.



**Prof. Anusuya Chinsamy-Turan**

**Professor, Zoology Department, University of Cape Town**

**South African Women in Science and Engineering, SOUTH AFRICA**

*Fostering a Scientific Culture in Society*

Professor Chinsamy-Turan is Palaeobiologist at the Zoology, Department of the University of Cape Town, as well as President of the Association of South African Women in Science and Engineering (SA WISE). She is a global expert on the microscopic structure of the bones of dinosaurs. Her research has been funded by several research grants from in and abroad. Lately, she was named "South Africa's Woman of the Year" and "Distinguished Women Scientist". She is the author of the internationally acclaimed book on fossil bone microstructure, *The Microstructure of Dinosaur Bone-Deciphering Biology through Fine Scale Techniques*.



**Mrs. Annette Smith**

**Director of Regions, The British Association for the Advancement of Science, UK**

*Communicating Science with the Public:*

Mrs. Smith's early career in science communication started with a period on environmental health and safety in the nuclear industry. She also acts as Vice President of the European Science Events Association, the network of science festivals and science weeks across Europe. She recently published the guide "Science Communication Events in Europe" following a three year EU project.



# Plenary Sessions

## » Session III : *Nexus of High-Tech and Society*

**Friday May 19 09:00~10:00, Grand Ballroom 102~103, COEX**



**CHAIR: Ms. Marina Joubert**  
**Director, Southern Science, SOUTH AFRICA**

Mrs. Joubert serves on the executive committee of the international Public Communication of Science and Technology (PCST) network, and the advisory council of South Africa's National Science and Technology Festival (SASOL SciFest). She is engaged in a wide range of science communication initiatives in South Africa, including public engagement programs in fields where South Africa holds a particular geographical advantage, such as astronomy and space sciences and Antarctic research. She recently launched the country's first dedicated science communication consultancy.



**Prof. Leo Wee-Hin Tan**  
**Director, National Institute of Education, SINGAPORE**

*Science and Teshnology Promotion in Singapore and Asia*

Prof. Tan is a marine biologist by training, while his career of 30 years covers biology, museology, education and administration. He sits on several Boards and International Organisations including Chairman of National Parks Board. He has been involved with youth and in youth activities for three decades as an educator at the National University of Singapore. He has awarded National Order of Merit from the French government in 2002 and the Honorary Degree of Doctor of Science from Loughborough University in 2003. He has numerous publications in renown journals, including SCIENCE & NATURE.



**Prof. Hasuk Kim**  
**Co-chair, Local Organizing Committee of PCST-9/Seoul National University, KOREA**

*Pushing Frontier Researches through Public Understanding*

Prof. Kim, Professor of Seoul National University, holds important posts in related society including Co-Chairman of Citizens' Coalition for Scientific Society. His study mainly focuses on analytical electrochemistry and energy related electrochemistry. Recently this year, he was awarded Special Service Award by Korean Electrochemical Society.



**Mr. Nell Calder**  
**Director of Communications, Stanford Linear Accelerator Center, USA**

*Connecting High-tech with Society in Research Laboratories including Stanford Linear Accelerator Center*

Mr. Nell Calder is a Director of Communications at the Stanford Linear Collider Center and Head of Communications and Public Affairs at CERN (Centre European pour la Recherche Nucleaire) in Geneva Switzerland. Over the last 15 years he has redefined the relationship between physics research laboratories and the media, initiating a dramatic increase in coverage.



**Dr. Guillaume Boudy**  
**Chief Executive Officer, Cite des Science et de L'industrie, FRANCE**

*Science Centers as Places of Dialogue between Science and Society*

Dr. Guillaume Boudy, Director General of the Cite des Sciences et de L'industrie, is an Advisor of Reference at the National Audit Office (Cour des Comptes). He began his working career in the private sector in the marketing department in Paris and later in the financial department in Venezuela. Before, he was the Commercial Counselor of French Embassy in Singapore, the Deputy Directoy of ministerial staff of the then Minister of Agriculture Herve Gaymard and the Deputy Director of ministerial staff of ministry of the economy and finance.

## ► **Session IV: *Present & Future of PCST (PCST Network Session)***

**Friday, May 19 16:30–17:30, Grand Ballroom 102–103, COEX**

**CHAIR: Mr. Toss Gascoigne**

**Executive Director,**

**Council for the Humanities, Arts, and Social Sciences (CHASS), AUSTRALIA**

Mr. Gascoigne is the Executive Director of the Council for the Humanities, Arts and Social Sciences (CHASS), a non-government organisation which represents the interests of Australians working in the humanities, arts and social sciences. Until 2004, he was the Executive Director of the Federation of Australian Scientific and Technological Societies (FASTS). He has since 1993 run training workshops (in conjunction with Jenni Metcalfe) for scientists, to help them improve their skill in dealing with the media and to improve their public communication skills and skills in dealing with the media.



**Prof. Vladimir De Semir**

**Commissioner for Scientific Culture, Barcelona City Council / Pompeu Fabra University, SPAIN**

Prof. De Semir, the President of the international network Public Communication of Science and Technology, is Commissioner for Scientific Culture in Barcelona City Council. He is also the Associated Professor of Scientific Journalism and the Director of the research centre Science Communication Observatory at the Pompeu Fabra University.



**Ms. Jenni Metcalfe**

**Director, E-connect Science Communication, AUSTRALIA**

Ms. Metcalfe is a scientific and environmental communication consultant and Director of Econnect Communication Pty Ltd. She is a Foundation Member of Australian Science Communicators and the current National President. Jenni has been working as a science communicator for more than 16 years. She has conducted training workshops for scientists in media, presentation and communication skills for 14 years in Australia and internationally in New Zealand, South Africa and The Philippines



**Dr. Donghong Cheng**

**Executive Secretary, China Association for Science & Technology, CHINA**

Dr. Cheng has been the Executive Secretary of China Association for Science and Technology (CAST) since June 2001, a non-governmental organization of Chinese scientists and engineers. Before, Dr. Cheng had been Director-General of the Department of Science Popularization of CAST from 1999 to 2003 and Director-General of the Department of Children & Youth Affairs of CAST from 1984 to 1999. Dr. Cheng is now taking the leadership of many national initiatives, such as the Chair of the Internet Science Communication Alliance of the Internet Society of China, and is the national focal point of the Asia-Pacific Network on Gender, Science and Technology of UNESCO. She is also a Member of the Executive Board of All China Women's Federation and a Board Member of the China Association for Science Instructors.



**Prof. Bernard Schiele**

**Director International Ph D. Program & Professor, University of Quebec at Montreal, CANADA**

Prof. Schiele is Head of the Joint Canadian & French International Graduate Programs in Museums Studies at the University of Quebec at Montreal, Researcher at the Interuniversity Research Centre on Science and Technology at UQAM. He frequently teaches and lectures in North America, Asia and Europe. He regularly consults governmental entities including the Auditor General of Canada and the Conseil de la Science et de la Technologie du Quebec. He is also a founding member of the scientific committee of the PCST network.



# Parallel Sessions

## » Session I Wednesday, May 17, 14:00–16:00

Informed Citizen I (WB1)	PCST in the World and in Asia I (WB2)	Scientific Contribution & Communication to Global Problem Solving I (WB3)
<b>Room 101</b> <b>Chair: Dr. Bruce Lewenstein</b>	<b>Room 102</b> <b>Chair: Prof. Hak Soo Kim</b>	<b>Room 103</b> <b>Chair: Dr. Michel Claessens</b>
<p>[77] <b>When Education Prevents the Uptake of Science: The Case of Childhood Immunisation in Australia</b>                      * Dr. Cathy Frazer (Centre for the Public Awareness of Science, Australia)</p> <p>[85] <b>Invisible Witnesses? - Representations of Women Scientists, Engineers and Technologists on UK Terrestrial Television</b>                      *Dr. Richard Holliman, Ms. Elizabeth Whitelegg, Mr. Joachim Allgeier, Dr. Barbara Hodgson (The Open University, United Kingdom)</p> <p>[112] <b>The Importance of the Place</b>                      *Mr. Jan Riise (Agadom AB, Sweden)</p> <p>[135] <b>The Informed Practitioner: Communication Between Social Scientists and Practitioners</b>                      *Ms. Gudrun Hessler, Mr. Kai Urdicker (Bielefeld University, Germany)</p> <p>[141] <b>The Only Green Solution? Science, Mass Media &amp; the UK Energy Debate</b>                      Dr. Steven Robert Harris, *Mr. Robert S. Miller, Prof. Mark Brake (University of Glamorgan, United Kingdom)</p> <p>[142] <b>A Reconceptualization of Science &amp; Technology in a Highly Mediatized and Democratized Society</b>                      *Mr. Pieter Maesele (Ghent University, Belgium)</p> <p>[144] <b>Science Communication and Citizen Science: How Dead is the Deflick Model?</b>                      *Mr. Brian Trench (Dublin City University, Ireland)</p> <p>[146] <b>Entertaining Science on TV</b>                      *Prof. Winfried Goeplert (Freie University Berlin, Germany)</p>	<p>[79] <b>Conceptual Framework and Approaches to PCST - An Indian Experience</b>                      *Mr. Brnder Tyagi (Department of Science &amp; Technology, Government of India, India)</p> <p>[106] <b>Communicating Science and Communicating about Science - An Content Analysis of Select Science Video Programmes</b>                      *Dr. Venkateswaran Tv (Vigyan Prasar, India)</p> <p>[122] <b>The Reception of the Anglo-Saxon Methods of Scientific Journalism in the Periphery: A Case Study in Spain</b>                      *Prof. Sergi Corinas (Universitat Pompeu Fabra, Spain)</p> <p>[123] <b>Student Project Virtual Worlds as Windows on Scientific Cultures in CTC SCIFAIR</b>                      *Ms. Margaret Corbit, Mr. Richard Berenstein, Ms. Suzanne Kolodziej, Ms. Catherine McIntyre (Cornell Theory Center, Cornell University, United States)</p> <p>[131] <b>The First Half Year of Science Interpreter Training Program at the University of Tokyo: From the Viewpoints of Graduate Students</b>                      *Dr. Tomohisa Sumida, Mr. Takashi Noguchi, Mr. Yurika Tachibana, Mio Furutani (University of Tokyo, Japan)</p> <p>[156] <b>Mapping Science Communication Activities in Italy</b>                      *Mr. Donato Raman (SISSA - International School for Advanced Studies, Italy)</p> <p>[161] <b>Science Communication after September 11</b>                      *Dr. Giancarlo Sturloni, Dr. Maria Chiara Montani (SISSA - International School for Advanced Studies, Italy)</p> <p>[688] <b>The Public Controversy over Science &amp; Technology and PCST</b>                      *Prof. Hee Ja Bak (Kyung Hee University, Korea)</p>	<p>[127] <b>Technical Task Force: A Pilot Project of Agricultural Science Communication in China</b>                      *Ms. Jing Ouyang (Graduate School of the Chinese Academy of Sciences, China)</p> <p>[129] <b>Communication of Scientific Information in the Assessment of Environmental Goal Achievement</b>                      *Dr. Victoria Wibbeck (Linköping University, Sweden)</p> <p>[134] <b>Science in News: Case Study of Media Coverage of Cardiovascular Disease</b>                      *Mr. Guangjiang Pei (Centre for International Communications Studies of Tsinghua University, China)</p> <p>[187] <b>Public Participation and the Governance of Innovation: Evaluation of Procedures for Citizens Involvement</b>                      *Prof. Giuseppe Pellegrini (Universite degli Studi di Padova, Italy)</p> <p>[204] <b>Preparing Economical Society Exhibition on the Basis of Changed Approaches in Science Center</b>                      Ms. Lily Lee (China Science and Technology Museum, China)</p> <p>[217] <b>Towards a Strategy for Mobilising Science in Global Problem-Solving</b>                      *Ms. Kajsa Eriksson, Ms. Malin Lindgren (Royal Swedish Academy of Sciences, Sweden)</p> <p>[325] <b>Scientific Temper and Conflict Management</b>                      *Dr. Manoj Pataniya (National Council for Science &amp; Technology Communication, India)</p> <p>[111] <b>Networking at All Levels for Global Problem Solving</b>                      * Mr. Abhay Kothari (National Institute of Design, India), Mr. Supriya Pukhama (Marathan Educational Programme Society, India)</p>

## → Session II Wednesday, May 17, 16:30-18:30

Practicing Scientists: Key Actor for Global Citizenship I (WC 1)	Societal & Educational System in Diverse Culture I (WC 2)	Dialogue between Tradition and Science I (WC 3)
<b>Room 101</b> <b>Chair: Prof. Hans Peter Peters</b>	<b>Room 102</b> <b>Chair: Prof. Bernard Schiele</b>	<b>Room 103</b> <b>Chair: Dr. Yuwanuch Tinnaluck</b>
<p><b>[80] The Scientist as a Global Citizen</b>                      *Dr. Femke Kramer, Ms. Henk Mulder (University of Groningen, Netherlands)</p> <p><b>[87] Impartial Scientific Advice for Citizen Participation in Decision Making Processes</b>                      *Dr. Henk Mulder (University of Groningen, Netherlands)</p> <p><b>[124] To Connect to Citizens, Researchers Must Rethink their Research Practices</b>                      *Dr. Marie-Claude Roland (French National Institute of Agricultural Research (Inra), France)</p> <p><b>[154] Scientists' View about Communication in the Italian Context</b>                      *Mr. Giancarlo Brunelli, Mr. Nico Pitrelli, Dr. Valentina Murelli (SISSA - International School for Advanced Studies, Italy)</p> <p><b>[169] I Want To Be a Science Communicator: A 10-Year Training Experience in Science Communication</b>                      *Ms. Sivia Coll, Ms. Gemma Revuelta, Mr. Vladimir De Semir (Universitat Pompeu Fabra, Spain)</p> <p><b>[175] Making Bridge between Scientists and Public: Providing a Venue for Live-talk for Young and Upcoming Scientists</b>                      *Prof. Noyori Mima, Mr. Fuji Nagami (National Museum of Emerging Science and Innovation, Japan)</p>	<p><b>[168] The World-Wide Day in Science 'Virtual Event' Continues to Grow</b>                      *Dr. Will Riffin (University of New South Wales, Australia), Dr. Maria Pia Cerdeiras (The University of the Republic of Uruguay, Uruguay), Ms. Gemma Revuelta, Ms. Sivia Coll (Pompeu Fabra University, Spain)</p> <p><b>[202] Teaching PCST: Providing Global Professional Development Opportunities That Recognize Local Context?</b>                      *Prof. Bruce Lewenstein (Cornell University, United States), Dr. Luisa Massarani (FIOCRUZ/Fundacao Oswaldo Cruz, Brazil), Ms. Marisa Joubert (Southern Science, South Africa)</p> <p><b>[252] Making Communicator through the Production of Science Radio: Challenges of CoSTEP</b>                      *Prof. Kunihiko Kumamoto (Hokkaido University, Japan)</p> <p><b>[255] Science Communication Training through Website Creation: Challenges of CoSTEP</b>                      *Mr. Gensai Ishitura, Ms. Shuko Ohtsu (Hokkaido University, Japan)</p> <p><b>[257] Hands-on Training of Science Writing: Challenges of CoSTEP</b>                      *Ms. Miho Namba (Hokkaido University, Japan)</p> <p><b>[258] Science Café as an Incubator of Science Communicators: Challenges of CoSTEP</b>                      *Mr. Naoyuki Mikami, Mr. Takeshi Okahashi (Hokkaido University, Japan)</p> <p><b>[259] Science and Technology Delivery: Science Education on the Move</b>                      *Mr. Yusuke Sato, Dr. Takashi Miyairi (Hokkaido University, Japan)</p> <p><b>[318] Characteristics and Roles of LG Science Hall in Korea - One of Enterprise Science Centers in Korea and Its Unique Aspects for the Public Awareness of Science</b>                      *Ms. Junghye Park (Australian National University, Korea)</p>	<p><b>[75] Co-existence of Traditional and Scientific Cultures: An Empirical Study during KUMBH 2001</b>                      *Mr. Surjit Singh, Mr. Gauhar Raza (NISTADS (CSIR), India)</p> <p><b>[104] The Role of Buddhist Monk in Local Development: Science Communication from Thai Local Context</b>                      *Ms. Nuta Supakata (Chulalongkorn University, Thailand)</p> <p><b>[120] Lung Function Parameters of Bangladeshi People in Different Living Conditions</b>                      *Prof. Shamsima K Choudhury (Dhaka University, Bangladesh)</p> <p><b>[150] Impacts of Tradition on Science Development in Nigeria</b>                      *Mr. Bamidele Fasunwan (Tai Solarin University of Education, Nigeria), Dr. Olusola Fasunwan (Olabisi Onabanjo University, Nigeria)</p> <p><b>[170] When Media Stardom and Scientific Stardom Combine: Nobel Laureates in the Italia Daily Press</b>                      *Prof. Massimiano Bucchi (Universite di Trento, Italy), Prof. Federico Neresini (Universita di Padova, Italy)</p> <p><b>[172] Journalists Views of Scientists - Breaking Down Cultural Differences</b>                      *Ms. Jennifer Metcalfe (Econnect, Communication, Australia)</p> <p><b>[174] Opening Dialogue between Tradition and Science: Science and Society? In Traditional Asian Ways</b>                      *Dr. Yuwanuch Tinnaluck (Science Writers and Publishers Forum, Science Society of Thailand, Thailand)</p>

# Parallel Sessions

## » Session III Thursday, May 18, 10:30-12:30

PCST in the World and in Asia II (TA 1)	Informed Citizen II (TA 3)	Scientific Contribution & Communication to Global Problem Solving II: Indicators of Public Engagement with S&T I (TA 4)
<b>Room 101</b> <b>Chair: Mr. Toss Gascoigne</b>	<b>Room 103</b> <b>Chair: Prof. Brian Trench</b>	<b>Room 203</b> <b>Chair: Dr. Luisa Messarani</b>
<p>[250] <b>Education Program on PCST: CoSTEP'S Challenge</b>  *Prof. Shigeo Sugiyama (Hokkaido University, Japan)</p> <p>[181] <b>Science as a Culture, and an Introduction to New Public Understanding of Research (PUR) Experiments in Japan</b>  *Dr. Hidehiko Agata (National Astronomical Observatory of Japan, Japan), Mr. James Dougherty (University of Tokyo, Japan)</p> <p>[223] <b>CreScENDO: Finding Ways to Join up UK Science Engagement Schemes and Activities and Building Capacity</b>  *Mr. Steve Mesure (The Creative Science Consultancy Ltd., United Kingdom)</p> <p>[228] <b>From Contents to Context: Current Status, Classification, and Perspective of Science Communication in Japan</b>  *Prof. Osamu Sakura, Ms. Soroda Emi, Ms. Mai Futaki, Mr. Kohta Jursaku (University of Tokyo, Japan)</p> <p>[238] <b>Cafe Scientifique: A Successful Model of Science Communication from West to China</b>  *Mr. Yai Wei Shang, Ms. Jing Guoyang (Graduate school of the Chinese Academy of Sciences, China)</p> <p>[251] <b>The Perception of Science and Scientists in the Young Public Italian Teenagers and Science: Views, Beliefs and Attitudes toward Scientific Research</b>  Prof. Yuri Castellfranchi (Campinas State University (UNICAMP), Brazil), *Dr. Daniele Gauthier, Ms. Federica Manzoli (SISSA - International School for Advanced Studies, Italy), Ms. Irene Cannata (Istituto Tecnico Attivite Sociale, Italy)</p> <p>[254] <b>Children and Scientists: Perception and Attitudes</b>  *Prof. Yunj Castellfranchi (Universidade Estadual de Campinas - UNICAMP, Brazil), Ms. Federica Manzoli, Dr. Daniele Gauthier (SISSA - International School for Advanced Studies, Italy) Ms. Irene Cannata (Istituto Tecnico Attivite Sociale, Italy)</p> <p>[351] <b>Science Communication Activities in Korea from the Year 2000 to 2005</b>  *Prof. Wan Soon Kim (Korea Science Foundation, Korea), Ms. Seung Hee Kim (Ewha Womans University, Korea)</p> <p>[1318] <b>Government Officers and the Public Awareness of Science in Thailand : A Case Study on Biotechnology</b>  *Ms. Aphiya Hathayatham (The National Science Museum, Thailand)</p>	<p>[158] <b>Scientists as Citizens: Talking Issues Versus Talking Science</b>  *Ms. Mary Brennan (University of Newcastle upon Tyne, United Kingdom)</p> <p>[163] <b>Science News in European Television. A Study of Quantity, Airtime, Agenda and Journalistic Values</b>  *Dr. Bienvenido Leon (University of Navarra, Spain)</p> <p>[165] <b>Communication of Science Enabling Societal Effectiveness</b>  *Dr. Ylva Sjonell (VINNOVA, Sweden), Prof. Sven Hamrefors (Mälardalens University, Sweden)</p> <p>[171] <b>Informing the Citizenry and Students through Public Outreach Programs Making Use of Science and the Arts</b>  *Prof. Brian Schwartz, Ms. Linda Merman, Ms. Adrienne Klein (The Graduate Center of the City University of New York, United States)</p> <p>[177] <b>The Development a New Objective Instrument to Measure Different Levels of Interactivity</b>  *Dr. Coes Koolstra, Mr. Mark Bos (Vrije Universiteit Amsterdam, Netherlands)</p> <p>[189] <b>On Japan's Ways of Science Communication</b>  *Mr. Masataka Watanabe (NISTEP, Japan)</p> <p>[195] <b>Climate Change, Science Communication and Public Engagement</b>  *Mr. Hepeng Jia (SciDev.Net / China Daily, China)</p> <p>[349] <b>SCIRAB - Science in Radio Broadcasting</b>  *Dr. Matteo Merzagora, Dr. Marzia Mazzonetta, Dr. Elisabetta Tola (SISSA - International School for Advanced Studies, Italy)</p>	<p>[207] <b>The Discrete Choice Analysis as a Valuable Tool for Estimating Consumer Attitudes towards Genetically Modified Food in Europe</b>  *Dr. Floriana Marin, Dr. Lucia Martinelli (Istituto Agrario di San Michele all'Adige, Italy)</p> <p>[208] <b>"Eco-friendly" Genes : From Scientific Research to Risk Management, Ethical Issues and Communication</b>  *Dr. Lucia Martinelli, Dr. Floriana Marin (Istituto Agrario di San Michele all'Adige, Italy)</p> <p>[209] <b>Semiotics of Natural Catastrophe Discourse in a Post-Tsunami World: Representing the Sciences in Media</b>  *Prof. Sung-Do Kim (Korea University, Korea)</p> <p>[214] <b>The First Decade of Aids in Brazil: The TV Presents a New Disease to the Public</b>  *Ms. Germana Barata, Mr. Gido Magalhaes (University of Sao Paulo, Brazil)</p> <p>[88] <b>Cloning Goes to the Movies</b>  Mr. Craig Cormick, *Ms. Sharon Ding (Biotechnology Australia, Australia)</p> <p>[166] <b>People's Science Movement in Late XXth Century India Presented at the 9th International Conference on Public Communication of Science and Technology</b>  *Mr. Subhasis Sahoo, Prof. Binay Kumar Pattnaik (Indian Institute of Technology, Kharagpur, India)</p>

## » Session IV Thursday, May 18, 14:00–16:00

Practicing Scientists: Key Actor for Global Citizenship II (TC.1)	Societal & Educational System in Diverse Culture II (TC.2)	Nexus of High-Tech and Society (TC.3)	Science Discourse/Science Museum or Science Center/Researching the Opinion Leaders (TC.4)
<b>Room 101</b> <b>Chair : Dr. Vladimir De Semir</b>	<b>Room 102</b> <b>Chair : Prof. Hans Peter Peters</b>	<b>Room 103</b> <b>Chair : Prof. Bruce Lewenstein</b>	<b>Room 203</b> <b>Chair : Dr. Chang Wou Cho, President of National Science Museum</b>
<p><b>[293] Required Skill and Training Program for Science Communicators</b>                      *Dr. Naoko Yamashina, Ms. Hiroshi Yamamoto, Ms. Sachi Ito, Dr. Noyari Mima (National Museum of Emerging Science and Innovation, Japan)</p> <p><b>[302] PCST Programs by 3 Korean Research Institutes and their Members' Perception on the Participation in Related Activities</b>                      *Ms. Sohee Kim (Korea Basic Science Institute, Korea), Prof. Jinwoong Song (Seoul National University, Korea)</p> <p><b>[305] Mobile Science Lab for Communicating Science and Technology with Teenagers</b>                      *Prof. Jung Hoon Choi, Dr. Bookhee Hwang, Dr. SungWan Hwang (Hanyang University, Korea)</p> <p><b>[360] Recent Sea Level Rise in the East/Japan Sea</b>                      *Dr. Sok Kuh Kang, Mr. Hong Sik Min (Korea Ocean Research &amp; Development Institute, Korea), Dr. Josef Cherniawsky, Dr. M.G.G Foreman (Institute of Ocean Sciences, Canada)</p> <p><b>[239] Genome Research and Communication with the Public in Japan</b>                      Dr. Makina Kato, Mr. Kei Kara, Mr. Motakoshi Hayato, * Kazuo Kato (Graduate School of Biostudies, Kyoto University, Japan)</p>	<p><b>[82] For Better Public Understanding : What Makes People Stay in Museums?</b>                      *Dr. Myeong-kyeong Shin (Kyeongin National University of Education, Korea), Prof. Chan-jong Kim (Seoul National Univ., Korea), Prof. Chang-an Lee (Chungbuk National University, Korea)</p> <p><b>[159] Developing a Good Practice of and In-Service Training for a Science Teacher to Acquire Competence as a Science Teacher to Acquire Competence as a Science Communicator for the Parents</b>                      *Prof. Hayashi Nakayama, Dr. Etsuj Yamafuchi (University of Miyazaki, Japan), Ms. Aki Satooka (Takaharu Junior High School, Japan), Mr. Noriaki Koshima (University of Miyazaki Prefectural Museum of Science and History, Japan)</p> <p><b>[276] Semiotics of Chemistry Posters</b>                      *Prof. Jae Young Han (Chungbuk National University, Korea)</p> <p><b>[288] Analyzing the Use of The Website and Developing the Website Evaluation Frame through Task-Based Physics Learning Activities</b>                      *Mr. Sung-il Kwak, Prof. Jinwoong Song (Seoul National University, Korea)</p> <p><b>[298] A Case Study on Dyadic Interaction in Natural History Museum</b>                      * Dr. Sun Kyung Lee, Dr. Chan-Jong Kim (Seoul National University, Korea)</p> <p><b>[301] Scientific Units Found in School Textbooks and Everyday Life</b>                      *Mr. Changmin Han, Prof. Jinwoong Song (Seoul National University, Korea)</p>	<p><b>[184] Infrastructure of Scientific and Technological Knowledge Flows in Society: Polish Experiences, 1989-2004</b>                      *Dr. Andrzej Jasinski (Warsaw University, Poland)</p> <p><b>[36] The Impact of Tissue Engineering on the High-tech Society</b>                      *Mr. Henry Ko, Mr. Cive McFarland (University of New South Wales, Australia), Mr. Dron Catts (University of Western Australia, Australia)</p> <p><b>[183] Ethical Consideration of Neuroscience: Neuroethics and Its Perspective</b>                      *Ms. Tamami Fukushi (Japan Science and Technology Agency (JST), Japan), Dr. Osamu Sakura (University of Tokyo, Japan)</p> <p><b>[201] Media Coverage of Emerging Technologies : Lessons from the Coverage of Biotechnology and Nanotechnology</b>                      *Prof. Bruce Lewenstein (Cornell University, United States), Mr. Jason Gerst (Rensselaer Polytechnic Institute, United States)</p> <p><b>[203] Before and After Science : Science and Technology in POP Music : 1970-1990</b>                      *Prof. Massimiano Bucchi (Universita di Trento, Italy)</p> <p><b>[205] Development of Learners Participatory Interactive Virtual Botanical Garden: Supporting Collaboration between Scientists and Learners with Mobile Phones</b>                      *Dr. Makiko Takenaka (Oita University, Japan), Prof. Shigenori Inagaki, Prof. Yoshiaki Takeda, Mr. Masahiko Ohkubo (Kobe University, Japan)</p> <p><b>[339] Estimation of Design Wave Height and Coastal Defense : Consideration of Global Climate Change</b>                      *Dr. Dong-Young Lee, Mr. Ki-Cheon Jun (Korea Ocean Research and Development Institute, Korea)</p>	<p><b>[110] Research on New Methods and Languages for Public Communication for Public Communication of Astrophysics at the INAF National Institute</b>                      *Dr. Caterina Boccato, Dr. Luca Nobili, Dr. Elena Lazzaretto, Mr. Marco Malaspina (National Institute for Astrophysics - INAF, Italy)</p> <p><b>[432] What Makes a Story as Interesting Way to Communicate Science</b>                      *Dr. Aquiles Negrete (ITESM, Mexico)</p> <p><b>[117] Textual Analysis of a Science Center : Expressive Modes and Positioning Implications</b>                      *Dr. Kostas Dimopoulos (Hellenic Open University, Greece), Prof. Vasilis Kouladis (University of Peloponnese, Greece)</p> <p><b>[184] Activity Trends of Communicating with Nature in National Science Museum of Korea: A Korean Case Study</b>                      *Dr. Dong Hee Kims, Dr. Seang Lak An, Dr. Jeong Gu Lee (National Science Museum Planning Office, Korea)</p> <p><b>[284] Science Communication for Adults and Community through Examples of Japanese Science Related Museums</b>                      *Dr. Maki Shimizu, Mr. Kan Imai (National Institute of Science Technology &amp; Policy, Japan)</p> <p><b>[361] The Development of the Exhibition Themes and the Display Technique about the Cutting Edge Science and Technology</b>                      *Mr. Goansu Jeon, Dr. Chung Taek Park, Dr. Jae Hyup Oh, Mr. Hyunsoo Tahk (National Science Museum, Korea)</p> <p><b>[121] Interactive Communications with Specific Target Groups. Examples Concerning Education Policy, and Socio-Economic Policy in Large Cities in The Netherlands</b>                      *Mr. Alfred Wald (Netherlands Organisation for Scientific Research, Netherlands)</p>

# Parallel Sessions

## » Session V Friday, May 19, 10:30-12:30

Informed Citizen III (FA 1)	Scientific Contribution & Communication to Global Problem Solving III (FA 2)	PCST in the World and in Asia III (FA 3)
<b>Room 101</b> <b>Chair : Prof. Massimiano Bucchi</b>	<b>Room 102</b> <b>Chair : Ms. Jenni Metcalfe</b>	<b>Room 103</b> <b>Chair : Dr. Sook-Kyoung Cho</b>
<p>[211] <b>"Information Transfer", "Translation" or What? A Constructivist to the Theory of Science Communication Presented at the 9th International Conference on Public Communication of Science and Technology</b>  *Prof. Hans Peter Peters, Ms. Arlene Jung (Research Center Juelich, Germany)</p> <p>[216] <b>The Use of Fiction for Presenting Science to the Public</b>  * Prof. Baudouin Jurdant, Dr. Elsa Poupardin (University Paris 7 - Denis Diderot, France)</p> <p>[225] <b>The Understanding and the Attitude of the Korean People for the Science and Technology</b>  *Prof. Hyeonjin Cho (Korea Science Foundation/Inha University, Korea)</p> <p>[243] <b>Social Decision Making Process for Siting of Nuclear Power Plants in Japan - Case Studies on Maki-machi and Hokkaido -</b>  *Mr. Kohta Juraku, Mr. Yuichiro Okawa, Prof. Osamu Sakura (University of Tokyo, Japan), Dr. Tatsujiro Suzuki (Central Research Institute of Electric Power Industry, Japan)</p> <p>[249] <b>An Analytical Panorama of the Functions of Psychiatry Communication</b>  *Ms. Anne-Laurence Margerand (Jean-Moulin Lyon III University, France)</p> <p>[274] <b>Promoting Dialogue around Developments in Stem Cell Research</b>  *Dr. Ana Coutinho, Dr. Clare Blackburn, Dr. Sarah Parry (University of Edinburgh, United Kingdom), Ms. Kate Doherty (European Consortium for Stem Cell Research (Eurostencell), United Kingdom)</p> <p>[275] <b>A New Center for Public Learning and Understanding of Science(CPLUS) in Sweden</b>  *Dr. Ilan Chabay (Göteborg University &amp; Chalmers University of Technology, Sweden)</p> <p>[458] <b>Analysis of the 'Informed Consent' as a Merging Point between the Network of Medical Scientists and the Network of Lay Patients</b>  *Mr. Juno Seok Lee (Seoul National University, Korea)</p>	<p>[326] <b>Science Communications as a Means of Preventing Infectious Diseases : Community Selection and Development of the Communication Program</b>  *Dr. Laura Vargas-Parada (Universidad Nacional Autónoma de México, Mexico)</p> <p>[359] <b>Development of the Index of Effective Safety in Nuclear Domain of Korea</b>  *Mr. Yun Hyung Chung (Korea Institute of Nuclear Safety, Korea), Prof. Incheol Choi (Seoul National University, Korea), Dr. Beom Jun Kim (Yonsei University, Korea)</p> <p>[411] <b>Working Collaboratively : The Case for the Humanities, Arts and Social Sciences to Work with Science</b>  *Dr. Toss Gascoigne (Council for the Humanities, Arts and Social Sciences (CHASS), Australia)</p> <p>[477] <b>Food Intake and Bio-physiological Indicators among Korean Rural Adults</b>  *Ms. Yun Kyung Kim (Chonnam National University, Korea)</p> <p>[651] <b>On the Special Science Class Program of Science and Culture City, Changwon</b>  *Prof. Gyoung Soo Woo (Changwon National University, Korea)</p> <p>[686] <b>Who Were Science Communicators in Hwang's Scandal?</b>  *Mr. Keun Young Lee (Hankyong Newspaper, Korea)</p> <p>[762] <b>The Korean Type Large-Scale Astrofest</b>  Dr. Youngsook Ahn (Korea Academy and Space Science, Korea), *Mr. Han Bae Yoon, Mr. Seo Gu Lee, Mr. Dong Joo Lee (Korea Astronomy and Space Science, Korea)</p>	<p>[281] <b>Practical Use of Expertise by Ordinary Citizens</b>  *Dr. Akifumi Ueda (Citizen Science Initiative Japan, Japan)</p> <p>[292] <b>The Important Role of Corporation Science Popularization in Fostering Corporate Culture</b>  *Ms. Qi Zhong, Prof. Hongye Zhang (China Research Institute for Science Popularization, China)</p> <p>[304] <b>Beautiful Guides - The Role of Professional Explainers and Young Scientists in Science and Society Dialogue</b>  *Ms. Paola Rodari, Mr. Matteo Merzagora, Ms. Federica Manzoli, Ms. Francesca Conti (SISSA, Italy)</p> <p>[315] <b>Science Communication in South Asia : Challenges and Prospects</b>  *Dr. Mansi Pataitriya (National Council for Science &amp; Technology Communication, India)</p> <p>[329] <b>Communicating Science and Technology in Brazil : Recent Actions and Attempts for Establishing a National Program</b>  *Dr. Ildu Moreira (Federal University of Rio de Janeiro, Brazil)</p> <p>[347] <b>Innovations for Sustainable Development: The Need for Knowledge Sharing</b>  *Dr. Margolain Zeekhorst, Dr. Jacqueline Broerse, Prof. Joske Bunders (Vrije Universiteit, Netherlands)</p> <p>[450] <b>The 'European Research Area' as a Challenge to Science Communication</b>  *Dr. Michel Claessens (European Commission, Belgium)</p>

» **Session V** Friday, May 19, 10:30–12:30

Dialogue between Tradition and Science II (FA 4)	Societal & Educational System in Diverse Culture III (FA 5)
<p><b>Room 104</b>  <b>Chair: Prof. Bernard Schiele</b></p>	<p><b>Room 105</b>  <b>Chair: Prof. Brian Trench</b></p>
<p>[190] <b>Collaborative Research with Mainland China: The Top Priority of External Impacts of Hong Kong's Scientific Contribution and Communication During 1994-2003</b>                      *Mr. Yinian Gu (CESU, China)</p> <p>[244] <b>Using Traditional Knowledge with Science: A "PARDYP" Network Experiences for Community Development</b>                      *Dr. Sudhir Singh Bhatti (G. B. Pant Institute of Himalayan Environment &amp; Development, India)</p> <p>[256] <b>Two Puzzles of Late Developer Countries Entering Globalization of Science - The Case of China</b>                      *Prof. Guoping Zeng, Ms. Xiaojin Yan (Tsinghua University, China)</p> <p>[323] <b>The Dark Side of the Universe: Fostering the Dialogue Between Ancient Andean Cosmology and the Alma Project</b>                      * Dr. Gonzalo Argandoña, Mr. Cristóbal Tello (ESO(European Organisation for Astronomical Research in the Southern Hemisphere), Chile)</p> <p>[422] <b>When Traditional Culture Meets Modern Science and Technology</b>                      *Mr. Yuji Wada, Mr. Tohru Ishizuka, Mr. Atsushi Ozawa (Institute for Future Technology (IFTECH), Japan)</p> <p>[752] <b>Body Mass Index and Self-perceived Body Weight among Korean Rural Adolescents</b>                      *Prof. Young Hee Kim (Woosuk University, Korea), Prof. Nam Sook Seo (Dangshin University, Korea), Prof. Hae Young Kang (Chonnam National Univ. CRINS, Korea)</p> <p>[648] <b>Plan for Management and Growth of Gwangju Regional Science Center</b>                      *Prof. Sunah Kim, Dr. Sang Hee Kim (Chosun University, Korea)</p>	<p>[83] <b>The Picture Library - Building the First Bridge between Science and the General Public</b>                      *Mr. Gary Evans (Science Photo Library, United Kingdom)</p> <p>[58] <b>Using Hybrid Learning Model to Enhance Public's Scientific Literacy</b>                      *Mr. Mun Fie Tsoi, Dr. Ngoh Khang Boh, Dr. Lian Sai Chia (National Institute of Education, Nanyang Technological University, Singapore)</p> <p>[115] <b>Raising Public Awareness about Science and Technology: Formal and Informal Education Programs</b>                      *Prof. Vasilis Koulaïdis, Dr. Konstantinos Dimopoulos (University of Peloponnese, Greece)</p> <p>[317] <b>Communication in Science Centers as seen through 'Context Diagram of Learning Experience(CoDiLE)'</b>                      * Ms. Oksu Hong (Donga Science, Korea), Prof. Jinwoong Song (Seoul National University, Korea)</p> <p>[452] <b>The Formation and Implications of Scientific Discourse among Students in learning Science: A Case of Extracurricular Science Club Activity</b>                      *Ms. Eunsun Ha, Dr. Jinwoong Song (Seoul National University, Korea)</p> <p>[578] <b>Science on Stage - Towards a Rejuvenated Science Teaching in Europe</b>                      *Mr. Claus Madsen (ESG, Germany)</p> <p>[682] <b>Communicating Science and Technology in the Making: A Case Study of "Mania Contest"</b>                      *Dr. SungWun Hwang, Prof. Bookkeek Hwang, Prof. Jung Hoon Choi (Hanyang University, Korea)</p> <p>[321] <b>What Made Korean Students Score High in the International Comparison Studies?</b>                      *Prof. Bong Woo Lee (Dankook University, Korea), Mr. Jong Oh Hyun (Korea Science Teachers Association, Korea), Dr. Juneu Hong (Hansung Science Highschool, Korea), Dr. Hae-ae Seo (Korean Educational Development Institute, Korea)</p>

# Parallel Sessions

## » Session VI Friday, May 19, 14:00-16:00

Indicators of Public Engagement with S&T B (Session organized by Prof. Martin Bauer) (FC 1)	Science in Massmedia (FC 2)	Societal & Educational Systems in Diverse Culture IV (FC 3)	Informed Citizen IV (FC 5)
<b>Room 101</b> Chair: Dr. Martin Bauer	<b>Room 102</b> Chair: Ms. Marina Joubert	<b>Room 103</b> Chair: Prof. Wulfried Goepfert	<b>Room 105</b> Chair: Dr. Manoj Patraiyah
<p>[295] <b>A Functional Analysis of Editorial Frames on Science Issues</b> Mr. Seung Ho Cho, *Mr. Kyun Soo Kim (University of Alabama, United States), Mr. Jimmyng Choi (Catholic University of Daegu, Korea)</p> <p>[336] <b>Learning Science in the Dark: Accessibility and Inclusivity of Exhibits in Science Centers to Young Visitors Who Are Blind or Vision Impaired</b> *Mr. Miguel Cano (St. Stephen, Philippines)</p> <p>[414] <b>Towards Post-Industrial Public Engagement with Science: Revisiting a 10-year Hypotheses for Europe 2005</b> *Dr. Martin W. Bauer (London School of Economics and Political Science, United Kingdom)</p> <p>[418] <b>Public Understanding of Science and Technology: Results from First India Science Report</b> *Dr. Rajesh Shukla (National Council of Applied Economic Research, India)</p> <p>[435] <b>New Tools and Directions toward a Better Understanding of Social Perception of Science in Ibero-American Countries</b> *Mr. Carmelo Polino, Ms. Maria Eugenia Fazio (Centro REDES / Red Iberoamericana De Indicadores De Ciencia y Tecnologia/RICYT), Argentina), Dr. Jose Antonio Lopez Cerezo (Universidad de Gviedo, Argentina)</p> <p>[474] <b>Proposing a New Indicator of Public Engagement with Science: PEP/IS</b> *Prof. Hak-Soo Kim, Ms. Hye-Jung Moon, Ms. Seong-Wan Han (Sogang University, Korea)</p> <p>[576] <b>Age, Generational, and Educational Effects on Basic U.S. Adult Civic Science Literacy</b> *Dr. Susan Carol Losh (Florida State University, United States)</p>	<p>[78] <b>Science Journalism in Latin America: How Scientific Information from a Scientific Primary Source is Accommodated in a Journalistic Story</b> *Dr. Luisa Massarani, Ms. Fernanda Veneu, Mr. Luis Henrique Amstutz (Oswaldo Cruz Institute, Oswaldo Cruz Foundation, Brazil)</p> <p>[92] <b>Analysing the Production of UK Newspaper Coverage: The Case Evolution/Creationism</b> *Mr. Joachim Allgeier (The Open University, United Kingdom)</p> <p>[103] <b>Constructing Stereotypes Concerning Gender and Health in the Mass Media</b> Ms. Nuria Perez, *Ms. Gemma Revuelta (Universitat Pompeu Fabra, Spain)</p> <p>[109] <b>EVE'S SONS: The Debate on Human Cloning in the Italian Press after Raelians' Announcement</b> *Prof. Federico Neresini (University of Padova, Italy)</p> <p>[113] <b>Biotech, Public Opinion and the Press: Frankenstein's Copycat Soldiers at War?</b> *Mr. Dimitri Schuurman, Mr. Pieter A. Maessela, Dr. Hans Verstraeten (University of Ghent, Belgium)</p> <p>[162] <b>The Mediability of Genomes - A Story from the "Book of Life"</b> *Ms. Simone Roedder (University of Bielefeld, Germany)</p> <p>[272] <b>A Tale of Two Missions: UK Newspaper Reporting of the Beagle 2 and Cassini/Huygens Space Missions</b> *Prof. Steve Miller, Ms. Asha Khehar (University College London, United Kingdom), Dr. Jergovic Blanka (University of Zagreb, Croatia)</p> <p>[669] <b>Making Science Newspaper in Biology Class - Case Study on an Activity - based Biology Class</b> *Dr. Junezy Hong (Biology Lab, Korea)</p> <p>[370] <b>Stem Cell Scandal Portrayals in South Korean Major Newspapers: A Qualitative and Quantitative Analysis</b> *Ms. Veronika Kusuma Wijayanti (Universitas Atma Jaya Yogyakarta, Indonesia), Ms. Donita Shahab, Mr. Benedictus Prabowo (Korea Institute of Science and Technology, Korea)</p>	<p>[300] <b>The Leading Part of the Scientific Knowledge in the Formation of the Pre-Schools Teachers and the Educators</b> *Prof. Marie-Chantal Schmitz (HEB (Pole Universitaire Europeen Wallonie-Bruxelles - Haute Ecole de Bruxelles), Belgium)</p> <p>[333] <b>Science Communication in University Education: Its Significance and Difficulties in Japanese Society</b> Mr. Sho Kamaga (Osaka University, Japan)</p> <p>[348] <b>Comparison of Communication Patterns in Science Classes between Korea and USA</b> *Prof. Mi Saeng Lee (Korea Science Foundation, Korea)</p> <p>[412] <b>Role of Regional Private Science and Technology Promotion Organizations - Centering around the Activities of the Federation of Busan and Technology</b> *Mr. Dong-Woon Sohn (Federation of Busan Science and Technology, Kookje Daily News, Korea), Mr. Ki-Sung Yang, Dr. Eun-Joo Lee (Federation of Busan Science and Technology (FOBST), Korea), Dr. Seok-Hee Lee (Busan National University of Education, Korea)</p> <p>[562] <b>Operation and Prospect of "Women's Science Class in Daily Life" at Pohang</b> Prof. Mi-Ji Kim, Prof. Gyeong Soon Im (POSTECH, Korea)</p> <p>[654] <b>Science Dream Tree Project</b> *Prof. Haeng Soon Park, Prof. Hyun-Jin Choi (Chonnam National University, Korea), Dr. Yoon Kyung Park, Prof. Jeong-A Yu (Chosun University, Korea)</p> <p>[676] <b>The Role of Local Autonomous Entities in Developing the Science Culture</b> *Mr. Chung Chin, Mr. Jong Yeon Choi (Yeongdeungpo-gu Office, Korea)</p>	<p>[279] <b>The Opportunity of Scientific Argumentation in the Classroom: Claim-evidence Approach</b> *Dr. Young-Shin Park, Prof. Chan-Jong Kim (Seoul National University, Korea)</p> <p>[320] <b>Science Communication VS. Science Journalism - How Do the News Media Best Contribute to Scientific Literacy</b> *Mr. Morten Jastrup (Politiken Newspaper, Denmark)</p> <p>[322] <b>Media and Scientific Citizenship: Exploring Media Effects on Feelings of Efficacy for Science Related Issues</b> * Prof. Bruce Lewenstein, Dr. Dominique Brossard (University of Wisconsin-Madison, United States)</p> <p>[340] <b>Effects of Mass Media in Science Communication</b> * Prof. Sung Kyum Cho, Ms. Eun Hee Cho, (Changnam University, Korea)</p> <p>[356] <b>Television: Why is the Old Medium Still Important for Science Communication?</b> *Dr. Gees Koolstra, Mr. Mark Bos (Vrije Universiteit Amsterdam, Netherlands)</p> <p>[358] <b>ESCITY: the European Science and the City Network</b> *Ms. Gemma Revuelta (Barcelona City Council, Spain)</p> <p>[424] <b>A Two Sided Communication Approach for Science and Technology Policy Research: The Case Biotechnology Food in The Netherlands</b> *Prof. Joske Bunders, Prof. Tjard De Cock Buning (Vrije Universiteit, Netherlands)</p> <p>[428] <b>Making Playful Learning Visible: Empowering Parents as Researchers</b> *Prof. James Michael Bradburne, Ms. Siobhan Thomas (Institute of Education, United Kingdom)</p>

## » Session I Wednesday, May 17, 13:00-14:00

### Poster Session I (WA7)

#### Grand Ballroom Lobby

**[68] Framing of Science News : A Study on the Patterns of News Coverage of Biotechnological Issues**

\*Dr. Sang Hee Kwon (SangKyunKwan University, Korea)

**[89] Research on Science Communication? Theory and Practice, The Swedish Case**

\*Prof. Thomas Tyden (Dalarna Research Institute and University of Drebro, Sweden)

**[133] Science, Media and the Public Sphere: a Media Sociological Perspective**

\*Prof. Hans Verstraeten (Ghent University, Belgium)

**[153] Young Investigator Award - No Jargon Science Excellence**

\*Dr. Edna Bates (Children, Youth and Women, Australia)

**[164] It Influences of Mass Media in the Concept of Biotechnology Shown by the Teachers of the City of Melilla**

\*Dr. Carmen Enriquez, Dr. Jose Manuel Cabo (Universidad de Granada, Spain), Prof. Jose Ramon Cortinas (Universidad Granada, Spain)

**[226] The Future View of Science Education in Japan - Workshop Focused on Science Communication for the Association of Promoting the Science Education for the 21st Century (APSE21)**

\*Ms. Kaoru Kimura (Japan Science Foundation, Japan), Dr. Yoko Uchio, Dr. Yoshikazu Ogawa (National Science Museum, Japan)

**[232] A Unique Platform for Communication of Science Culture - The Museum**

\*Ms. Jing Yang, Dr. Min Tang, Dr. Miao Jin, Dr. Xiaoli Liu (Beijing Museum of Natural History, China)

**[261] Designing Science Communication Processes : Bridging the Gap between Theory and Practice by a Communication Spectrum**

\*Mr. Maarten Van der Sanden, Ms. Caroline Wehrmann (Delft University of Technology, Netherlands)

**[283] The Types of Physical Environments for Fostering Creativity at Natural History Museums**

\*Dr. Ji-Eun Choi, Prof. Chan-Jong Kim (Seoul National University, Korea)

**[335] Introduction to the 4 Digital Universe Project**

\*Mr. Hitoshi Miura (Musashino Art University, Japan)

**[346] The Informed Citizen\* - How to Get the Public Interested and Involved - A New Mechanism**

\*Dr. Camilla Moderer, Ms. Dissi Askwall (Vetenskap&Allmanhet (Public&Science), Sweden)

**[357] A New Framework for Research on Interactive Communication**

\*Mr. Mark Bos, Dr. Gees Koolstra (Vrije Universiteit, Netherlands)

**[186] Proposals for Interactive Communication Based on the Historical Analysis of Japanese Genome Science Community**

\* Ms. Machiko Itoh, Dr. Kazuto Kato (Kyoto University, Japan), Dr. Masanori Arita (Tokyo University, Japan), Dr. Terutaka Kuwahara (National Institute of Science and Technology Policy, Japan)

**[237] Opinions of Life Scientists on Science Communication in Japan**

\*Ms. Jin Higashijima, Dr. Kazuto Kato (Kyoto University, Japan)

**[242] A New Model for Effective Communication of Science: Audio-visual Presentation of the Latest Life Science Topics at Planetariums**

\* Ms. Emiko Ide, Dr. Kazuto Kato (Kyoto University, Japan), Mr. Nachina Takanashi (Tokyo University, Japan)

**[266] Patterns and Linkages of Scientific Contribution and Communication to Knowledge Discovery and Data Mining**

\* Mr. Yinian Gu (CESU, China)

**[294] Outreach Activities for School Education by Science Museum**

Ms. Hiromi Yamamoto, \*Dr. Naoko Yamashina, Ms. Sachi Ito, Dr. Noyori Mima (National Museum of Emerging Science and Innovation, Japan)

**[591] Development of Science and Culture through Dinosaur Research in Korea**

\*Dr. Yeong-Nam Lee (Korea Institute of Geoscience and Mineral Resources, Korea)

**[685] KIGAM's Experience towards the Public: "Guidebook of Geological Tour in Jeju Island"**

\*Dr. Ki Hwa Park, Prof. Joo Sung Ahn, Dr. Byong Woo Yum (Korea Institute of Geoscience and Mineral Resources (KIGAM), Korea)

**[107] Communication of Scientific and Technological Knowledge in Pupils' Games Outside Class - New Playing of Traditional Games in Old Kunming**

Ms. Dan Wang (Jiang'an Primary School, China), Ms. Zhi Hong Shi (Wuhua District Association of Science & Technology of Kunming, China), Jiang-Hong Chen (National Science Library, Chinese Academy of Sciences)

# Poster Sessions

## Session II Thursday, May 18, 13:00-14:00

### Poster Session II (TE7)

#### Grand Ballroom Lobby

**[100] The Two Cultures and the Real World**

\*Prof. Lui Lam (San Jose State University, United States)

**[105] Nurturing the Scientific Leaders of Tomorrow: Engaging the Youth of Today**

\*Ms. Jean Chung-Ching Hsu, Mr. Henry Ko (University of NSW, Australia) Mr. Hamish Hawthorn (ATP Innovations, Australia)

**[277] Finding a Needle in a Haystack: Facilitating Web-based Searches for Educational Resources**

\*Dr. Ian Chabay (The New Curiosity Shop, Inc., United States), Mr. Tom Bowman (Bowman Design Group, United States), Mr. John Prusinski (S2N Media, Inc., United States), Dr. Parvin Kassaie (NASA/JPL, United States)

**[297] Interactive Events Related to the Latest Research Achievements : For Closing the Gap between Science Advancements and the Public**

\*Mr. Fuji Nagami (Japan Science and Technology Agency (JST)/ National Museum of Emerging Science and Innovation (Mirai), Japan)

**[332] Art about Science : An Innovative Use of Art and Technology for Science Education**

\*Prof. Adrienne Klein (Graduate Center of the City University of New York, United States), Prof. J. Douglas Klein (Union College, United States)

**[652] Women's Network for Science & Engineering in Gwangju-Jeonnam**

Prof. Haeng Soon Park, Prof. Jai Gi Kim (Chonnam National University, Korea), Prof. Sook Young Lee (Dongshin University, Korea), \*Prof. Hyun Ei Oh (Chosun University, Korea)

**[674] Science Education Focused on Experience through YSC (Young Science Club)**

\*Mr. Ho Keun Chung (Posang Highschool, Korea)

**[677] Inquiry Project to Departments of Science and Engineering of Universities for Elementary, Middle and High School Students in Daegu Metropolitan City**

Prof. Mae Ja Park, Ms. Sungim Park, Prof. Won Jung Lee (The Association of Daegu-Gyeongbuk Women in Science and Engineering, Korea)

**[683] Diffusion of Science through Community Science Class in Daegu and Gyeongbuk in Korea**

\*Prof. Sang Hee Cho (Catholic Univ. of Daegu, Korea), Prof. Won Jung Lee (Kyungbuk National University, Korea)

**[97] Comparison of Hepatitis B Reporting from China and America**

Ms. Fei Zhao, \*Prof. Xiguang Li (Tsinghua University, China)

**[118] Developing Public Awareness of Science in Indonesia**

\*Ms. Dyah Ratna Permatasari (Docto Rabbit, Fun Learning through Experiments, Indonesia)

**[173] Communicating Science and Technology in Romanian Schools - The "Hands-on Science" Project**

\*Mr. Radu Sporea (Politehnica University, Romania) Dr. Dan Sporea (National Institute for Laser, Plasma and Radiation Physics, Romania)

**[176] Science Media Focus? With a Touch of Thai Culture**

\*Ms. Sasithorn Teth-uthapak (National Science and Technology Development Agency, Thailand)

**[193] A Development Process to Promote Educational Activities under Collaborative Relationship in Local Community : A Case Study of Nishinomiya in Japan**

\*Ms. Shiho Miyake, Prof. Shigenori Inagaki, Dr. Tomoyuki Nogami (Kobe University, Japan), Ms. Yuki Namba (IBM Japan, Japan)

**[233] A New Communication Model for Popularization of Science Today: Concerning the Scientist Role Changes**

\*Prof. Xian-min Zhu (Institute of Policy and Management, China)

**[314] Scientists and Technologists of North Korea Rushed into the Public : The Roles of Scientists and Technologies as the On-site Research program was Launched**

\*Mr. Ho-Je Kang (Seoul National University, Korea)

**[680] A Reconsidering of Communication Looking through the Interaction between Science and Art**

\*Mr. Dohyun Choi (Sogang University, Korea)

**[194] A Training Program for Science Communicators in Collaboration with Universities and Museums**

\*Dr. Yoshikazu Ogawa, Dr. Osamu Kamei, Dr. Maki Shimizu (National Science Museum, Japan)

**[321] Some Characteristics of Public Communication of Science and Technology in China**

\* Dr. Lin Yin (China Research Institute for Science Popularization, China)

**[761] The History and the Present Status of Korean Amateur Astronomical Groups**

\* Dr. Seo Gu Lee, Mr. Han Bae Yoon, Mr. Kyoung Suk Lee (Korea Astronomy and Space Science Institute, Korea)

## → Session III Friday, May 19, 13:00-14:00

### Poster Session III (FB7)

#### Grand Ballroom Lobby

**[115] Global Warming between Science and Fiction**

\*Dr. Tiziana Lanzi (Istituto Nazionale di Geofisica e Vulcanologia, Italy)

**[138] Scientific Culture - A Challenge for Development**

\* Prof. Shamima K. Choudhury (Dhaka University, Bangladesh), Prof. Naiyyum Choudhury (BRAC University, Bangladesh)

**[271] The Gap between Sexworkers' Needs and Information Provided by Medical Specialists on HIV/STD Prevention in Japan**

\*Dr. Nozomi Mizushima, Mr. Kohra Juraku, Dr. Osamu Sakura (University of Tokyo, Japan)

**[299] Present Situation and the Future : Analysis of China's Science Newspapers**

\*Mr. Guangiang Pei (Tsinghua University, China)

**[648] Comparative Analysis of Science Knowledge and Attitudes : -from the Science Culture Point of View**

Mr. Jong Hyun Yun (Korea Science Foundation, Korea)

**[650] Importance of Scientific Communication and the Role of the Press (Scientific Broadcasting in Center)**

\*Mr. Seong Hwan Lim (Korea Science Foundation, Korea)

**[89] TV Science Programs in Transitional Period in China - A Case Study : "Scientific Chinese" of CCTV at the Crossroads**

\*Ms. Jiao Li, Prof. Daguang Li (Graduate University of Chinese Academy of Sciences, China)

**[93] Chintamani Ragoonathachary and Secularisation of Time during the Late Nineteenth Century Madras Presidency**

\* Dr. Tv Venkateswaran (Vigyan Prasar, India)

**[157] The Medical/Scientific Imagination of Psychiatric Patients in their Accounts of Mental Illness**

Mr. Nico Fibrelli, \*Dr. Vincenza Pellegrino (SISSA - International School for Advanced Studies, Italy)

**[263] The Debate about "Reverence for Nature" in 2005 and It's Meanings for Public Understanding of Science in China**

\*Prof. Bing Liu (Tsinghua University, China)

**[679] The Theory on the Structure of Tao and the Way of Learning**

Dr. Jong Yeol Kim (Korea Institute of Oriental Medicine, Korea)

**[151] A Successful Canadian Initiative Linking Water Science to Policy & Related Work on Practical Linkage Mechanisms, Focusing on the Needs of Policy Analysts and Decision-Makers**

\*Dr. Alex Bielak, Mr. Karl Schaefer, Mr. Shealagh Pope (Environment Canada, Canada)

**[234] How to Design Science Communication via WWW? : Interaction between Virtual and Real Community**

\*Ms. Uematsu Yoshiko (University of Tokyo, Japan), Ms. Kusumi Harumi (National Museum of Emerging Science and Innovation, Japan), Prof. Wakita Akira (Keio University, Japan), Prof. Funakata Masahiko (International Academy of Media Arts and Sciences, Japan)

**[626] What and How to Pay in Seoul City Bus? - From Annyang to T - Money**

\*Mr. Jong Min Lee (Center for Democracy in Science and Technology, Korea)

**[306] An Analysis of Secondary School Teachers' Professionalism for Teaching Environmental Subjects**

\*Prof. Yeon-A Son, Prof. Byeong-Mee Min (Dankook University, Korea), Dr. Soojung Myeong (State University of New York, United States), Prof. Don-Hyung Choi (Korea National University of Education, Korea)

**[312] Self-directed Learning through Mobile Learning in Secondary Science Education**

\*Dr. Jeong-Hee Seo (KERIS, Korea), Mr. Jong-Heun Kim (DanSan Girls' High School, Korea)

**[300] A Comparison Study on Illustrations of Elementary Science Textbooks in Korea and USA**

Dr. Sang-Ihn Yoo, \*Dr. HeeJun Lim (Gyeongin National University of Education, Korea), Mr. Chang-Sik Park (Songjo Elementary School, Korea), Dr. Shinha Jang (Seoul National University of Education, Korea)

**[713] Interplay of Gesture and Speech in Science Exploration**

\*Prof. Jae Young Han (Chungbuk National University, Korea), Prof. Jung Hoon Choi (Hanyang University, Korea)

**[542] The Scientific Culture Propagation for the Public : A Case Study on KIGAM Geological Museum and its Mineral Exhibition**

\*Mr. Seok-Ki Kwon (Korea Institute of Geoscience & Mineral Resources (KIGAM), Korea)

**[675] Science Museums for Adults: To Make PCST More Serious**

\*Ms. So Yeon Loom (Seoul National University, Korea)

**[678] Development of Instruction-Learning Materials for the Field Experience Activity at Electricity Museum**

\*Ms. Kyung An Oh (Doksan Highschool, Korea), Prof. Sung Won Kim (Ewha Womans University, Korea)

**[342] Science on TV : Assessing Effects of Different Mediation Processes**

\*Prof. Jose Arevedo, Dr. Ana Couto (Porto, Portugal), Prof. Luisa Aires (Open University, Portugal)

**[670] Analysis of Students' Understanding of Digestive Organs through Students Centered Classes**

\*Dr. Juneuy Hong (Hansung Science Highschool, Korea)

# Joint Sessions

## » Joint Sessions

<b>Interfaces between Sciences and the Korean Society (WE6)</b> <i>Organized by KHSS</i>	<b>Science Education as Communication (TAZ)</b> <i>Organized by KARSE</i>	<b>Bioethics and Journalism (FA6)</b> <i>Organized by Korean National Commission for UNESCO</i>	<b>Science Communication and Women (FC4)</b> <i>Organized by KDFWST</i>
<b>Wednesday, May 17 14:00-16:00</b> <b>Room 203</b>	<b>Thursday, May 18 10:30-12:30</b> <b>Room 102</b>	<b>Friday, May 19 10:30-12:30</b> <b>Room 203</b>	<b>Friday, May 19 14:00-16:00</b> <b>Room 104</b>
Chair : Mr. Ki-Yun Kim, Chair of The Korean History of Science Society	Chair : Prof. Wha-Kuk Lee, Korea Cyber University	Chair : Prof. Young-Sik Kim, Seoul National University	Chair : Prof. Kyung-Suk Cho, Ewha Woman's University / Prof. Ju-Young Kim, Catholic University of Daegu
<p>[475] <b>Approaching for Korean History of Science at Elementary Education in Korea</b>            *Dr. Myon U Lee (Chuncheon Nat'l Univ. of Education)</p> <p>[587] <b>Einstein and Theory of Relativity in Korea during the 1920's</b>            *Prof. Zae-young Ghim (Seoul National University, Korea)</p> <p>[635] <b>Innovating Farming, Against Farmers : The Government's Initiative in the "Green Revolution" in South Korea, 1964-1980</b>            *Mr. Tae-Ho Kim (Seoul National University, Korea)</p> <p>[690] <b>Genealogy of the Korean Nationalism in Science and Technology</b>            *Dr. Jin Hee Park (Kookmin University, Korea)</p> <p>[891] <b>Science in Public : Theoretical Trends and the Korean Case</b>            *Dr. Sungsoo Song (Science and Technology Policy Institute, Korea)</p> <p>[913] <b>Value-neutrality and Objectivity of Science during the Colonial Choson Period</b>            *Prof. Sungook Hong (Seoul National University, Korea)</p> <p>[922] <b>Scientific Research as Value-laden Activity : the Case of NT Stem-Cell Research in Korea</b>            *Prof. Sang Wook Yi (Hanyang University, Korea)</p> <p>[1091] <b>Social Construction of "Avoidance of S&amp;T" and the Korean Scientific Community</b>            *Prof. Eun Kyoung Lee (Chonbuk National University, Korea)</p>	<p>[102] <b>Exploring Possibility of Developing Indifferent Group-driven Science Communication Activities and Its Implication to School Science Teaching</b>            *Prof. Masakata Ogawa (Kobe University, Japan)</p> <p>[236] <b>Educationally Meaningful Communication in Natural History Museums</b>            *Prof. Chan-Jong Kim (Seoul National University, Korea)</p> <p>[278] <b>Humanizing Science with Context: Some Context-Rich Approaches to Teaching Physics</b>            *Prof. Jinwoong Song (Seoul National University, Korea)</p> <p>[280] <b>The Nature of Science Drama in Science Education</b>            *Prof. Hye-Gyoung Yoon (Chuncheon National University of Education, Korea)</p> <p>[360] <b>Explaining Evolution in Schools and in Natural History Museums: What is the Role of Natural History Museums in Science Education?</b>            *Prof. Sun-Kyung Lee (Cheongju National University of Education, Korea), Prof. Heui-Baik Kim, Ms. Jung-Nam Song, Ms. Joo-Hye Jung (Seoul National University, Korea)</p>	<p>[879] <b>Bioethics and Media's Responsibility-A Chinese Perspective</b>            *Ms. Lei Xiong (Xinhua News Agency, China)</p> <p>[962] <b>Bioethical Debates on Embryonic Stem Cell Research in Korean Newspapers</b>            Prof. Baeg Dok Jun, Mr. Manjee Kim (Kangnung National University, Korea)</p> <p>[1326] <b>The Stem Cell Controversy and the Role of Scientific Journals and the Media in the Public Communication of Science</b>            *Dr. Edna Einsiedel (University of Calgary, Canada)</p>	<p>[200] <b>Korean Women's Understanding of Science Technology and Their Needs for Science Programs</b>            *Dr. Moo-Suk Min, Dr. In-Sook Yang (Korean Women's Development Institute, Korea)</p> <p>[438] <b>Science Program for Groups of Mothers and their Children</b>            *Prof. Miok Man, Prof. Hui-Sook Lee (Ewha Womans University, Korea)</p> <p>[449] <b>Friendly Education on Mathematics and Science for Girl Students</b>            *Prof. Ju-Young Kim (Catholic University of Daegu, Korea)</p> <p>[433] <b>Networks for Women in Science and Technology in Korea</b>            *Prof. Ji-Young Kim (Kyung Hee University, Korea)</p> <p>[436] <b>Busan Campaign for Promotion of Scientific Awareness in Youth</b>            *Prof. Kyung-Ja Ha (Pusan National University, Korea), Dr. Mi-Sook Won (Korea Basic Science Institute, Korea)</p> <p>[434] <b>Management of Regional Science Classes</b>            *Prof. Kyung-Suk Cho, Prof. Mee-Ok Moon, Prof. Hui-Sook Lee (Ewha Womans University, Korea)</p> <p>[620] <b>Fostering the Science Communication to the Public Through the NIS - WIST Science Communicator Training Program</b>            *Dr. Ju-Young Min (WIST, Korea), Prof. Gil-Ja Jhon, Ms. Young-Sook Kim (National Institute for Supporting Women in Science and Technology, Korea), Prof. Hui-Sook Lee (Ewha Womans University, Korea)</p> <p>[437] <b>Being a Science Communicator in the Science Korea Program</b>            Dr. Jung Sook Won (Korean Federation of Women's Science and Technology Associations, Korea)</p> <p>[440] <b>Women and Invention : Infusing Modern Functional Elements into Traditional Korean Diet</b>            *Prof. Young-Keun Lee (Korea Women's Inventors Association, Korea)</p> <p>[624] <b>Nicotine Dependence, Smoking-Related Attitude, Subjective Norm, and Family Support across the Stages of Change for Smoking Cessation among Korean Rural Adult Smokers</b>            *Prof. Nam Sook Seo (Dongshin University, Korea), Prof. Hee Young Kang (Chonnam National Univ. CRINS, Korea), Prof. Hae Young Kang (Chonnam National University, CRINS, Korea)</p>

\* KHSS: The Korean History of Science Society  
 KARSE: Korea Association for Research in Science Education  
 KDFWST: Korean Federation of Women's Science and Technology

## » Special Sessions

From Science to Public Subtitle: The role of Science Journalists in Translating Science Organized by KOSRA*		Risk Governance in Science and Technology Organized by KAST*	
Wednesday, May 17, 18:30-18:30 Room 203		Friday, May 19, 14:00-16:00 Room 203	
Chair: Mr. Ki-Soo Lee, Chair of Korea Science Reporters Association		Chair: Mr. Kyoung-Rae Lee, Research Fellow of Industrial Innovation Team, Science and Technology Policy Institute (STEPI)	
Program		Program	
16:30-16:35	Introduction	14:05-14:35	<b>Won K. Kim</b> , Deputy Director of Institute of Science, Technology & Society, Myongji University <i>The Role of Science and Technology in Risk Governance*</i>
16:35-17:00	<b>Se-Jung Oh</b> , Dean of College of Natural Sciences, Seoul National University <i>Good Science Reporting from the perspective of Scientists</i>	14:35-15:05	<b>Changsoo Kim</b> , Lecturer of Dept. of Preventive Medicine, Yonsei University College of Medicine <i>Risk Assessment and Communication of Dioxin Exposure in Korea*</i>
17:00-17:20	<b>Chang-yong Kim</b> , Professor of School of Communication and Politics, Inje University, Korea <i>A Study on Code of Ethics in Science Journalists</i>	15:05-15:35	<b>Jaeyool Yee</b> , Professor of Dept. of Sociology and Director of Institute for Social Development and Policy Research, Seoul National University <i>Falling to Fall-Safe: The Anatomy of Man-made Disasters in Korea, 1993-2004</i>
17:20-17:30	Break	15:35-15:55	Panel Discussion - <b>Jaeeoo Ha</b> , Director of Integrated Safety Assessment Division, Korea Atomic Energy Research Institute - <b>Kyoshik Park</b> , Head Researcher of Facility R&D Division, Korea Gas Safety Corporation
17:30-18:20	Speakers & Floor Discussion	15:55-16:00	Floor Discussion
18:20-18:30	Wrap-up and Closing Remarks	16:00-16:05	Wrap-up and Closing Remarks

\* KOSRA: Korea Science Reporters Association  
KAST: The Korean Academy of Science and Technology

## Social Program

### ▶ Welcome Dinner



**Wednesday, May 17 19:00~21:00**

#### **Harmony Ballroom, COEX Inter Continental Seoul**

All participants are invited to attend the Welcome Dinner. The participants to PCST-9 will have an opportunity to break the ice and network.

### ▶ Conference Banquet

**Thursday, May 18 16:30~22:30**

#### **Samcheonggak & Chunggyechn**

- The number of participants to the Conference Banquet is limited to 150 people based on a first-come first-served basis.
- Please come to the COEX Lobby at 16:20 to leave at 16:30 punctually.



#### **Samcheonggak**

Established in 1972, Samcheonggak was the place of important government negotiations and dinners in the 1970s and 1980s. Samcheonggak is now rather called as a traditional cultural performance center, as it was designated as a cultural facility in 2000. This place consists of 6 buildings that are designed in a traditional style of Korean Architecture known as 'hanok'. The six buildings are comprised of a performance hall, Korean restaurant, tea house and guest accommodations. Samcheonggak is one of the most famous places in Seoul where one can enjoy traditional performances and fine dining.



#### **Chunggyechn**

Chunggyechn, a man made stream in the middle of city 600 years ago, had been covered for 40 years by the automobile roads. Seoul City government decided to remove the street and express way for restoring the stream and city natural environment in 2003. It has been past 20 months as of May 2005, since the restoration project began on July 2003. The 40-year-hidden sewage stream showed itself by the removal works completed two months ahead of schedule and now we can see the almost-finished restored stream from one side of bank boasting its beautiful scenery.

## ▶ City Tour

**Satur, May 20 09:00–13:00**

### **Changdeok Palace & Insa-dong**

- Conference Banquet registrants only. On a first-come first-served basis, the number of people will be limited up to 80 people.
- Please come to the COEX Lobby at 08:20 to leave at 08:30 punctually.

#### **Changdeok Palace**

Changdeok Palace is the oldest of Seoul's Royal Palaces. It dates from 1405, and is still very well preserved. For the Chosun Dynasty (1392-1910) it served as the main palace for over 300 years. Attached to the palace is the "Secret Garden", a beautiful landscape garden to be used by the Royal Family only. You can find especially imported trees, pavillions, pagodas, stone bridges and ponds. One of the buildings in the palace complex still has the old blue tiles, that once were common in Korea. Now Changdeok Palace is the only place in Seoul where you still can see this.



#### **Insa-dong**

Insa-dong and the surrounding area were the residences of Joseon Dynasty officials. Since then, Insa-dong art and antique district have dozens of art galleries and shops selling art supplies, antiques and handicrafts along one main street and many side alleys. To explore the interesting places on these side alleys, it would be helpful to get a map at one of three Tourism Information Centers that are located at the center and the two ends of the main street.



# Pre-Conference

## » Workshop

- **Main Theme**     *Training Scientists to Communicate with Lay audiences*
- **Dates**             May 20(Sat)~21(Sun), 2006
- **Venue**             Allegro, COEX InterContinental Seoul, Seoul, Korea
- **Organized by**     Korea Science Foundation
- **Program**

Sunday, May 14	
13:00-14:00	Opening Ceremony & Keynote Speech ■ Keynote Speech: Dr. Hans Peter Peters, Research Center Juelich, Germany <i>Natural Disasters and Science Communication</i>
14:00-16:00	<b>Session 1: Public Understanding of Natural Disasters</b> ■ Ms. Inge Niedek, Senior Weather Presenter, ZDF German National Television, Germany <i>Risk Reporting about Natural Disasters: What Do the Media Expect from Science?</i> ■ Prof. Hayashi Haruo, Director of Research Center for Disaster Reduction Systems, Disaster Prevention Research Institute, Kyoto University, Japan <i>The Role of Scientists in the Reporting of Natural Disasters</i> ■ Prof. Hae-Ryang Song, Sungkyunkwan University, Korea <i>Natural Disasters in the Movies</i>
16:00-16:30	Break
16:30-18:30	<b>Session 2: Science Communication Case Studies</b> ■ Mr. Koen Meyers, Advisor for Environmental Sciences, UNESCO Jakarta Office <i>The Tsunami in the Indian Ocean - Education and Recovery Activities</i> ■ Dr. Gerald Galloway, Glenn L. Martin Institute, USA <i>Hurricane Katrina - The Reactions of Related Authorities</i> ■ Dr. Youngsin Chun, Applied Meteorology Research Division, Meteorology Research Institute, Korea <i>Dust and Sandstorms in East Asia - Reporting in the Mass Media</i>
19:00-21:00	Early Birds Dinner
Monday, May 15	
09:00-11:30	<b>Session 3: Risk Management System and Citizenship</b> ■ Mr. Bernd Probst, Head of Coastal Defense Department, Schleswig-Holstein Ministry for Agriculture, Environment and Rural Areas, Germany <i>Risk Management System - A European Case</i> ■ Dr. Dugkeun Park, Senior Analyst of the National Institute for Disaster Prevention, Rep. of Korea <i>Risk Management System - A Korean Case</i> ■ an NGO activist from Korea <i>Citizenship and the Activities of NGOs</i>
11:30-12:30	Plenary Discussion
12:30-19:00	Field Trip • Jeju Biosphere Reserve Site • Lunch
Tuesday, May 15	
09:00-13:30	Field Trip • Jeju City Tour • Lunch

## Workshop

- **Main Theme**     *Training Scientists to Communicate with Lay audiences*
- **Dates**             May 20(Sat)–21(Sun), 2006
- **Venue**              Allegro, COEX InterContinental Seoul, Seoul, Korea
- **Organized by**     Korea Science Foundation
- **Program**

Saturday, May 20		Sunday, May 21	
13:00	Lunch	09:00	Short Plenary Meeting
14:00	Welcome/Workshop Objectives	09:30	Group Discussions & Demonstrations
14:15	Current and Future Challenges for Training Scientists (Steve Miller)	10:30	Morning Tea
14:45	Training Scientists in Developing Countries (Marina Joubert)	11:00	Group Discussions & Demonstrations
15:15	Afternoon Tea	12:30	*Lunch
15:45	Theoretical Considerations (Bruce Lewenstein)	14:00	Group Rapporteurs Present Summary
16:15	Panel Discussion	15:00	Closing Remarks
17:00	Group Discussions	15:30	Afternoon Tea
18:00	*Dinner	16:00	Departure

\*Jupiter, COEX InterContinental Seoul, 30F

### Group Discussion Topics

- Training scientists to engage/have a dialogue with the lay public
- Training scientists to dialogue with target groups (e.g. policy makers and funding bodies)
- Training scientists to communicate risk/manage crisis situations
- Training as a tool for breaking down the barriers between scientists and journalists
- Training scientists through the formal education system
- Evaluating training programs/extending training to other scientists (e.g. websites/booklets on How to?)

## Optional Tours

### » Spouse Programs

Theme Course	Date	Tour Code	Itinerary	Price (KRW) / person
Nature & Beauty	May 17 13:00-17:00	ST1	Hotel - Pass by Blue House - Gyeongbokgung Palace - National Folk Museum - Jogyssa Temple - Ginseng Center - Drop-off at Itaewon Shopping Area / <b>Min2 persons</b>	KRW 30,000
DMZ & 3rd Tunnel	May 17 08:00-17:00	ST2	Hotel - Injngak, register for passing civilian control line - ID check at Unification Bridge - 3rd Infiltration Tunnel and exhibition hall - Dorasan Observatory & Dorasan Station - Unification Village, Memorial Monument, Freedom Bridge - Ginseng Center or Amethysts Center - Drop-off at Itaewon or City Hall / <b>Min2 persons</b> You must keep your passport on tour day !! Schedule is subject to change	KRW 65,000
Ancient Palace	May 18 09:00-13:00	ST3	Hotel - Changdoekgung Palace & Secret Garden - Amethyst Factory - Insa-dong Antique Shop Alley or Art Galleries - Hotel / <b>Min2 persons</b>	KRW 28,000
Old & New In Seoul	May 18 09:00-17:00	ST4	Hotel - Changing the Guard Ceremony (in front of Deoksu Palace) - Home of the Last King of Joseon Kingdom - National Museum of Contemporary Art - World Cup Stadium - Ginseng Center / <b>Min5 persons</b>	KRW 105,000
Into the time capsule	May 19 09:00-17:00	ST5	Hotel - Korean Folk Village - Hae Gang Pottery Museum - Icheon Ceramics Town / <b>Min5 persons</b>	KRW 145,000

#### \* Booking Conditions

- Deadline for booking is May 11, 2006 for Spouse programs (except: ST3-ST5 are booking available on-site).
- On-site registration for Spouse Programs (ST3-ST5) should be booked by one day prior to the tour.
- Reconfirmation is required by the one day before the tour at the Tour Desk (Information Desk).
- Tour desk will be operated from May 16-18, at the Lobby, COEX

### » Post Conference Tours

Tour Course	Date	Tour Code	Itinerary	Price (KRW) / person
Gyeongju	May 20-22 (2 nights 3 days)	HT10	Tumuli Park - Chumsongdae Observatory - Anapchi Pond - Gyeongju National Museum - Pulguksa Temple - Sokkuram - Susseadaong / Andang City - Hahoe Village - Dosan Confucianism School / <b>Min4 persons</b>	KRW 550,000
Mt. Seorak	May 20-21 (1 night 2 days)	HT11	Kwongumsanseong Walled Fortress - Shinheungs Temple - Mt. Seoraksan National Park - Sokcho Beach - Goseong Unification Observatory / <b>Min4 persons</b>	KRW 264,000
Baekje Tour with Spa	May 20-21 (1 night 2 days)	HT12	Buyeo Jeongnimsaji Five-story Stone Pagoda - Gunnamji Artificial Pond - Buyeo National Museum - Nakhwaam Rock - Goransa Temple - Spa Bath / <b>Min4 persons</b>	KRW 363,000
Hongdo Island	May 20-21 (1 night 2 days)	HT13	Mokpo-National Maritime Museum - Hongdo Island / <b>Min10 persons</b>	KRW 385,000
Island Jeju	May 20-22 (2 nights 3 days)	HT14	Yongduam - Yeomiji Botanic Garden - Jeju Folk Museum - Magic Road - Jeongbang Waterfall - Sengjeup Folk Village - Seongsan Sunrise Peak - Marjang Cave - Sangumburi Crater - Jeju Folk & Natural History Museum / <b>Min4 persons</b>	Deluxe: KRW 785,000 Budget: KRW 605,000

3 or 4 star hotel, Twin sharing & English Speaking Guide  
Post Conference Tours will open from May 20, 2006.

#### \* Booking Conditions

- Deadline for booking is May 4, 2006 for Post-Conference Tour .
- Reconfirmation is required by the one day before the tour at the Tour Desk (Information Desk).
- Tour desk will be operated from May 16-18, at the Lobby, COEX

#### Contact

Ms. Jecce Yoo / H&T  
Tel: +82-2-2088-7871  
Fax: +82-2-6008-2561

## » About Korea



Once known as the Land of Morning Calm, the peninsula now thrives with commerce and trade, showing a great resilience following the 1997 financial crisis. The country has hosted many major global events such as the 2002 FIFA World Cup Soccer. Customs regulations.

The Korean peninsula extends southward from the northeastern part of the Asian continent between latitudes from 33 to 43 degrees North, and longitudes from 124 to 131 degrees East. The standard meridian of the peninsula is 135 degrees, 9 hours ahead of GMT. The Amnok and Tuman Rivers border both China and Russia to the north, and Japan lies just across the East Sea.



Seoul has been the center of politics, economy, culture and transportation of Korea for six centuries since Taejo, the founder of the Joseon Dynasty, moved the capital here in the third year (1394) of his reign. Today, one quarter of the nation's population lives in Seoul, which serves as the broadband core of all branches of knowledge. Seoul preserves numerous relics of the Joseon Dynasty and the litany of Seoul's cultural heritage is endless. At the same time, Seoul has risen as a global landmark of modernity, with many must-see attractions, which make Seoul a favorite tourist destination.

### ■ Currency and Exchange Rate

The unit of currency in Korea is the South Korean Won (KRW). US dollars should be used to pay hotel accommodations and tour fees. The exchange rate as of May 6, 2006 is USD\$1.00 = KRW 930.40.

Foreign currency may be exchanged at banks during normal business days (09:30-16:30 hrs. from Monday to Friday) as well as at the airport and hotels. Exchange rates are set daily by each bank.

### ■ Climate

Korea's climate is regarded as a continental climate from a temperate standpoint and a monsoon climate from a precipitation standpoint. The climate of Korea is characterized by four distinct seasons: spring, summer, fall and winter.

May is the middle of Spring in Korea, which is the best season for visiting Korea. Temperatures range from 15-20°C, so it is not necessary for participants to bring warm clothes.

### ■ Electricity

The power supply in Korea is 220 volts.

### ■ Time Zone

Local time in Korea is 9 hours ahead of Greenwich Mean Time.

### ■ Useful Phone Numbers

- Police 112
- Fire and Ambulance 119
- Medical Emergency 1339
- International Telephone Information 00794
- International Telephone 00799
- Local Directory Assistance 114
- Long Distance Directory Assistance Area Code +114
- International Telegram Services 00795
- Tourist Complaint Center 02-735-0101
- Tourist Information 1330

## General Information

### ▶▶ Tour Attraction

#### COEX Mall

Under the World Trade Center Seoul, this huge mall stretches from Samseong Subway Station to ASEM Tower. Along the underground labyrinth are a variety of amenities and facilities, including Lake Food Court with ethnic restaurants, COEX Aquarium, displaying more than 40,000 fish of 600 species and dozens of large sharks; and the Kimchi Field museum, which contains extensive kimchi displays such as recipes, techniques, etc.



#### Restaurants in COEX Mall

Over 65 restaurants and snack bars!!

You can pick your favorite ethnic foods from Korean, Japanese, Chinese and other authentic foods from around the world.

You'll experience not only, a delicious cuisine and gourmet delights, but also a unique and sophisticated atmosphere featured at the restaurants.



#### Dongdaemun Market

Some of the greatest bargains can be found at Dongdaemun Market, a large area packed with small shops and big malls.

Some 10 or so modern clothing malls have sprung up among the long-established older markets and these shops are open all night, brightly lit and play cheerful music.



The biggest items are fabrics, clothing, leather goods, women's and children's costumes, bedding, house wares, footwear and sporting goods. The Dongdaemun Gate (Heunginjimun or East Gate) area has become famous for selling clothing similar to what can be found in department stores at reasonable prices.

#### Daehangno Street

The literal meaning of Daehangno is "university street" because until the mid-1970s, the College of Liberal Arts and Sciences of the Seoul National University campus was located in the current Marronnier park site. Daehangno is the cradle of Korean performing arts, the off-broadways of Korea. Small theaters, galleries, cafes, folk taverns and restaurants are sprawled across Marronnier Park. Various outdoor sculpture and painting exhibitions and performing arts are offered on makeshift stages on the street. About 40 theaters and several museums attract throngs of young people.



## ▶ Transportation

### Incheon International Airport ↔ Hotels / Venue

#### 1. Bus

Buses from Incheon International Airport to Seoul operate on 10-15 minute intervals during the flight operation hours. The most convenient and cheapest way to get to Seoul is Limousine Bus. Deluxe limousine bus tickets cost KRW 13,000, while standard limousine bus cost 7,500-8,000 won. Tickets can be purchased at the Transportation Information Counter near the exits No. 2, 4, 9, 13 on the arrival floor (1st floor) or at the bus stops themselves. It is recommended that passengers confirm the bus stop number and location at the Transportation Information Counter because there are many bus routes to and from the airport. For those who plan to stay at Ibis Ambassador, Seoul Residence, CO-OP Residence should first arrive at Korea City Air Terminal(KCAT). CO-OP Residence is only 5 minute walk from KCAT, while taxi will be necessary in getting Seoul Residence and Ibis Ambassador. Taxi fare from KCAT to these two spots will be no more than KRW 5000 (approx. USD 5).

Bus Type	Bus Company	Boarding Spot	Bus Stop	First Bus	Last Bus	Interval (min.)	Travelling Time (min.)	Fare (KRW)
Deluxe Limousine Bus	KAL (02-2667-0386/89)	4B, 11A	-COEX -InterContinental -Imperial Palace -Ramada Seoul	Hotels 04:55	Hotels 04:55	20-30	80	13,000
				Airport 05:50	Airport 18:30			
Deluxe Limousine Bus	Korea City Air Terminal (KCAT) (02-551-0790)	3B, 10B	Korea City Air Terminal (KCAT)	KCAT 05:30	KCAT 22:30	10-15	60	13,000
				Airport 05:20	Airport 20:00			
Standard Limousine Bus	Airport Limousine No. 600 (02-2664-9898/9776)	6A, 12B	Ramada Seoul	Jamsil 05:35	Jamsil 22:25	10-15	100-110	7,500
				Airport 05:00	Airport 20:00			

#### 2. Taxi

Taxi Stand is No. 16~21 on the passenger car platform on the arrivals floor (1st floor). Taxi fare to our accommodations would be more than KRW 50,000 (approx. USD 50). Toll fees shall be furnished by the passenger.

#### 3. Chauffeured Services

Personalized meet & greet service is available at the airport. For more information, please contact Excellent Limousine Service(ELS).

- Tel: 82-2-773-5588
- E-mail: limo@limosvc.co.kr
- Website: www.limosvc.co.kr

# General Information

## Incheon International Airport ↔ Gimpo Airport

Buses from Incheon International Airport to Gimpo Airport operate on 10-15 minute intervals at a cost of KRW 4,500 (approx. USD 4.5) during the flight operation hours. This service is offered by Airport Limousine. For more information, you are free to make a phone call at 82-2-2664-9898/9776

Bus Type	Bus No.	Boarding Spot	Bus Stop	First Bus	Last Bus	Interval (min.)	Travelling Time (min.)	Fare (KRW)
Standard Limousine Bus	604	6A, 12B	Gimpo Airport	Gimpo Airport 05:40	Gimpo Airport 22:25	25-30	30	4,500
				Incheon Airport 05:00	Incheon Airport 20:20			
	604-1	6A, 12B	Gimpo Airport	Gimpo Airport 06:00	Gimpo Airport 22:35	30	30	4,500
				Incheon Airport 05:00	Incheon Airport 21:10			
	600	6A, 12B	Gimpo Airport	Gimpo Airport 05:35	Gimpo Airport 22:25	10-15	30	4,500
				Incheon Airport 05:00	Incheon Airport 20:20			

### Useful Sites

Information on Korean tourism and others can be found on the following websites.

#### ■Tourism

<http://english.tour2korea.com>

<http://www.korea.net>

#### ■Visa Information

[http://www.mofat.go.kr/me/me\\_a006/me\\_b025/me06\\_01.jsp](http://www.mofat.go.kr/me/me_a006/me_b025/me06_01.jsp)

#### ■Flight Information

Incheon International Airport: <http://www.airport.or.kr/Eng/home.jsp>

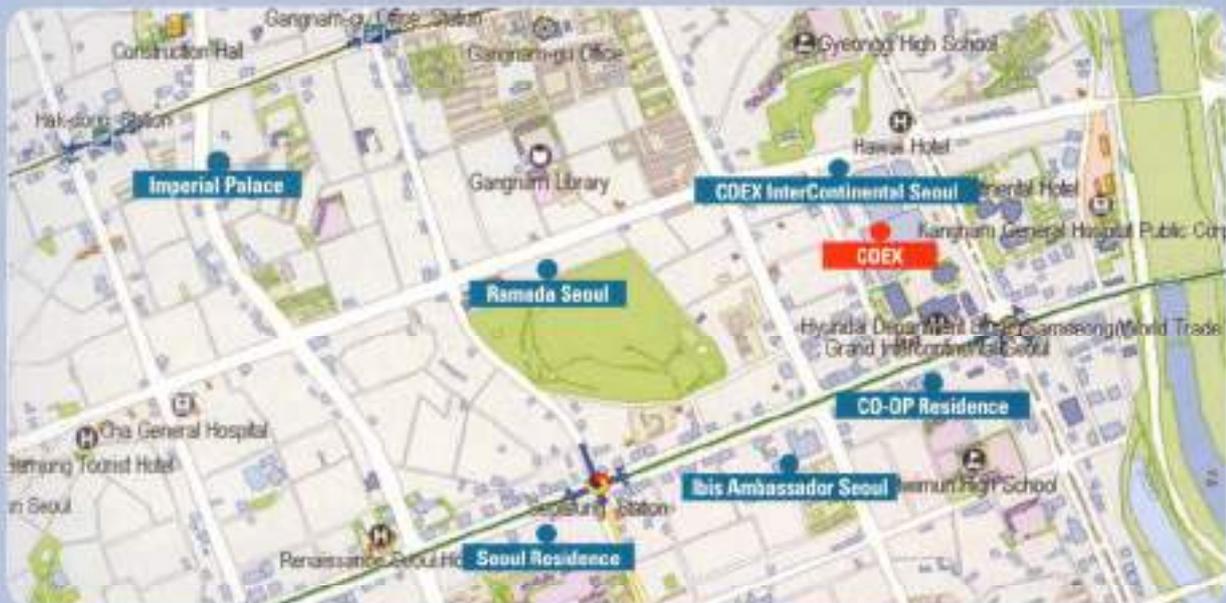
Gimpo Airport: <http://gimpo.airport.co.kr/eng/index.jsp>

Jeju International Airport: <http://jeju.airport.co.kr>

Asiana Airlines: <http://flyasiana.com/english>

Korean Airlines: <http://www.koreanair.com>

## » Accommodation



### +Within the COEX Complex

- COEX InterContinental Seoul (Adjacent to the venue)
- CO-OP Residence (150m from the venue)

### +10 min. Walking Distance

- Ibis Ambassador Seoul (1.5km from the venue)
- Ramada Seoul (1.5km from the venue, Operate shuttle bus)

### +20 min. Walking Distance

- Seoul Residence (2.0km from the venue)
- Imperial Palace (2.5km from the venue, Operate shuttle bus)

### COEX InterContinental Seoul

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### Imperial Palace

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Website: <http://www.imperialpalace.co.kr/eng/index.asp>

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# General Information

## » Onsite Guidelines

### 1. Registration Desk

The registration desk will be located in Lobby of COEX and participants may pick up the conference materials after registration.

Registration Fee includes Welcome Dinner and Conference Kit (Conference Bag, Name Tag, Program & Abstract Book, Participants List, Proceedings and so on).

Onsite Registration Fee:

- OECD Countries: General USD 250/Student USD130
- Non-OECD Countries: General USD 130/Student USD 70
- Coupon Sales: Conference Banquet USD 89, Conference Kit USD 100, Welcome Dinner USD 50

If you have any inquiries, please visit Registration Desk.

The desk will be open during the following hours:

- Tuesday, May 16, 13:00~19:00
- Wednesday, May 17, 08:00~19:00
- Thursday, May 18, 08:00~19:00
- Friday, May 19, 09:00~17:00

### 2. Information Desk

On-site registration for optional tours should be booked and reconfirmed by one day prior to the tour.

Tour Information Desk will be operated from May 16~18, at the venue, COEX.

### 3. Preview Room, Speakers' Room

Preview Room, Speakers' Room are open during the conference in Room 205, COEX.

If you have any amendments to your presentation file, please bring your revised file to the preview room prior to at least a day before the presentation.

### 4. Internet Cafe, Press Center

Internet Cafe and Press Center are open during the conference in Room 206, COEX. Desktop computers and printers will be available at the Internet Cafe and Press Center.

### 5. Preparatory Meetings

#### \* Oral

To ensure a smooth operation and to improve the communication between chairpersons and speakers, please attend the Preparatory Meeting to be held in the assigned session rooms. Please be seated in the assigned session room 20 minutes prior to the beginning of your session and introduce yourself to the chair.

- WB1~WB6 | Wednesday, May 17, 13:40-14:00
- WC1~WC6 | Wednesday, May 17, 16:10~16:30
- TA1~TA6 | Thursday, May 18, 10:10~10:30
- TCI~TC6 | Thursday, May 18, 13:40~14:00
- FA1~FA6 | Friday, May 19, 10:10~10:30
- FC1~FC6 | Friday, May 19, 13:40~14:00

#### \* Poster

Please enter the assigned session room 20 minutes prior to your session and introduce yourself to the chair.

All presenters are requested to affix and remove posters on the appropriate dates and time as indicated below.

Date	Session	Code	Affixation	Presentation	Removal
May 17 (Wed)	I	WA7	08:30- 09:00	13:00- 14:00	18:30- 19:00
May 18 (Thu)	II	TB7	08:30- 09:00	13:00- 14:00	16:00- 16:30
May 19 (Fri)	III	FB7	08:30- 09:00	13:00- 14:00	18:30- 19:00

### 6. Message Board

A bulletin board for attendees to post messages for other attendees is located in the Preview Room 205.

### 7. Secretariat

The Secretariat office is open from 08:00~20:00 during the conference in Room 204. If you have any inquiries about the conference, please visit the Secretariat Office.



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# The 9<sup>th</sup> International Conference on Public Communication of Science and Technology (PCST-9)

## ▶▶ ABSTRACT BOOK

17-19 May 2006 COEX, Seoul, Korea

**“Scientific Culture for Global Citizenship”**

The 9th International Conference on Public Communication of Science and Technology (PCST-9)



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## Plenary Session - Why Scientific Culture for Global Citizenship

Speaker 1

### A GLOBAL FUTURE DREAM—NEW METHOD TO MAKE RENEWABLE ENERGY MORE EFFICIENT

Koichi Kitazawa

Senior Executive Director, Japan Science and Technology Agency, JAPAN

The spirit of “global citizenship” may be encouraged by a bright future vision for which the youth can work together for the better globe. I believe that a new such target has been brought in by a recent scientific breakthrough. It may change the global future although we have to work together to realize the future.

It is related with the change of the global energy source from fossil to renewable energy. The generation of electricity by wind and solar power are facing some difficulties with the inevitable characteristics of the natural energy; i.e., the electricity is generated only intermittently due to the change in the weather and cannot meet the needs upon demand.

The intermittent nature of the natural energy sources pushes up the cost of electricity because it then needs to be stored by the time we need it. The energy can be stored either in chemical, mechanical or electrical form. But the storing cost is thought to be rather too high for the world major energy sources to depend on the natural energy. The concept “storage” is to take average of energy over “time”. What comes out if we average electricity over global “position”. This will bring about the big difference. The problem of intermittency can be solved by having many generators on different places on the earth where the weathers are different.

In order to average electricity globally, it then needs the long power transmission line without losing electricity on the path by the “electrical resistance”. The recent discovery of the “high temperature superconductivity” has provided the solution. It made “perfect zero resistance” possible to transmit electricity from a side on the earth to the other side without losing any electricity.

Since the discovery of “high temperature superconductivity” in 1986, scientists have been paying constant efforts to let the superconducting wires conduct large enough current and to let the cooling system work efficiently with circulating liquid nitrogen along the cable under ground.

Electricity generated in the desert or in the remote windy area can then be utilized in big cities. This reduces the cost of renewable energy from the nature significantly and should provide us a big dream that human kinds can live on natural energy in the future.

As an advocator of the “superconducting global electrical power network” with high temperature superconductor, I would like to discuss about the future of global energy comparatively with the other energy sources, mentioning the recent technological developments.

Speaker 2

### CITIZENS OF THE KNOWLEDGE SOCIETY

Vladimir de Semir

Commissioner for Scientific Culture, Barcelona City Council &  
Pompeu Fabra University, SPAIN

We are living the transition from the industrial society to a new era featured by the quick incorporation of scientific advances into our daily lives and by our competence to transform information into knowledge. This transformation entails not only economic but also, and particularly, deep cultural and social changes.

In this context, popularisation of sciences is a crucial issue. It is not just the case of understanding that only one culture exists-including humanities, arts and sciences-but also trying to explain the world we live in. We want to have-and we must have! - competent citizens in this emerging society of knowledge, people able to have ideas to take advantage of the new opportunities of this world.

Indeed, in this changing context of our society, and for a city to have a leading position, political agendas must include the promotion of scientific & technological culture. First of all, this allows societies to understand and support changes and the subsequent large investments these involve, and, secondly, citizens gain access-I insist-to new opportunities for their personal and professional development.

We must spread political initiatives in this way with more commitment by the different levels of all the involved administrations: national, regional and municipal. Countries, regions and cities must reach a political compromise in this area. To put the appropriate political policies into practice we need to definitively break the wrong idea of two separate cultures. With the shared goal that today it is not possible to be a citizen of the world without knowing that science is part of a unique integrated culture and acting according to this principle.



Speaker 3.

## SCIENTISTS OPEN THE WAY TO THE ERA OF GLOBAL SCIENCE CULTURE

Doesun Na

President, Korea Science Foundation, KOREA

In this era that is experiencing an increasing impact of science and technology on our society, there is a global focus on efforts to expand the interface between science and society. Citizens with scientific literacy are the driving force in a democratic society and practicing scientists and engineers are the key actors for improving science culture because their researches are the basis of scientific knowledge. In this vein, participation of scientists in public understanding of science is crucial and scientists' participation in public understanding of research in particular, is regarded as a duty in this era of democracy.

In this presentation we will introduce Korea Science Foundation (KSF) and the typical science culture activities of KSF carried out through the 'Science Korea' program. In particular, we seek to present the future direction of Korean science culture through various programs initiated since 2005, which have been designed for direct and active participation of scientists and engineers, such as PUR-KOREA 2006.



## Plenary Session - Communicating Science to the Public

Speaker 1.

### COMMUNICATING SCIENCE TO THE PUBLIC: THE IMPORTANCE OF CRITICAL PUBLIC ATTITUDES

Martin W Bauer

Reader, Social Psychology and Research Methodology, London School of Economics, UK

The equation of S & T = Progress is no longer common sense. Since the 1960s five bench marks for the external evaluation of S & T have emerged in public discussion: product safety, sustainability, fairness and equity, critique of reification, and productivity. These external criteria of evaluation limit the autonomy of science. Together with the current trend towards the privatization of scientific research a new context for science communication arises. This new context suggest of modus operandi that is familiar in the commercial world and some of its pathologies are likely to appear also in science communication: innocent fraud (Galbraith, 2004) and bull-shitting (Frankfurt, 2005). One of the implications for science communication is to look out and to foster the critical capacity in society. On the basis of Euro barometer survey data of 2005, I will point towards the sociological location of diverse attitudes towards S & T in the context of 32 European countries. I will end with some speculative remarks on how critical public attitudes have been important in the past.

Speaker 2.

### FOSTERING A SCIENTIFIC CULTURE IN SOCIETY

Anusuya Chinsamy-Turan

Professor, Zoology Department, University of Cape Town/South African Women in Science and Engineering, SOUTH AFRICA

Socio-economic progress and Science are positively correlated, and as such improving human resources in Science is a priority of many developing countries. However, many challenges exist. As a consequence of South Africa's history of apartheid, a large percentage of the population were marginalized and prevented from participating in the broader Science system. Hence efforts to promote increased participation in Science, as well as, public appreciation and understanding of Science are still a real challenge in South Africa.

Perhaps the most fundamental obstacle with regard to the communication of science in South Africa is the lack of appreciation of the relevance of Science in everyday lives. This is compounded by rampant stereotypes that exist about who scientists are, and what scientists do. For many South Africans, Science supposedly happens in laboratories and is far removed from their lives, and there is a failure to realize how scientific and technological advances impact on our daily lives.

In this talk I will use my experience in South Africa, in my personal capacity as a scientist, and as President of the Association of South African Women in Science and Engineering, to show what we are doing to nurture and develop a culture of science among school children and the wider community.

Speaker 3.

### COMMUNICATING SCIENCE WITH THE PUBLIC

Annette Smith

Director of Regions, The British Association for the Advancement of Science, UK

This presentation describes some of the issues and challenges facing science communication with the public in the UK in 2006 as seen from the perspective of the British Association for the Advancement of Science (The BA). A brief description of the programmes that comprise the work of the BA is followed by an exploration of the UK Government's initiatives in the area of science policy and a discussion on how those initiatives impinge on science communication in general. Next, the strategy employed by the BA in tackling the debates around climate change is explored, and finally, the challenge of measuring the impact of science communication activity is examined.



## Plenary Session - Nexus of High-Tech and Society

Speaker 1.

### SCIENCE AND TECHNOLOGY PROMOTION IN SINGAPORE AND ASIA

Leo Wee-Hin Tan

Director, National Institute of Education, SINGAPORE

Science and technology are key drivers of economic development in today's world. The pace at which developments in science are occurring has spawned a diversity of technologies that are threatening to become ubiquitous. The embedding of many of these new technologies in society is already occurring at a steady pace.

Endeavors to connect high technology and society in Asia have taken on greater importance in recent years, not surprisingly since these have economic implications.

The case of Singapore is of particular interest. A nationwide broadband telecommunications network leveraging on four different but interoperable platforms is in place-asymmetric digital subscriber line, hybrid fiber coaxial cable modem, asynchronous transfer mode and wireless systems. This prime endeavor in connecting high technology and society has been transforming life to an extent hitherto unknown. Many aspects of society have been e-enabled through these platforms-for example, e-banking, e-government, e-business, e-commerce and so on. These platforms are also fuelling the development of new applications and services, in the process triggering related R & D activities in the universities, research institutes and industrial laboratories as well as bringing on new products into the market place. Global Positioning Systems have become common in Singapore, with cab companies using it to locate the nearest taxi to respond to a commuter and bus companies using it to auto-update fare stages for levying tariff on passengers. Bioinformatics is another area which is helping to connect high technology and society - biometric sensors are becoming more common for identification while tracing of ancestral trees via genetic means is now a popular school activity. The outreach activities of universities and the various research institutes, which are doing cutting edge research in areas such as nanotechnology and new materials, are another avenue to connect high technology and society, and these have come on upstream rather strongly in recent times - thus, complementing the role played by science centers.

The Keynote Address will elaborate on the above as well as other initiatives in a few Asian countries in greater detail. It reinforces the point that endeavors to connect high technology and society play a useful role in sensitizing people to the importance of science and technology in economic development.

Speaker 2.

### PUSHING FRONTIER RESEARCHES THROUGH PUBLIC UNDERSTANDING

Hasuck Kim

Co-chair, Local Organizing Committee of PCST-9/Seoul National University, Korea

We all are benefiting by the progresses of modern science and technology because we are living in a world infused with science and technology. Fast internet and telecommunication have changed our daily life in many ways in such a short time. Because the technological breakthroughs are based on the results of scientific cutting edge research, it is worth to support those cutting edge researches. Modern scientific research requires up-to-dated laboratory facilities, clever ideas and dedicated hard working hands. But these are possible with great supports not only from government but also from general public. Researchers and funding agencies therefore reach-out to public to point out the importance of their works. Also it is obvious that more people should understand scientific research and how to use it to make life better. This directs the way how public understanding on science should proceed. The most important one is education, especially in primary and secondary levels. The next one is reach-out programs for youngsters and general public by mass media and extra activities on science such as Communicating European Research and Public Understanding of Research Korea. Individual researchers share with others (especially with non-technical) about their results, how important they are, how they will affect our life, and most importantly why the work has to be continued. A Public Understanding of Research effort, therefore, is likely to have greater effectiveness because they are getting the information from the first hands. In addition, it will provide a much deeper understanding of the scope and depth of the research. In this talk, push-pull relationship between frontier scientific research and public understanding will be discussed with some examples on cutting edge research works on a BT-NT-IT area for clinical diagnosing disease.



Speaker 3.

### CONNECTING HIGH-TECH WITH SOCIETY IN RESEARCH LABORATORIES INCLUDING STANFORD LINEAR ACCELERATOR CENTER

Neil Calder

Director of Communications, Stanford Linear Accelerator Center, USA

This talk will outline the very successful initiatives to define common communication strategies amongst the world's high energy physics laboratories. Previously, each laboratory had communicated its news and achievements without any interaction with laboratories doing similar work. A new model has now been instituted where each laboratory sees itself as part of a global community and designs its communication strategy towards the good of the whole field rather than a single laboratory. Many media have been used - new magazines, websites, blogs and newswires. A similar initiative has been announced now to unite the communication strategies of the world's synchrotron radiation laboratories.

The approach is new - the results are excellent.

Speaker 4.

### SCIENCE CENTERS AS PLACES OF DIALOGUE BETWEEN SCIENCE AND SOCIETY

Guillaume Boudy

Chief Executive Officer, Cité des sciences et de l'industrie, FRANCE

Communicating and engaging with the public about science and technology is the key mission of Science Centers and Science Museums.

In most of our countries, particularly in Europe, we observe a growing gap between science and society even if, paradoxically, the number and variety of communication tools have increased (in the medias, through internet, science festivals etc). Young students do not go more into scientific studies. There is a global defiance towards science and technology, and the recent crisis we underwent (the avian flue, the mad cow illness, environmental issues etc) have engendered fears and misunderstanding on the public side. Yet, research and science are the driving forces to achieve progress in our societies. Citizens no longer want just to hear about the achievements of science or the newest technologies. They want to forge their own opinion, to debate about the options, to take part in the decision making process on science and technology.

For Science Museums, whose mission was initially to present and explain, this represents a challenge and an opportunity. They have to change their approach in order to face new challenges?

- The apparent public's loss of interest in science
- The speeding up of change in all areas of life
- A growing competition from other centers of interest

There is no model, each institution is influenced by its own history, its size, its political and social environment, and by its mode of funding. Communicating research and science is not easy. Depending on their approaches and methods science museum/centers can play a key role in the dialogue between science and society.

I will present to you the steps taken by la Cité des sciences et de l'industrie in Paris;

First, let me introduce you briefly to la Cité. After then, I will present a few ways through which the Cité achieves its mission of increasing public interest in science and industry.

# Parallel Sessions

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## WB1 - Informed Citizen

PCST NO.77

(WB1-01)

### WHEN EDUCATION PREVENTS THE UPTAKE OF SCIENCE: THE CASE OF CHILDHOOD IMMUNISATION IN AUSTRALIA

Cathy Frazer

Centre for the Public Awareness of Science, Australian National University, Canberra

Public health officials and scientists call for improved education of parents in order to increase the proportion of Australian children who are fully immunised against vaccine-preventable diseases. This paper asks whether it is general education level or specific information about immunisation that is necessary to persuade more parents to ensure that their children are kept up to date with vaccinations. It gives the results of a small survey (n = 175) that assessed the education levels of parents who chose to immunise and those who chose not to. Most often, parents who immunised their children were only taught a general understanding that vaccines protect from diseases. A similar proportion of parents who did and did not immunise were taught the biological basis of vaccination (23% and 19% respectively). Parents who chose not to immunise were often very highly educated, holding higher level degrees. The reasons why educated people are more likely to resist scientific information are discussed. The paper concludes that most parents will immunise their children if they have a general understanding of the protective effects of vaccines rather than detailed biological education, however, well educated parents who are considering not taking part in the program need messages specifically tailored to address their concerns and misconceptions.

PCST NO.85

(WB1-02)

### INVISIBLE WITNESSES? - REPRESENTATIONS OF WOMEN SCIENTISTS, ENGINEERS AND TECHNOLOGISTS ON UK TERRESTRIAL TELEVISION

Richard Holliman, Elizabeth Whitelegg, Joachim Allgaier, Barbara Hodgson and Eileen Scanlon

Centre for Research in Education and Educational Technology, The Open University, UK.

Gendered representations, particularly those that reinforce sex-role stereotypes, have the potential to influence audience reception. It follows that the images young people see portrayed on television are one factor that has the potential to influence the choices they make about their future careers. With the aim of informing these ongoing debates the Invisible Witnesses? Project Team is investigating representations of science, engineering and technology (SET) on UK terrestrial television from a gender perspective. In this paper we briefly discuss the rationale behind the project and describe our methods of data collection and analysis. Two week-long samples, six months apart, of a wide range of output - e.g. including factual and fictional programmes from primetime, daytime and children's TV - from the five channels currently broadcasting using analogue signals in the UK, were collected. In our presentation we will describe some quantitative findings from the first week-long sample, e.g. documenting the distribution of programmes that portray SET, and provide qualitative illustrative examples of gendered representations of scientists, engineers and technologists with a view to informing ongoing debates about the influence of popular culture on the uptake of careers in SET by girls and women.

**Keywords:** Science, engineering and technology on television, Sex-role stereotypes

PCST NO.112

(WB1-03)

### THE IMPORTANCE OF THE PLACE

Jan Riise

Swedish Research Council, SE 10378 Stockholm, Sweden  
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The informed citizen is the key to scientific culture, participation in decision-making processes and the knowledge-based society. Many efforts are made by the science community to inform and communicate, in museums, lecture-halls, science centres and recently also at a growing number of science events, such as science festivals and science weeks.

Evaluations from some of these science communication events show that the physical location of the communication activity - a lecture, workshop or experiment - plays an important role when it comes to reaching different target groups.

Science communication events are characterized by the use of unusual places for "bringing science to the public", such as railway stations, city squares, streets and shopping malls. In Göteborg, one of these arenas is called "science in the park"; a large tent next to one of the main pedestrian and shopping areas in the city centre. The visitor profile of the activities there shows significant differences compared to other venues of the festival.

While the adult academic group is much larger than its proportion of the city's population at the lectures arena, it is significantly smaller at the "science in the park" arena. The arena where the visitors reflect the population as a whole is a shopping centre, with an almost identical demographic profile.

Science in the park shows the most encouraging outcome: the proportion of young people, under the age of 24, is significantly larger than at other arenas. And not only that, some of the suburban parts of the city, generally regarded as not so "academic", actually seem to be over-represented. The figures are not exact, but the indications are the same and actually increasing over two consecutive evaluations (2002 and 2004).

The findings in Sweden seem to be confirmed by observations at other science communication events in Europe.



PCST NO.135

(WB1 -04)

### THE INFORMED PRACTITIONER: COMMUNICATION BETWEEN SOCIAL SCIENTISTS AND PRACTITIONERS

Gudrun Hessler, Kai Unzicker

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This paper examines interaction processes and knowledge-exchange between social scientists and practitioners. We conducted semi-structured interviews with practitioners who work in specified fields of practice and who have been involved in sociological research projects - as subjects of investigation or as experts. These research projects focused on social integration and disintegration regarding different sectors of German society. The interviewed practitioners were working in these sectors under scrutiny such as public administration, social work, labour relations and others. Therefore we assume that scientists and practitioners work on likewise aspects of society - the sciences from the more theoretical point of view and the practitioners from the more practical point of view.

In detail in this paper we focus on the process of knowledge-exchange between the scientists and practitioners described above. In four case studies we present findings regarding the practitioners' understanding of the scientists' research and whether they regard the research as valuable for their work. We describe dimensions that are relevant for interaction and knowledge exchange: interest and approach to the topic under investigation, the motivation of both, scientists and practitioners, to cooperate, the preconditions to establish contact and the position of both in their own fields of science or practice. Finally we focus on the practitioners' expectations towards scientific knowledge and further specify obstacles that frustrate interaction and knowledge exchange.

**Keywords:** interaction, knowledge exchange, practitioner, social sciences, case study

PCST NO.141

(WB1 -05)

### " THE ONLY GREEN SOLUTION " : SCIENCE, MASS MEDIA & THE UK ENERGY DEBATE

Robert S. Miller, Steven R. Harris, Mark Brake

Centre for Astronomy and Science Education, University of Glamorgan

One factor motivating the public engagement with science and technology movement is the suggestion that sufficiently well-informed mass media coverage of scientific and technological issues contributes toward the democratic process by enhancing citizens' ability to debate and make informed decisions about scientific and technological issues. At least two considerations call this model of PCST into question. The first is that science and the mass media apply markedly different criteria to deciding which information is has value, legitimacy and authority within any area of knowledge and debate. The second is the well-documented tendency of scientific and policy controversies carried out within the public sphere to reflect the special interests and agendas of those experts engaged in interpreting the issues for a popular audience. This paper examines the complex interaction between scientists, policy-makers, and the mass media in the light of the recent resumption of public debate in the UK about the future of nuclear power generation in Britain. Our exploration of the implications of the way in which this debate has been managed for the further development of civically engaged science communication practice starts from the application of Gregory's model of the circuit of mass communication to the analysis of a Single news story. In March 2004, the well-known scientist and environmentalist James Lovelock kick-started a new phase of discussion on UK energy policy with an article suggesting that citizens should accept the increased use of nuclear power in the short term as the only effective way of insuring against worsening global warming in the future. In analysing this article, and its subsequent impact, we examine the evidence for Lovelock's skilful use of such media 'news values' as continuity, personalisation, unexpectedness and sensationalism in his structuring of the text, and note the contrast between Lovelock's media portrayal and his credibility within the science establishment.

PCST NO.142

(WB1 -06)

### A RECONCEPTUALIZATION OF SCIENCE & TECHNOLOGY IN A HIGHLY MEDIATIZED & DEMOCRATIZED SOCIETY

Pieter A. Maesele

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We inhabit an age in which economic progress in the European Union is equalized to more European research and better communication of that European research to the public. In strongly developed Western democracies this implies an important role for the citizen, and second for the highly democratized mass media acting in a transforming public sphere. Beyond a call for more communication and more scientific literacy, the discourse has shifted to a call for more engagement and more participation on behalf of the citizen. There is a widespread sentiment however that we are on a cross-road. From a mediasociological perspective we argue that our contemporary democracies which are in essence primarily issue driven require detours of public-isation for their settlement to allow the citizen to make an informed assessment of the scientific debates in which his/her engagement is demanded and thus allow the informed citizen to play his/her 'informed role'. Inevitably this leads us to problematize the three actors in the debate about science communication, i.e. 'science & scientists', 'communication & the media' and 'the public'. The



former will have to come to terms with the fact that their authority is no longer a priori given in present circumstances. Second the media are primarily to be considered as a feedback channel in which public opinion is represented and constructed. In this perspective science is but one of the many other knowledge cultures in society, albeit one with considerable weight, but also perceived as an actor with several interests. Science has changed from a unified cause to a highly politicized divisive force, being at best an opinion leader. This means science will need to reckon with trust, values, and emotion in revising its role in a highly mediatized & democratized society.

PCST NO. 144

(WB1-07)

### SCIENCE COMMUNICATION AND CITIZEN SCIENCE: HOW DEAD IS THE MODEL?

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What are the assumptions that underlie the increasingly frequent references in discussion of science communication to two-way communication, dialogue and engagement? Terminology has shifted from 'public understanding' to 'public engagement', but do the dominant discourses and practices of science communication reflect a model of communication that is authentically contextual and participatory, and thus oriented to stronger scientific citizenship?

These are central questions in this paper, which notes that the critique of one-way, top-down approaches to communication was available for some decades before it was acknowledged in science communication. However, as science communication has matured, it has been increasingly able to recognise its connections with, and debts to, disciplines such as communication studies and sociology and it is argued that these developments have strengthened rather than weakened science communication, both as professional practice and as academic discipline.

Based on a review of the strategies of selected scientific institutions and government initiatives, it is argued that a deficit model remains the default position of scientists in their public activities and underpins much of what is proposed by public officials in their promotion of science. Approaches based on a deficit model also characterise many of the initiatives presented and discussed in science communication fora. It is argued that the policy framework of the 'knowledge society' has reinforced this previously existing tendency and that more critical approaches to science communication could contribute to fuller citizen engagement with science-based issues.

PCST NO.146

(WB1-08)

### ENTERTAINING SCIENCE ON TV

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Can science be presented in an entertaining way, especially on TV? Science coverage often is regarded as complicated and difficult to understand. But there are new ways in presenting science.

Every type of program - including journalistic or documentary formats - must take into account the entertainment-oriented reception on the part of viewers. This results in three basic available methods of eliciting the entertainment factor 'fascination':

- **Fascination through images**
- **Fascination through personality**
- **Fascination through story.**

In principle, science stories have a narrative structure: This kind of narrative structure can be utilized dramaturgically. But how can awkward and complex subjects be presented in an entertaining way? A number of ingenious formats may be of service, some of which have been recently developed or rediscovered. Some of the new, entertainment-oriented documentary formats are:

- **Docudrama**
- **Docusoap**
- **Docufiction**
- **Historical documentary**
- **Experimental documentary with**
  - **Change of place**
  - **Change of time**
  - **Role change**
  - **Competition**
  - **Supervision**
- **Pseudo-documentary**

The new docuformats mostly have been developed for subjects other than science, but can generally be applied to research themes - and have in some cases been tested for use on science subjects. Typically examples for these new formats in science coverage will be presented.



## WB2 - PCST in the World and in Asia

PCST NO.79

(WB2-01)

### CONCEPTUAL FRAMEWORK AND APPROACHES TO PCST - AN INDIAN EXPERIENCE

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Public Communication of S&T in India (PCST) is a fast growing area of inquiry and gaining the attention of the policy makers. It has been realized that the real key to treasure of scientific knowledge is PCST.

The concerted efforts over the years by Government and non-governmental agencies working hands-in-hands, have yielded highly encouraging results. Continued efforts like BJGV-89, BJGVJ-92, and campaigns on eclipses, transits of planets, comets, programmes like children science congress, Year of Scientific Awareness-2004 and mega radio serials, have proved quite effective in evolving and defining the conceptual framework and approaches/methodologies of PCST as per social, political, cultural and economical milieu of the country.

S&T popularization, as PCST is known in India, does not mean only flow of S&T information from source to target group. It also includes spreading/nurturing of scientific temperament and promoting method of science for developing rational outlook besides evolving innovative techniques/strategies/tools/method for PCST.

In addition to traditional approaches to PCST, (like exhibition, science museums/cities, planetarium etc.) something more suitable for India - a participative intensive approach, which is activity based, low cost, easy to adopt and replicate has been developed. The efficacy of this approach has been proved, though a formal validation is yet to be done. Training programmes and field activities developed on the above conceptual frame work and approach, could also provide a new insight to the existing models used to assess the level of scientific literacy, which does not take into account the attitudinal and behavioural aspects of sample population.

Given the overlapping concerns of Afro-Asian countries, the rich experience India has had in interactive mode of PCST can be shared for crossbreeding and cross fertilization of ideas for mutual benefits.

PCST NO.108

(WB2-02)

### COMMUNICATING SCIENCE AND COMMUNICATING ABOUT SCIENCE - AN CONTENT ANALYSIS OF SELECT SCIENCE VIDEO PROGRAMMES

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*Abstract:* Media studies hitherto have been preoccupied with developing a theory and understanding of the impact of scientific and technological information on the target audience. These studies aim to understand how the information is produced and the modalities adopted for purveying of scientific & technological information and knowledge. Even in the studies on the impact of media, the shift is taking place in understanding how the audience 'make sense of' the scientific and technological information communicated through the mass media. Informed by the social learning theories a turn has come about in recent scholarship of science communication studies which views audience as an active participant in the production of scientific meaning.

No era has been more visual than the twentieth century and science is not an exception. However, in the recent scholarship a fair share of attention has shifted towards the media production of scientific and technological information. As Kemp has argued the great difference between the visual qualities of twentieth century science and what went before it, is the new predominance of the representation of things that are technically invisible. Further scholars such as Keller have shown that in modern science depend upon the visuals to 'make visible the invisible' and reify the modern scientific concepts and theoretical constructs.

Of the entire spectrum of visual medium such as television, videos, posters, multimedia and so on television still has a vast reach unsurpassed by any other media. Therefore it is only natural that the television images of science and scientists are important as a subject of study. Televised images provide an opportunity for the viewer to observe the actions, attitudes and thoughts of others, which in turn can influence the viewers' action, values, thoughts and behavior. In particular, the self-efficacy towards scientific activities may be greatly influenced. Investigations of television programmes have brought certain typical images of science and scientists in media productions. The very programme format, narrative style and emphasis cue a certain view about science.

In the light of the insights garnered, this paper will detail the efforts of Vigyan Prasar in communicating science through visual media and in particular critically examine the content, format and narrative structure of a television serial titled 'Asia Hi Hota hai' telecast by Vigyan Prasar and DECU.

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PCST NO.122

(WB2-03)

## THE RECEPTION OF THE ANGLO-SAXON METHODS OF SCIENTIFIC JOURNALISM IN THE PERIPHERY: A CASE STUDY IN SPAIN

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Scientific journalism is a fundamental tool to guarantee freedom and democracy in a society based on knowledge like the one we live in nowadays. This paper tries to reason the causes and consequences of the phenomenon of the globalisation of scientific journalism in the world, which is every day more and more spread. From the Second World War the Anglo-Saxon model has been the dominant paradigm in the popularisation of sciences and the Anglo-Saxon strategies and methods have caught on all the continents. One of the best examples in continental Europe of this tendency is the journalist of the main Spanish newspaper *El País* Javier Sampedro, whose work is strongly marked by Anglo-Saxon influences. This paper is based on my PhD thesis. It comprises a study of the main schools of scientific popularisation and an analysis of 532 texts of this Spanish journalist.

PCST NO.123

(WB2-04)

## STUDENT PROJECT VIRTUAL WORLDS AS WINDOWS ON SCIENTIFIC CULTURES IN CTC SCIFAIR

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One approach to building science literacy can begin in middle and high school with student-centered experiences in science communication. The SciFair outreach program at the Cornell Theory Center, Cornell University, is an Internet-based science communication fair primarily run as a supplemental and/or informal learning environment at seven to ten sites per year around the US since 2003. SciFair participants are primarily from underserved, rural, and/or minority communities. In 2005, the program expanded to add a pilot site in Singapore.

The goal of the SciFair program is to leverage the appeal of the multi-user online virtual environment in which it takes place to engage teens in creating their own knowledge spaces (often games) centered on areas of science of their own choosing. The program appears to have the greatest impact, at least in the context of improved attitudes toward science, on students who begin with neutral or negative attitudes and are attracted by the technology and then drawn into building their science literacy through the team based projects. Anecdotal evidence suggests that social interaction (across scientific cultures) with college student mentors, program staff, scientists, and peer SciFair teams all lead to increased motivation and performance.

The virtual worlds created through each program represent individual or team knowledge spaces in which participants present personal or group contexts for various science topics. These include worlds created by Northwest American Indian teams, an urban black middle school team, and an elementary school science class in Singapore. A review of these worlds offers a kaleidoscopic view of the contexts within which the program is incorporated into the learning communities and the contexts within which these communities place science.

PCST NO.131

(WB2-05)

## THE FIRST HALF YEAR OF SCIENCE INTERPRETER TRAINING PROGRAM AT THE UNIVERSITY OF TOKYO: FROM THE VIEWPOINTS OF GRADUATE STUDENTS

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Science Interpreter Training Program, The University of Tokyo commenced at Oct. 2005. The program was adopted as a part of the Program for fostering Talent in Emerging Research Fields, Special Coordination Funds for Promoting Science and Technology. The funds are one of competitive funds of MEXT (Ministry of Education, Culture, Sports, Science and Technology). This is the first case of fostering of personnel responsible for science communication in Japan. In this presentation, we report current activities of our program.

There is the worldwide viewpoint that citizens as well as scientists bear the primary responsibility for deciding the direction of policies for science and technology. Science Interpreter is designed to be the person who mediates mutual understanding between scientists/engineers and citizens. The Interpreter is expected to assume a vital role in science communication by acquainting the science study to citizens easily and the citizens' interests to scientists. For the achievement of fostering Science Interpreter, our program provides such basic and practical lectures as the frontier of science, science writing, essence of making TV program and science literacy as elective subjects to selected graduate students of the University of Tokyo for one year and a half. The course emphasizes actual projects as well. Lectures at high school and observation-cum-study are arranged.

First year candidates were screened by examining their papers and orals. The backgrounds of 14 passers were such various specialties as medicine, mathematics, biology, aeronautics and astronautics, psychology and linguistics. After completing this course, our students are expected to be a science writer, a producer of science program, a planner of science exhibition, or to participate in making science and technology policies and such like. They are also expected to be scientists who can communicate



with citizens themselves. Without sticking to their backgrounds, students challenge themselves to improve their various skills as Science Interpreter.

PCST NO.156

(WB2-06)

## MAPPING SCIENCE COMMUNICATION ACTIVITIES IN ITALY

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Considering the often heated debates on science communication issues in different national settings, one could question the core motives that drive different actors to engage in science communication activities of various kinds. In order to speak about the effectiveness or failure of these activities it would be necessary to identify the assumptions behind them, as well as the roles and functions that such communication initiatives would have. In other words, in the very dynamic world of contemporary science communication, you would need some guiding instruments would be needed to be able to better orient theory and practice in this area.

We have embarked on research that aims to identify the range of science communication activities that are undertaken in Italy today. It represents a preliminary step towards building up a 'map' of these activities. We have considered a previous work that has been done in UK and carried out by Research International. We have used a flexible approach combining a mixture of desk research, qualitative research and quantitative methods. We have conducted more than 20 interviews with different provider of activities and experts in science communication. The information obtained will serve as the basis for the quantitative stage based on an Internet questionnaire through which we will study in depth some themes that have already emerged in the qualitative stage, like the reasons and resources behind the current science communication activities, how to improve them, how one tries to understand if a specific activity has been successful or not. It is relevant to note in this first phase a growing presence, also in Italy, of actors such as environmental or consumer organizations that are active in producing knowledge of relevance to techno scientific questions although they are not scientists.

PCST NO.161

(WB2-07)

## SCIENCE COMMUNICATION AFTER SEPTEMBER 11

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The great impact of September 11 on society and public opinion is still there for everyone to see. But the terrorist attack and the anthrax letters circulating in the U.S. in October 2001 have greatly affected the mechanisms of science communication as well - a tangible evidence is the Statement on Scientific Publication and Security of February 2003. In what way was it mirrored in newspapers and scientific journals?

We analysed a daily newspaper, the American *New York Times*, and two scientific journals, *Science and Nature*. Not surprisingly, after September 11 the number of articles on bioterrorism increased exponentially, especially in the daily newspaper. The real unexpected fact however is the new approach scientific journals devote to this issue.

We analysed all articles on bioterrorism published by *Science and Nature* between October 1995 and June 2003, respectively 140 and 69. The identified articles were then grouped into seven different topics: science, health, research policy, security, politics, economics and ethics. Politics and economics make up together for 22% of the articles analysed for *Science*, and the percentage goes up to 34% for *Nature*. These figures are similar or even much higher than those found in the analysed lay press (23% in the *New York Times*), a fact that confirms the important role that politics and economics play today in the internal debates of the scientific community. On *Nature* such changes are much more apparent: politics, economics, ethics and research policy together make up for 70% of the total, and the photographs accompanying the articles on bioterrorism show politicians as often as scientists (18% each). The debate on bioterrorism seems therefore to have deeply influenced science communication, opening up for ethical, political and economic aspects in the narration of science, which further deepen the links between science and society.

PCST NO.688

(WB2-08)

## THE PUBLIC CONTROVERSY OVER SCIENCE & TECHNOLOGY AND PCST

Hee Je Bak

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In contemporary society, the public controversy over science and technology is one of the most important ways of communication between the public and scientists. By analyzing in-depth interviews of biotechnology scientists in Korea, this paper attempts to examine how scientists view the public controversy over science and technology. The overall findings of this paper affirm Martin Bauer's assertion that the public controversy over and resistance against new technology may function as unofficial technology assessment. In the in-depth interviews, many scientists confess that, due to the public controversy over and resistance against new technology, they became given a serious look over the potential adversarial effects of their research for the first time. The scientists involved in the controversial research, in particular those who belong to industrial research laboratories, have tended to pay greater attention to the public controversy over their research, while those whose research is relatively distant from the public



controversy have tended to be insensitive to it. Some scientists reported that they have even changed their research topic to avoid the public controversy. In the conclusion, the implications of the public controversy over science and technology for PCST and technology assessment will be discussed.

PCST NO.94

### DELIVERING INCLUSION IN SCIENCE COMMUNICATION (DISC) LINKING THE UK SCIENCE COMMUNICATION COMMUNITY WITH BLACK AND MINORITY ETHNIC GROUPS

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The BA (British Association for the Advancement of Science)

Elizabeth Rasekoala

ACNST (African Caribbean Network for Science and Technology)

We all recognise the need to reach new audiences in science communication. DISC (Delivering Inclusion in Science Communication) is a project that has provided opportunities for Black and Minority Ethnic (BME) groups and the UK science communication community to work together to enable greater participation in science.

Over a period of two years the project has created empowering networks and sustainable partnerships between BME groups and science communicators, by engaging both groups in consultation and dialogue, in two stages:

In 2004 DISC organised separate consultation events for BME groups and science communicators to assess the needs, interests and barriers faced when BME's in science communication activities. Barriers fell into three main categories:

- i. Organisational culture and strategic approaches
- ii. Current representations of 'science' particularly BME science
- iii. Lack of appropriate market intelligence

In order to further explore and attempt to address some of these barriers in 2005 representatives of ethnic minority groups and science communication groups were brought together at three two day residential workshops to network, share ideas and challenges, and develop partnerships. 16 partnership groups were formed to organize innovative initiatives in collaboration and in 2006 the groups will work to deliver new and inclusive science communication activities across the UK. The projects are being mentored by a national coordinator and recorded as case studies to share good practice amongst the community.

Alongside this work DISC has commissioned BME researchers to undertake research projects identifying and producing materials that detail BME contributions to science, both contemporary and historical and to gather market intelligence on a variety of BME communities that enables science communicators to better understand the wants and needs of BME groups and individuals.

DISC is uniquely the first initiative of its kind in the UK, working to illuminate the inclusive landscape that can be achieved through dynamic partnerships between science communication and BME groups, to deliver innovative scientific culture for an empowered citizenship, in a world of increasingly diverse societies and communities.

PCST NO.179

### EXPORTING AND ADAPTING SCIENCE COMMUNICATION MODELS IN FOREIGN COUNTRIES.

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Is it possible to export science communication models out of the country where they were born? How many modifications are necessary to make them effective when applied in foreign cultures? We would like to discuss this argument starting from our experience inside the Italian National Institute for the Physics of Matter, which started, nine years ago, a research line devoted to communication of science. The INFN staffs involved in these activities has chosen an approach which reflects his nature: as we are primarily scientists, and not journalists or pedagogues, we decided to start from contents, i.e. from a deep knowledge of the presented matter, in order to have high chance to communicate right concepts, experimenting different strategies to pursue this objective. We tried several approaches, experimented different ideas and improved our skills and techniques, through interaction with different categories of science communicators and their strategies. The kind of actions we undertook ranges from multimedia instruments to distance e-learning, from scientific journalism to radio programs, from conferences to hands-on exhibitions; started in a national context, many project have been extended in foreign countries: some European states, as well as some extra-European states, as South Africa, China, Australia, Japan, Cuba; some projects were born from cooperation between European states, or cooperation between European and Asian countries. In all these cases, we realized that not only content but also the cultural and social background in which the project is carried on is important: models effective for a country are not effective for other ones. For institutions as our Institute, whose aim is to diffuse science, the cultural and social aspect is an important parameter to consider. The problem is probably less crucial for Science Centres or private institutions located in a specific country and more interested in capturing the attention of local public.



## WB3-Scientific Contribution & Communication to Global Problem Solving

PCST NO.127

(WB3-01)

### TECHNICAL TASK FORCE: A PILOT PROJECT OF AGRICULTURAL SCIENCE COMMUNICATION IN CHINA

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China is an agricultural country with 63.91% of its total population living in rural areas. As traditional agriculture is being gradually replaced by modern agriculture, low level of science literacy of Chinese farmers has considerably hindered productivity in the agriculture sector. As a consequence, the farmers are still poor, so it is crucial for Chinese farmers to learn modern agricultural methods in order to eliminate poverty. However, due to insufficient qualified personnel and lack of technical services, urgent needs of the farmers are not met. While agricultural technicians are locally available in large numbers, their knowledge has not been fully applied in agricultural practices; thus a big information gap exists between technicians and farmers. Therefore a proper communication channel and a cooperative guarantee system need to be established so as to pass on science and technology (S&T) information from the 'rich region' to the 'needy region'. With this background, a pilot Project of agricultural science communication has been launched. Based on 'Voluntary Registration & Mutual Selection', lots of technicians were hired by the local government as 'Technical Task Force (TTF)'. They lived and worked together with the local farmers. In their cooperative efforts, they made technological as well as capital investment and share profits and losses to achieve 'double win' and then they both become shareholders. This pilot Project to persuade Chinese farmers to use modern scientific methods is so successful that the government is expanding it across the whole country. So far this Project has been tried and practiced in 267 counties across 23 provinces in China. This paper attempts to analyze the working mechanism of the innovative Project and discuss the relationships amongst local governments, farmers and TTF. The aim is to elaborate on an effective and successful practice of agricultural science communication between technicians and farmers in developing countries.

Keywords: Technical Task Force (TTF), pilot Project, agricultural science communication

PCST NO.129

(WB3-02)

### COMMUNICATION OF SCIENTIFIC INFORMATION IN THE ASSESSMENT OF ENVIRONMENTAL GOAL ACHIEVEMENT

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During the last few decades, the discourse of sustainable development has motivated new global, national and regional political strategies for action, not least in the environmental arena. One such strategy, used in several countries, is management-by-objectives, which implies that objectives are formulated, their attainment is directed and the results are measured. In Sweden, which is frequently cited as a world-leading country as regards environmental policy, efforts to achieve sustainability have been canalised through fifteen national environmental quality objectives. In the process of monitoring and assessing progress towards the environmental objectives, communication of scientific information is a crucial component. Thus, there is a need to identify obstacles in the communication process, focusing on the information flow between the scientific community and the environmental bureaucracy.

In this paper, I present results from a Swedish case study, where key actors within the environmental bureaucracy were interviewed about their experiences of using statistical tools and methods in the assessment of environmental goal achievement. The analyses focus on the management and communication of uncertainty and the role of science in the assessment of environmental objectives.

Key words: Sustainable Development, Environmental Management, Management-by-objectives, Statistics, Communication, Science and Policy.

PCST NO.134

(WB3-03)

### SCIENCE IN NEWS: CASE STUDY OF MEDIA COVERAGE OF CARDIOVASCULAR DISEASE

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Public health is a global issue related to science. Media promote both public understanding of public health and science



which is pivotal in working out public health problems.

How the media cover public health? Did the media cover science and technology related to public health in a way that can be easily understood by the public? This paper, analyzing contexts of mainstream newspapers coverage of cardiovascular disease in China, will seek the actuality of Chinese media coverage of this global issue and will offer practical suggestions on improving public understanding of science through media.

The analysis will put emphasis on frequency, types of literature, sources and contents of reports and science terms in the reports of cardiovascular disease. The same methods will also be applied to coverage of cardiovascular disease in three American newspapers. Comparison will be made between analysis of Chinese and American coverage to tell what is the best coverage being helpful in solving global health problems, and what changes should be made in helping the public understand of science.

PCST NO.187

(WB3-04)

### PUBLIC PARTICIPATION AND THE GOVERNANCE OF INNOVATION: EVALUATION OF PROCEDURE FOR CITIZENS INVOLVEMENT

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Techno-scientific innovations with an impact on the lives of citizens are increasingly at the centre of strong debates. One of the main challenges at all policy levels seems to be finding innovative ways to couple the increasing need to take decisions on complex, techno-scientific issues with democratic representation and citizens involvement.

The aim of the PPGI Project, promoted by the Italian Lombardia Region together with the Bassetti Foundation ([www.fondazionebassetti.org](http://www.fondazionebassetti.org)) in collaboration with Observa ([www.observa.it](http://www.observa.it)), has been to test out - for the very first time in Italy - new methods of citizen participation to policy processes regarding complex techno scientific issues. As a test case study, the topic of GMO research was selected as the main focus of panel discussions.

Two participatory meetings with citizens were held; the purpose was to test out methods for a direct and interactive involvement of different stakeholders (such as interests group, consumers associations and member of the general public alongside professional experts, representatives of the business sectors and scientists).

Two parallel procedures were designed and implemented in March 2004 involving stakeholders and two citizen panels selected by age, gender, educational level and geographic area. Members of the first panel were offered brief presentations by selected experts and stakeholders, with an aim to start the discussion on a balanced representation of different points of view. Members of the second panel could, instead, choose from a list of experts and stakeholders those they wanted to consult.

Specific social research tools were used (ex-ante and ex post questionnaires, telephone follow up, discourse analysis) to thoroughly evaluate the activity results. The analysis show relevant effects with respect to learning, participation and effectiveness of decision- making models.

PCST NO.204

(WB3-05)

### PREPARING ECONOMICAL SOCIETY EXHIBITION ON THE BASIS OF CHANGED APPROACH IN SCIENCE CENTRE

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With a huge population , China faces numerous challenges in the future including the rapid development of economy, the lack of energy, resources, water and so on. Given these challenges the necessity to communicate energysaving and resources conservation ideas among the public, foster the economical society culture is self-evident. The Chinese Government regards science centre institutions as an effective means to achieve these goals through their development of permanent public exhibitions. From the Chinese science centers perspective, staff are experiencing a bottleneck period in design and manufacturing conventional phenomenon-based exhibits, which are motivated to be interacted by curiosity and interest. The collection of this kind of classical exhibits often provide children with a fun experience in science centre, but at times fail to meet the demands of adult visitors, who are the key players in the thrift society planning and implementation. It is a considerable challenge to solve the problem of attracting\_ and holding the adult visitors' attention as an exhibition designer Several studies show that, to effectively serve the demands and desires of the general public in science center, the exhibition should challenge visitors with striking issues in thoughtful and emotional ways. This paper provides some means with regard to how to carry out this approach in practice, focusing on contextual physical environment and engaging the visitors by finding and satisfying the needs of visitors through the following strategies: 1) linking with their daily life; 2) sharing the new research outcomes and stimulating dialogue and debate; 3) promoting reflection, to change people's behaviors or guide their decision-making. The advantages of hands-on exhibits and new approach, have being embodied in the outline of the economizing resources exhibition.



PCST NO.217

(WB3-06)

## TOWARDS A STRATEGY FOR MOBILISING SCIENCE IN GLOBAL PROBLEM-SOLVING

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The Royal Swedish Academy of Sciences is an independent organisation with the purpose of promoting the natural sciences. Central tasks are to speak for science in the community and to influence research-policy priorities. Each year the Royal Swedish Academy of Sciences awards the Nobel prizes in physics and chemistry and the Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel. The Nobel prizes confer the best-known and prestigious scientific distinction, and their award attracts attention all over the world.

For research to bring about change and contribute to a better world, the research community and academia must not only communicate the contents and results of research (which of course happens to some extent through the Nobel prizes), but also be able to clarify and discuss the conditions and prerequisites of science. Important key people to reach are decision-makers, and here politicians are one of the highest-priority target groups. This is the reason why the Royal Swedish Academy of Sciences has for some time adopted a new, active, strategic starting point for reaching political representatives and the leaders of opinion.

Researchers seek new knowledge and new answers. Politicians do the same, though with much more practical and shorter-term perspectives: citizens and voters demand solutions and quick concrete answers. Science is among the most important tools for this and must in turn possess the conditions for action. But how to create among politicians the confidence in, and knowledge of, the operations of science? How can the dialogue between politicians and researchers be fostered?

A plan for research strategy includes/would include:

- target groups, a message, avenues
- an action plan
- formulation of short-term and long-term goals

Issues to be decided upon:

- how to measure the result?
- Challenges and risks?
- Opportunities and success factors?

PCST NO.325

(WB3-07)

## SCIENTIFIC TEMPER AND CONFLICT MANAGEMENT

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It has been a growing belief that only things having commercial and economic viability will sustain in today's fast advancing world that is governed and influenced by commercial and economic factors. The issue of increasing influence of commerce in society and development, and problems arising thereof has been the emerging concern recently. Things have even reached the point where commercial compulsions are making fundamental changes in the way a society acts and responds. In the process, there emerges a plethora of issues and problems resulting into conflicts that have no clear solutions but options. Here comes the role of scientific reasoning, scientific temper and communication that hold the key. The author has studied some of such situations and has arrived at certain conclusions. For example, plains of Ganges in northern India generally experience low water level during extreme summer leaving most of the water bodies dry. Even drinking water is not available for man and cattle in some areas. As a contrast, some forward looking farmers tend to exploit water bodies and even ground water for advanced agriculture to reap more profit during summer. It speaks in volumes the importance of creating a balance between custom approach and forward approach to help resolve the conflict. Scientific reasoning and science communication if applied rationally can only help in such cases. With several such examples, the present paper also discusses the efforts directed towards inculcating scientific temper and public understanding of science thereby empowering people to address such problems at local level. The phrase, 'Scientific Temper' introduced by first Indian Prime Minister Pt. Jawaharlal Nehru, means using method of science and being rational.



PCST NO. 111

(WB3-08)

## NET WORKING AT ALL LEVELS FOR GLOBAL PROBLEM SOLVING

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Today the entire world has become a small village with trade and exchange happening across borders, but when natural catastrophe like tsunami had hit the South Asian coastal belt, where a young Japanese girl understood it, people in Tamilnadu, India only regretted afterwards for losing everything due to ignorance and fear. Thus, the core problem on the global level today **is uneven and diffused exchange of information and lack of proper medium through which people can share their knowledge and experiences.**

An example could be, (**Case study 1**) when earthquake had hit Latur and Kutch areas of India, we had distributed **simple, informative and interactive scientifically designed earthquake kits.** This was of immense help to the affected people. But, when the same thing occurred in Pakistan and some parts of Jammu, they again went through the same agony and problems in spite of us having already experienced and handled it. We could not share our learning due to lack of any medium or network.

(**Case study 2**) But, at the same time the simple idea of watershed management that we had introduced in Saurashtra area, was very successful and now it is being replicated in various other regions. Initially here also, people wasted much time, effort and money in experimenting with complex machines. But, with the simple stone arrangement technique, such a critical problem could be resolved. **It was possible only because of people coming together, working in a team or as a natural network.**

So, whether the problem is local or on a global level, it is important to involve the common men through various levels of networks, **at grass- root, regional and international level, which are interrelated, interlinked and working actively and consistently to solve global problems.** Also, basic scientific knowledge should become the **'way of living life of people'.**

PCST NO.126

## KIDS UNIVERSITY VIENNA - CHILDREN'S QUESTIONS TO SCIENCE

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University of Vienna

The concept of Kids University Vienna (KUV) is as simple as successful: One week a year, children aged from 7 to 12 years take the place and the role of ordinary students at the University of Vienna.

In summer 2005 - during the third KUV - 3.500 children attended one or more of the 300 lectures and workshops. Scientists present research outcomes and come up for discussion. Experimental arrangements and innovative didactical approaches provide the chance to take a glimpse into the world of technology and science while looking over the scientists' shoulders. The latter not only act as role models, but are mutually inspired when children's commonplace curiosity is brought together with scientific problem formulation and research hypotheses.

Children are as active interested as critical and one of the keys to the project's success is that subject matters are close to their everyday interests and concerns, but approximate scientific ways of thinking - as they do for parents or relatives who frequently accompany them. (f. ex. environmental pollution, renewable energy, cross-cultural relations)

The concept of KUV is an excellent model of enhancing young people's interest in science studies and careers and is totally in line with political strategies and social attempts of bringing science into society.

However, recurrent evaluation outcomes show in the same way that there is a considerable social divide in participation, which is a well-educated and upper-class domain and predetermined by the constitutive cultural disposition within the scope of social origin. This might be a substantial contribution to the basic discussion of educational inequality and to finding more advanced models of bridging the gap between scientific community and the society at large

The paper presents the concept and is based upon >100 interviews with scientists and children, supplemented by an analysis of the social background of participants (survey: n>1.000).



PCST NO.148

## THE USE OF INFORMATION ABOUT HEALTH RESEARCH RESULTS IN COLOMBIA

Lisbeth Fog, Catalina Ávila  
Colombian Association of Science Journalism

Colombians hardly know what the health scientific community is working on, and what the results of its research are. During 2005 we designed a health communication strategy so that this information reaches the population that could make an important use of it. As methodology we used surveys, -to find out who should receive the info-, interviews and Focus Group meetings, -to find out if researchers in Colombia are willing to popularize science, to understand what health means to the media, and to confirm which groups of the population need the information.

According to interviews and surveys applied to researchers, people working on public health and decis/on-makers do need the information of health research results. Also it is important to train health communicators and journalists to reach the general public with accuracy and in an understandable way. It is difficult for them to reach these groups of the population.

The health communication strategy starts with the proposal of creating an Information of Colombian Health Research Observatory, in which all the research in this discipline will be gathered in data bases, and will be the raw material for the implementation of communication tools. An open and free website will be the main tool. According to the affiliation of the consultant, he (she) will find the information in their own language and stressing the most important part of the results for their use, based on the hypothesis that not all the information should reach the same people. Television and radio will also be used and a poster for each research that deserves to be spread out to children, families, and school teachers.

The training strategy that we propose to run parallel to the communication tools deals with three kind of programs: for researchers, for journalists active in the media, and for PIO of health research institutions.



## WC1 - Practicing Scientists: Key Actor for Global Citizenship

PCST NO.80

(WC1-01)

### THE SCIENTIST AS A GLOBAL CITIZEN

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In today's public communication of science and technology, not only citizens need to be informed of science, but scientists must also be able to understand and empathize with their fellow citizens, and be able to engage with them in interactive communication. These are the pillars of the MSc-program "Science Communication", launched at Groningen University in 2003, which converts highly specialized scientists into flexible mediators in the various interfaces of science and society: the scientists as a global citizen.

Students enter this program as a Bachelor in a single scientific discipline (e.g. Biology, Chemistry, Astrophysics), and then pass through a two-year curriculum, encompassing six months of scientific research in their original discipline, twelve months of communication classes and reflective topics (e.g. scientific methods, public dialogues), and six months of optional subjects and/or an apprenticeship. Their highly specialized Bachelor-education and their scientific Master-research supplies our students with much more knowledge and awareness of the realities of scientific labour than an average journalist or communication expert has, whilst their communicative and reflective skills are much better developed than those of regularly educated scientists. In this way, our graduates fill up a niche in society, as is established by the various work placements our students find for their apprenticeship and the varying professional careers of our first graduates.

In our paper, we will expound on the choices we made to tailor this MSc-program to the needs of present-day and future PCST, and how these choices are embedded in current theory and philosophy of communication and science communication. We will also demonstrate their practical implications, by giving examples of our classes (among which master classes by professionals in journalism and TV) and assignments (in which actual communication situations are taken on, and some have real external clients).

PCST NO.87

(WC1-02)

### IMPARTIAL SCIENTIFIC ADVICE FOR CITIZEN PARTICIPATION IN DECISION MAKING PROCESSES

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The Chemistry Shop of Groningen University has a history of more than 25 years of opening scientific research to civil society. It gives (mostly free) advice to the non-profit side of civil society, such as citizen and neighbourhood groups, workers associations, patients groups, environmental organisations, et cetera.

In many of our cases there is some kind of dispute between citizens, and companies or local authorities. Often, all parties refuse to talk because of mistrust and not understanding each other's motives. In this paper I will describe the role that we play in these disputes. There are different stages in which our science communication has an influence. This ranges from advise on scientific reports that are used by other parties, to doing additional research, and participation in the discussion with stakeholders. I will describe a number of cases, mostly focusing on the issue of 'odour pollution'.

In our work, we maintain our impartiality as scientists, and integrate other knowledge domains such as law and health. Sometimes we can achieve absolutely nothing for our client group, sometimes we achieve more than they hoped for. In general, our scientific support allows the citizens to discuss on an equal level with the other parties, because they can better handle the scientific and technical details of the issue. In many cases, our involvement benefits all actors involved, since in the end trust is restored. Therefore, the science shop is a good practice to involve citizens in the political decision making process, especially in local and regional issues. The citizens get the information and support that they need to participate (empowerment). By the way, for a scientist, communicating science with 'real people' in real troublesome situations is also very rewarding.



PCST NO.124

(WC1-03)

## TO CONNECT TO CITIZENS, RESEARCHERS MUST RETHINK THEIR RESEARCH PRACTICES

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Are science communicators a breed apart from which scientists seem to be excluded? Most scientists are seen as poor communicators and thus should be trained to acquire excellent communication skills to be key actors in the “democratic” model of science communication. Yet scientific writing manuals as well as reports on the conduct of science insist that “communicating is the doing of science” and that scientific communication is “ordinary”. We explore here some of the obstacles impairing researchers’ ability to communicate and defend the idea that changes are needed in researchers’ practices, in the concepts scientific practice is based on; we also show that the training young researchers receive reproduces what R. Day, author of the renowned manual on “How to write a scientific paper” calls “error in perpetuity”.

The author has conducted an action-research project for the past ten years within the scientific community, analysing scientists’ written and oral discourse and communication practices. Papers were analysed, as well as referees’ reports, Journals’ recommendations and editorials. Scientists’ discourse and communication practices were studied at interdisciplinary seminars on research project design and communication, working with researchers, and with researchers and their PhD students. Writing practices are in contradiction with the standards set by the scientific community and published in Journals’ recommendations, leading to verbosity and ambiguity; introductions lack key elements like a clearly formulated research question, problem or strategy, and implications of the research are often absent. The same is observed in research projects and when scientists defend their research orally. The weaknesses reported are confirmed by observations from evaluators of European Projects and American funding bodies. To connect to society in the democratic process of science communication, scientists will have to become enunciators again, revisit concepts like objectivity, responsibility and neutrality, speak in the first person, accept confrontation and share their questions.

PCST NO.154

(WC1-04)

## SCIENTISTS’ VIEW ABOUT COMMUNICATION IN THE ITALIAN CONTEXT

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The dispute about science communication has tended to focus on public opinion and attitudes towards science and scientists. The views of scientists have often been neglected. Policies to deal with science and society issues make ever growing demands on scientists to improve their communication skills and to be involved in public dialogue, but there is a relative lack of knowledge about scientists’ attitudes towards these themes. This knowledge should also be considered a basic need to improve the developing and delivering of science communication courses addressing the training of science researchers.

We have considered various aspects of the problem by the construction of a representative survey of over 300 Italian researchers. We have selected a random sample of scientists and started the qualitative stage of the research through telephone interviews conducted with scientists of different ages, backgrounds and positions. In this phase we have explored, for example, if scientists recognize a need to communicate their research and its implications in the public sphere; if they feel able to communicate effectively themselves to the public, through the media, to politicians, etc.; if they recognize some peculiarities in the Italian context. The interviews will serve as the basis for the quantitative stage based on a questionnaire. We will study in depth some themes that have already emerged in the interviews, like the distance between the perception of an activity, the communicative one, that is considered by scientists as secondary, and the reality of a working day that is full of communicative activities, even for researchers.



PCST NO.169

(WC1-05)

## I WANT TO BE A SCIENCE COMMUNICATOR: A 10 YEARS TRAINING EXPERIENCE IN SCIENCE COMMUNICATION

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CONTEXT: Science communication is becoming more and more important every day. Citizens are interested in science and particularly in that science that affects them the most (health, environment, technology). So science communicators have adopted a prominent role in the society of knowledge as mediators between scientists and general public. For successful results as science communicators, apart from their background in science or in social sciences, they need to have a specific comprehensive training in science communication.

OBJECTIVES: to show the specific skills required to be a successful science communicator; show up the strategies to reach them from a real experience carried out in Barcelona for 10 years and finally show up the main debates and reflection being considered around science and society to provide students with a critical point of view useful to tackle controversial issues.

METHODS: This project, sponsored by the Institute Novartis de Comunicación en Biomedicine, is a 10-year-old experience master degree in Science Communication run in Barcelona (Spain), which includes specific satellites around it providing students with a specialization on Science on TV, Science Museums or Medical Communication. The Masters includes a theoretical part aiming at providing a background on science and society, on ethical issues related to science communication and in short to create a critical opinion in order to be able to debate and reflect on science communication. The practical background is made up with different projects: writing workshops, oral communication workshops, radio and TV workshops, a web-based international project of science communication, an internship in a company or institution and a final project which ranges from a research study on science coverage in the media to a project of an exhibition on science and arts. It tries to give a comprehensive view of science communication, science in society and the practical skills to develop a career as science communicator.

PCST NO. 175

(WC1-06)

## MAKING A BRIDGE BETWEEN SCIENTISTS AND PUBLIC: PROVIDING A VENUE FOR LIVE-TALK FOR YOUNG AND UPCOMING SCIENTISTS

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National Museum of Emerging Science and Innovation (Miraikan)

Over the past 50 years science and technology has evolved at an unprecedented speed. This has resulted in the public being overwhelmed by science and thus, confusion and disinterest has spread. National Museum of Emerging Science and Innovation (Miraikan) was established four years ago in Japan in order to provide a bridge between what seems to the public the bewildering world of research, science and technology, and people.

Traditional Science museums have been focused on Public Understanding of Science which presents established science knowledge and examines applications of science in the past. Compared to PUS, Miraikan focuses on Public Understanding of Research which examines research into the unknown. PUR must be an on-going presentation following research as it develops. The future impact and applications of research are discussed, presenting the process, including negative and positive aspects, of research as it is happening. It enables the public to engage in a dialogue with the scientists, and to give feedback to the scientists.

Miraikan assumes an important role as the basis for PUR activities in Japan. For instance, it organizes special 'like talk' events where young and upcoming scientists get a chance to talk about their work to undergraduate students. Such activities promote interaction between scientists/researchers and the general public and arouse social interest in science and technology.



## WC2 - Societal & Educational System in Diverse Culture

PCST NO.168

(WC2-01)

### THE WORLD-WIDE DAY IN SCIENCE CONTINUES TO GROW

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University of New South Wales, University of the Republic of Uruguay, and Pompeu Fabra University

Imagine a 'virtual event' engaging students from high school through to postgraduate study in capturing the drama of a single day in science around the world via amateur science journalism, multi-media reporting, and weblogging. In 2005, the World-Wide Day in Science had grown to involve over 150 students and scientists on every continent, including Antarctica.

The World-Wide Day in Science project addresses a range of aims. It produces an annual, and growing, global career guide in science, in order to help reverse the decline in science enrolments in schools and universities. The career guide is assembled by students for students, a strategy designed to enhance its authenticity in the eyes of the student audience. Reports feature images, sound, and video placed on the world wide web, a resource often favoured by the young. Web publication enables students not only to create and disseminate authentic publications at minimal cost but to undertake international collaboration.

The scientists portrayed are usually not those covered by the media. Intriguing but previously little noticed areas of science are revealed to the student audience. In addition, 'quieter' scientists gain practice in explaining their scientific work to non-experts, without entering a lecture hall, where so few scientists excel.

In educational terms, participating scientists enter the 'community of practice' of science communication as do the student reporters. The latter also gain 'peripheral participation' in the communities of practice of scientific research and application and reveal their inner workings to their peers.

Experiences and preliminary research suggest challenges ahead as well as opportunities for building participation and readership. Methods, rationale, and development of the project in Australia, Spain, and Uruguay will be described. Those who are interested in collaborating on this project or in building other, global, 'virtual events' may benefit from this account.

PCST NO.202

(WC2-02)

### TEACHING PCST: PROVIDING GLOBAL PROFESSIONAL DEVELOPMENT OPPORTUNITIES THAT RECOGNIZE LOCAL CONTEXT

Luisa Massarani, Marina Joubert, and Bruce Lewenstein  
Fiocruz, Univ. Pretoria/SAASTA, and Cornell University

Worldwide, public communication of science and technology is increasingly recognized as an exciting and essential interdisciplinary field of study and research. In many developing countries there is a growing government support for public communication of science and therefore demand for science communication professionals at organizations like science centers, science councils and universities. Consequently there is a growing need for professional development opportunities in the field of science communication. This three-person panel will present the results of an attempt to meet that need by offering a distance-learning course from August to November 2005 that brought together students from Cornell University (USA), Fiocruz (Brazil), and SAASTA/Univ. of Pretoria (South Africa). The course was designed to review appropriate literature, develop case studies, and explore training possibilities in the field. The course was designed to give students a chance to discuss both theoretical and practical issues with science communicators in differing contexts.

**NOTE: This proposal is for a panel of three presentations, not just a single paper.**

PCST NO.252

(WC2-03)

### MAKING COMMUNICATOR THROUGH THE PRODUCTION OF SCIENCE RADIO: CHALLENGES OF CoSTEP

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CoSTEP, Hokkaido University

"The Science Explorers CoSTEP" is a weekly radio program produced by Hokkaido University's education program in science and technology communication (CoSTEP). The main target of the radio program is the upper grades of elementary school pupils (but it may also be educative for their parents). This radio program is trying to communicate science and technology to pupils and their parents in understandable and enjoyable way.

Together with teaching staff, students in CoSTEP are making a 30 minutes radio program every week. The production of radio program requires several communication skills that are essential for public communicators in science and technology. First, they need to gather material for the program by collecting information and contacting experts. Second, they need to explain scientific and technological matters in understandable language for children. Third, they need to communicate the matters in oral communication. Finally, they need to direct overall composition of the program that should be understandable and attractive. These communication skills are overlapped, so that students are learning how to synthesize these skills and other knowledge step by step.

Our radio program is broadcasted by a community FM station. Community FM may be the best entry point for the novice communicators because it is easy to imagine the audience in neighboring communities. In addition, our self-made radio program is now on the podcasting service, and we expect that it can attract wider audience.



PCST NO.255

(WC2 - 04)

### SCIENCE (2)COMMUNICATION TRAINING THROUGH WEBSITE CREATION: CHALLENGES OF CoSTEP

Gensei Ishimura, Shuko Ohtsu  
CoSTEP, Hokkaido University

This paper describes how students can learn the skills of science and technology communication by creating a website. In CoSTEP (Communicators in Science and Technology Education Program) at Hokkaido University, Japan, we have a practical training class where the students themselves produce and operate a website titled "Science Sightseeing Map" ([http://d.hatena.ne.jp/costep\\_webteam/](http://d.hatena.ne.jp/costep_webteam/)). The Sightseeing Map introduces various sight-seeing spots in the city of Sapporo, where the university is located, from scientific points of view, and reveals the new aspects of the city. For example, a beer factory and fermentation, audio engineering of the city concert hall, LEDs in electric bulletin boards, physical science of ski jump, etc. The students walk around the city with digital cameras, take pictures and gather information about the spots, and write short articles about them from scientific or technological viewpoints. We use a blog system to create the website, and that helped us get feedbacks from the readers.

Through the project, the students could learn the way to communicate attractively scientific and technological topics to the public, and experience various responses from the readers. They also need to learn the way of producing high-quality articles constantly to get many visitors to the website. In this way, the Sightseeing Map project can provide a clear example of the education of public communicators in science and technology through community-based activities.

PCST NO.257

(WC2-05)

### HANDS-ON TRAINING OF SCIENCE WRITING: CHALLENGES OF CoSTEP

Miho Namba  
CoSTEP, Hokkaido University

This paper gives a report on science writing education in CoSTEP (Communicators in Science and Technology Education Program) of Hokkaido University. The purpose of science writing is to write an article on science or technology that even non-specialist readers can understand easily, but the fundamentals of writing is common to all subjects, which is to express the writers' intention correctly and plainly. And, any articles can be improved with the proper basic writing skills and technique.

From a professional editor and writer's point of view, it seems to me that university students do not have opportunities to learn the proper writing skills. I got a chance to read many articles written by university students and have been amazed that most of them are unstructured, unorganized, and hard to understand.

My science writing class deals with the way to strengthen basic and common skills of creating and expressing ideas, especially focusing on paragraph development and logical connection between sentences.

The other unique character of this science writing class is that we are using existing publishing media. We actually receive orders to write and edit public relations magazines, news release documents, and science books as materials for science writing training. In some cases, the students have to win a competition against professional writers to get their works published. Also, I always require students to imagine the specific readers that they want to reach.

Through this hands-on training, the students can learn to review their self-righteous description and organize their writings more logically in order to make their writing understood by general audience. They also have to communicate with their clients (ex. editors and public relations officers) and learn the styles and modes of expression according to the media and audience.

PCST NO.258

(WC2-06)

### SCIENCE CAFÉ AS AN INCUBATOR OF SCIENCE COMMUNICATORS: CHALLENGES OF CoSTEP

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Science and technology communicators course (CoSTEP) at Hokkaido University, Japan, started a monthly Science Café as a part of its educational program in October 2005. The uniqueness of our café is that organizing the science café itself becomes a way of leaning PCST. In other words, students of CoSTEP are learning how to design and manage dialogic events on scientific or technological topics by operating actual events.

The Café by CoSTEP is the first regular science café in the region, and it gathers more than 100 participants in each event. So far, it featured topics such as astronomy and extra-terrestrial life, world heritage and science (industrial heritage), secrets behind the success of Finnish (science) education, earthquakes and tidal waves, and utilization of snow.

The students of CoSTEP in this café practicum have to learn how to choose topics and themes, write project documents, approach speakers, and design the program. Through this project, we found that science café can function as an incubator of science communicators who can organize and facilitate dialogic events on science and technology. Combined with lectures, seminars and practical trainings on science and technology communication, students are learning the basic and practical skills of PCST. In this paper, we will provide the details of this café practicum, and how our students turned to be science café organizers and science communicators.



PCST NO.259

(WC2-07)

## SCIENCE AND TECHNOLOGY DELIVERY: SCIENCE EDUCATION ON THE MOVE

Yusuke Sato, Takashi Miyairi  
CoSTEP, Hokkaido University

“Science and Technology Delivery” is an outreach program for the public. It is one of the practical trainings in an education program of science and technology communication in Hokkaido University in Japan, which is called “Communicators in Science and Technology Education Program (CoSTEP)” .

The method of Science and Technology Delivery is different from common school classes in terms of its flexibility and mobility. It is a way of outreach activities for the wider public, which is responding to the public’s needs and interest.

In an academic year of 2005-2006, we focused on the ordinance of GM crops because the ordinance was just in motion in January 2006 in our region (Hokkaido Prefecture). Understanding information in GM crops is important for the public so that we would collaborate with the local authority in the future.

In Science and Technology Delivery, several communication skills are required such as:

Research and Analysis Skills: exploring and researching content of catering.

Presentation Skills: composing contents, and making concise documents.

Event Production Skills: negotiating with clients, advertising, and designing programs.

PCST NO.318

(WC2-08)

## CHARICTERISTICS AND ROLES OF LG SCIENCE HALL IN KOREA : ONE OF ENTERPRISE SCIENCE CENTERS IN KOREA AND ITS UNIQUE ASPECTS FOR THE PUBLIC AWARENESS OF SCIENCE

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Private enterprises have been encouraged to be more concerned about business ethics including restoration for society. To return their profits to the customer, some companies have set up and operated special exhibition centers. Providing many services and activities, they have encouraged people to visit them more and to have better image of the company.

Among them, the enterprise science centers can be spotlighted in science communication. Because they are considering visitors as potential consumers for the company, they actively try to influence on public attitudes and opinions. Through the procedure, they have been contributing important roles for the free-choice science learning.

LG Science Hall in Korea is one of enterprise science centers in Korea. We need to pay special attention to it, because it has constructed its own characteristics through interaction with visitors and exhibits. It was affected by national need and visitors’ opinion.

In this paper, I will show the characteristics of LG Science Hall with scrutinizing the mass media data and historical records. To contribute for the public awareness of science, it has improved the purposes, the contents, the target visitors, etc. Through the procedure it can construct its unique characteristics.

In conclusion, the unique system of LG Science Hall is reflecting its inside and outside conditions and affecting on public awareness of science.



PCST NO.220

## COMMUNICATING SCIENCE FOR EVERYONE

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Engage scientists in social communication activities is a rather complicated job. First, because, sometimes they do not have the social commitment to spend some of their valuable time going to record some radio or TV programs or going through the all island to share, in a rigorous and simple language, their scientific background. In another hand, when you find someone with the willing to enface the job, usually the researcher do not have communication capabilities..

Every year, in the Cuban Ministry we organize a national meeting that we call *Journey for a Scientific Culture* that has become a very important moment when many professionals, journalists, decision makers, public in general have the possibilities to hear the most eminent Cuban scientists talking about the more relevant and hot topics of the universal science and also about their own researching backgrounds. The main objectives are: to promote and popularise the development of Science and new Technologies, to improve and update the knowledge of specialists on top scientific topics of special interest, to popularise the latest advances of science, to contribute to the development of a Scientific Culture among specialists and executives in Science and technology Systems in the Region

It is a relevant fact, that we include in our audience the workers of science, technology and environment, belonging to every municipality of our country, in such a way that having they all the materials, CDs, documentations, films, etc, they have the possibility to multiply the experience to rural communities, schools, neighbourhoods.

The three day event is dedicated to relevant thematic lines, for example, Genetically modified organisms, Stem Cells, last results of the Cuban sciences in Vaccines or Biotechnology, other edition have devoted to Science and Technology for environment or Sustainable Development, Global Climate changes and specifically year 2005 was devoted to the “World Year of Physics”, with topics about the Big-Bang or the origin of the Universe, Einstein in the dairy life, Women in Basic Sciences, etc. In 2006 we plan to develop a journey joining the Social scientists and scientists in basic an natural sciences, promoting a debate on the impact of our activities in social and cultural development of the Cuban population.

In every edition the most relevant men and women in sciences in Cuba and Latin America are invited to teach Special Conferences, to show experiences or films, and all the activities are organized as a *Show Talk* style. In the process of the *Journeys* we include the modality called *Café Scientifique* to promote open discussions about the public perception on Science and Technology.

The impact of the *Journeys* has been important in the Scientific *panorama* in Cuba. As long as we know, there were isolated experiences in different places and moments of the scientific development in the last four decades, but not a permanent national meeting having these characteristics.

Each time already the scientific community, young people, students and teachers, journalists dedicated to scientific journalism, administrative workers of the S&T systems, wait the days of the *Journeys* (usually every April).

We modestly think that we have achieved three main results as the followings: to engage every year Cuban scientists and Academicians in the communication activities, to stimulate the interest of knowing more about Science and Technology of a wider group of the Cuban people, to contribute to the appropriation of basic concepts on S&T of, every year, more number of citizens, increasing their scientific culture.



## WC3 - Dialogue between Tradition and Science I

PCST NO.75

(WC3-01)

### CO-EXISTENCE OF TRADITIONAL AND SCIENTIFIC CULTURES: AN EMPIRICAL STUDY DURING KUMBH 2001

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Every culture is driven, in some senses, by the beliefs and superstitions prevalent in the society and held by the traditions. The strong cultural bond between society and these beliefs is quite hard to break. The cover of education and development in science, have contributed for the rational thinking in the society, but still some integrated approach is needed for superstition-free society. The superstitions associated with science or scientific phenomena are more abundant in the society as people apprehend a) contradiction of science with religion and b) scientific research and discoveries have generated more and more questions to be probed. The authors have mentioned elsewhere the indicators or the intrinsic factors in science contributing to the cultural distance between science and public. The present paper is a step ahead and tries to reveal socio-religious basis of beliefs and superstitions and existence of these systems in the society along with the scientific knowledge. Efforts have also done to establish that the more complex a scientific phenomenon (with greater cultural distance) entertains variety of superstitions associated with it. Furthermore, even the educated lot perceive some beliefs or superstitions in relation to more distant scientific phenomenon. The hypothesis has been put to empirical test for the data collected during Kumbh-2001 (a religio-cultural conglomeration at confluence of two [holy] rivers). The qualitative as well as quantitative analysis revealed that the superstitious responses or beliefs for science are widely distributed among the Indian public irrespective of peoples' education level. The analysis for the area of Astronomy and Cosmology also describes that more complex a phenomenon is, the more percentage (quantitative) of respondents invoke supernatural aspect of response. The type of superstitious (qualitative) responses showed various shades of (mis)-belief for more complex scientific aspects rather than simpler one.

PCST NO.104

(WC3-02)

### THE ROLE OF BUDDHIST MONK IN LOCAL DEVELOPMENT: SCIENCE COMMUNICATION FROM THAI LOCAL CONTEXT

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After the capitalist economy has circulated extensively in the country for the last few decades, traditional ways of life have been gradually destroyed. Problems of migrant labor, debt crisis, and deforestation have turned more serious especially in the rural part. Like other villagers in the remote areas, *Pongkhum village* in Amphur Santisook, Nan province (668 kilometres from Bangkok) in the northern part of Thailand has faced difficulty to be self-reliance because the expansion of commercial economy and consumption-oriented notions have influenced the village to import more and more material merchandises from the outside. Even though the textiles woven from natural-dyed fabric, a heritage craft handed down from generation to generation has been deliberately replaced by the industrial chemical-dyed fabric and slowly disappeared along with the elders. To conserve and to systematically develop this splendid treasure to be an alternative to nurture village self-reliance, *Phra Somkit Jaranathummo*, Buddhist monk from Wat (temple) Pongkhum who is a native to this village, launched the research named "The development processes of natural-dyed fabric production: case study of ", a participatory action research which had financial support from Thailand Research Fund (TRY). Because of the difficulty to link between Thai local wisdom and science & technology, in this case *Phra Somkit Jaranathummo* as mediator plays significant role to connect these two sides of knowledge. This study aims to identify and analyze the role and processes of mediator in bridging the two knowledge by using the SECI Model of Ikujiro Nanaka as the tools to investigate knowledge creation directed by mediator.



PCST NO.120

(WC3-03)

### LUNG FUNCTION PARAMETERS OF BANGLADESHI PEOPLE IN DIFFERENT LIVING CONDITIONS

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The “standard” values of pulmonary function tests obtained from Western populations do not agree with that of people of Bangladesh. The present study was conducted with a view to determine the values of lung function parameters such as vital capacity, forced vital capacity and forced expiratory volume in healthy Bangladeshi population from two different income group with different living conditions. 300 non-smokers of age group 20-40 years were selected for the study of which 150 were university students and employees and 150 were slum dwellers of low income group. The lung function values correlated positively with height and weight, and negatively with age. There is a definite effect of aging on lung function showing a declining trend from age 35 years onwards. The slum dwellers showed lower values of lung functions than the other group. The difference decreased with age. Prediction equations were set up using height, weight and age as parameters. In general the lung function values were found to be 80% of the European Standards.

PCST NO. 150

(WC3-04)

### IMPACTS OF TRADITION ON SCIENCE DEVELOPMENT IN NIGERIA

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Tradition has become the basis of knowledge to every group of mankind throughout the world as every community existence depends on their traditional values. In view of this scientific development, which is also an attribute of knowledge, could not be totally divorced from these human traditions, which had either enhanced socioeconomic and scientific development or inhibits the interaction of traditional values to scientific development.

This study highlights the conceptual framework of tradition as regards to national science policy and their effects on scientific development in Africa especially in Nigeria. It also highlights the influence of traditional values such as hierarchy, egalitarianism, and fatalism on science development.

Each was categorized into different forms of knowledge as regards the problematic status each had on science development.

In conclusion, suggestions were made as to link the exploits of tradition on science development in view of the increase in scientific knowledge.

PCST NO.170

(WC3-05)

### WHEN MEDIA STARDOM AND SCIENTIFIC STARDOM COMBINE: NOBEL LAUREATES IN THE ITALIA DAILY PRESS

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The paper presents the preliminary results of a longitudinal study of the coverage of Nobel prize assignments in Chemistry, Physics and Medicine in the Italian leading newspaper, *Il Corriere della Sera*, throughout the last century (1901-1999). Through a quantitative and qualitative analysis of the prize coverage, the paper focuses on the historical transformation of discursive strategies employed to present and contextualize scientific excellence and more in general on the emerging images and conceptions of research activities, research achievements and their social, cultural and political implications. The multiple public ‘uses’ of Nobel laureates - for instance as wide-ranging experts or media celebrities, as resources for political claims of national pride - are also highlighted.



PCST NO.172

(WC3-06)

## JOURNALISTS VIEWS OF SCIENTISTS - BREAKING DOWN CULTURAL DIFFERENCES

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This paper will use the results of surveys conducted in Australia with journalists to discuss the attitudes of science journalists and general journalists to scientists. This is further explored by interviews with journalists to determine the depth of their views. A recent survey of journalists in Australia (May 2005) where most of the survey respondents were science journalists indicated existing barriers between scientists and journalists. Most of the journalists (81%) indicated they contacted scientists consistently or sometimes receiving good quality information (90% said consistently or sometimes). A number of questions in the survey asked journalists about their view of scientists, and most journalists responded that scientists were (consistently or sometimes) passionate about their work (113), trustworthy (111), and helpful to the media (102). However, a significant number of journalists also said that scientists were (consistently or sometimes):

- unlikely to be able to explain their work clearly without using jargon (99)
- cared more about their peers than what the public thought (90)
- were removed from the concerns of ordinary people (77)
- did not understand how the media worked (71)
- were more concerned about funding than making a difference (67)
- were likely to hype or exaggerate their work (50)

This preliminary survey results will be further explored and compared with similar international research.

PCST NO.174

(WC3-07)

## OPENING DIALOGUE BETWEEN TRADITION AND SCIENCE: “ SCIENCE AND SOCIETY ” IN THE TRADITIONAL ASIAN WAYS

Yuwanuch Tinnaluck

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Besides modern marvels and their impacts on quality of contemporary life, rapid expansions of knowledge and technologies also have downsides. The discrepancy has shown in the clashing of modernity and globalization with local traditions and cultures. In addition, we realize that development driven by the dominant knowledge of science and technology makes it possible to consume natural resources at great speed. The exploitation of natural resources and degradation of the environment is threatening the sustainability of life on this planet. New trend of development looks to sustainability and the importance of cultural pluralism for a more holistic and harmonious development. This trend appears to be having similar line of thinking as traditional Asian cultures. This article presents a double fold discussion on ancient Asian sciences, especially, from the two Great Civilizations of India and China, together with traditional Asian ways of thinking that were comparable to the “Science and Society” perspective of today. It points out some approaches that enable PCST to assume its role in opening dialogue between tradition and science in order to mutually enrich and be enriched. The author also sees that this can be a natural way to integrate social and cultural dimensions to modern development.

PCST NO.147

## AN EPISTEMOLOGICAL UNDERSTANDING OF PUS

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There is absence of a conceptual and theoretical foundation towards the formulation of an epistemological understanding of PUS in South Africa. Such a foundation is required as a base to intellectually steer rigorous academic research within the Universities. Once such an understanding is formulated it could assist in the research process and the formulation of questionnaires when doing surveys amongst the publics. To successfully develop such an epistemological understanding we need to critically evaluate the interaction between the policy (vision and mission) of governmental bodies involved with the promotion of PUS and the process (implementation) and dissemination of survey results by the same bodies. We need to differentiate, as part of this evaluation, between the intellectual ‘understanding’ of science by the publics and the ‘knowledge’ of science imparted by the scientists. At the same time the ‘attitude’ of the publics towards science is as important to consider as the ‘understanding’ of science by the same publics. The most difficult task, however, will be to bridge the gap created by an epistemological divide between research paradigms created by government (macro perspectives) and the micro narratives embedded within the South African publics (the indigenous knowledge systems). This divide needs to be breached to empower researchers to provide space for the still ‘unknown’ factor of the publics’ knowledge systems. These knowledge systems that exist traditionally within communities helped them to reach and sustain a certain level of development over centuries and still play a crucial role in the societies.

The presentation will be based on the intellectual exploration of these ideas by the authors during a collaborative research project between two countries- India and South Africa as well as between ‘two cultures’ - science and the arts.



## TA1 - PCST in the World and in Asia II

PEST NO.181

(TA1-01))

### SCIENCE AS A CULTURE, AND AN INTRODUCTION TO NEW PUBLIC UNDERSTANDING OF RESEARCH (PUR) EXPERIMENTS IN JAPAN

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Although Japan is considered a technologically established state, the Japanese adult's interest in science is very low. Although Japanese children's academic ability is high according to international tests, interest in science is very low. But, is Japanese children's academic ability really high? According to the research I conducted in 1994, 40% of the Japanese elementary school students answered that the Sun rotates around the Earth and only 60% of elementary school students know the Earth rotates around the Sun. Scientific development requires support of the public, and astronomy can be a good entrance to science for the public. In Japan, we have about 350 planetariums and about 250 public astronomical observatories. Recently, more Japanese astronomers cooperate with these social educational institutions, science journalism, and school education. Science plays an important role in technology and economic development. But science also plays intellectual and cultural roles. Science is the same over the world but public culture vary, and public understanding of research (PUR) activities have to reflect these differences. Goals and approaches of education & popularization are somewhat different in various countries. Robert Semper (2005) has classified the public understanding of research (PUR) as follows. The PUR Culture in Europe – "Dialogue", in US - "Understanding", and in Japan – "Interest and Awareness". For PUR to succeed, training of science communicator, dialog with citizens, expansion of 'Outreach' (For example, information service over the Web, delivery lessons at school), and especially fusion and cooperation of "research community" and "educational community" are needed. Furthermore, I will introduce (1) 4D Digital Universe project (4D2U) and (2) Astronomy Pub as a new experiment of PUR, and try to evaluate these two NAOJ activities.

PCST NO.223

(TA1-02)

### CRESCENDO: FINDING WAYS TO JOIN UP UK SCIENCE ENGAGEMENT SCHEMES AND ACTIVITIES AND BUILDING CAPACITY

Steve Mesure

The Creative Science Consultancy Ltd.

In the UK, as in many other countries, the growth of public science engagement has arisen from many different sources and from a variety of stakeholders interested in promoting science.

The UK has a plethora of teaching and learning initiatives throughout the education system to raise attainment, inspire and engage young people and teachers, and improve the quality of teaching. We also have a wide variety of schemes and activities aimed at encouraging the public to engage in science and engineering.

Many new projects take place without the knowledge of other similar activities. Lessons learned do not get passed on to new projects and mistakes are repeated. The opportunity to duplicate successful projects is missed and useful resources are not used as widely as they might be.

CreScENDO is piloting ways of building capacity and developing lateral networks in the UK. It aims to assist the organization of, and build networks between, the stakeholders, experts and practitioners involved in the public engagement of science and engineering, and in related informal education. CreScENDO will help to develop lateral networks between schemes, encourage useful evaluation to be shared among practitioners and policy makers, and shift the culture into one of mutual support. In short, CreScENDO will help to avoid 'reinventing the wheel'.

Steve Mesure will report on the latest developments of CreScENDO one year into the project.

PCST NO.228

(TA1-03)

### FROM CONTENTS TO CONTEXT: CURRENT STATUS, CLASSIFICATION, AND PERSPECTIVE OF SCIENCE COMMUNICATION IN JAPAN.

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Science Communication (SC) is both a critical and trendy field now bandwagon in Japan and other developed countries. Possible reasons for the increasing importance of SC include the emergence of a class of highly educated individuals and the perceived conflict between the value systems of science and daily life. SC is a creative process that encourages clear communication between science and the experiences of daily life, rather than the mere conveyance of scientific results. It is not enough to convey the "content" of scientific and technological results. It is necessary to explain and communicate the common "context" of science and daily experience. Café Scientifique is an effective trial effort to create such common context, as the Cafés create a discussion space in which scientists and laypersons interact. Our field research demonstrated that Cafés in the UK and France function in this way. However, such Cafés in Japan have sometimes operated differently. We presume this is a consequence of Japan's cultural history. Since the late 19th century, we have introduced Western science into our society, but we have only been exposed to the products of scientific activity from outside of our society without the background, context and process surrounding such science. This means that we have not shared the context of scientific knowledge acquisition. Such a condition is commonly experienced by non-Western countries, suggesting a new perspective on the science-society relationship.



PCST NO.238

(TA1-04)

## CAF SCIENTIFIQUE: A SUCCESSFUL MODEL OF SCIENCE COMMUNICATION FROM WEST TO CHINA

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Cafe Scientifique is a place where the public can explore the latest ideas in science and technology with the scientists, while enjoying a cup of coffee or a glass of wine freely. This kind of informal discussion is often taken place in cafes, bars, but always outside a traditional serious academic context. Its aim is to promote public engagement with science and to make science accountable, not to be a shop window for science. It is based on the Café Philosophique movement which was started in France in 1992 by the philosopher Mare Sautet who wanted a place where ordinary people could discuss topics in philosophy. Duncan Dallas of the UK adapted the model to science communication - leading to the development of the Café Scientifique movement, which so far has been popular and welcomed in the west. Now the movement has been introduced by the UK to China. From 2003 up to now, the British Council has organized lots of Café Scientifique activities in the city of Beijing, Shanghai, Guangzhou, Chengdu, Chongqing, with the topics of global issues such as Zero Carbon City, Clone, GMO, global warming, etc. Since it came to China, it has been deeply loved by the Chinese public; more and more people participate in the Cafe Scientifique. In a relaxing and comfortable atmosphere, the public is involved in the discussion with the scientists and feel the charm of the science; for the first time, they develop a great interest in science. This paper will analyze how a mature model of science communication from west is introduced, and developed in a developing country, with the emphasis on its communication process and effects, which can fully show a successful model of science communication can be expanded trans-culturally and shared in diverse culture.

PCST NO.251

(TA1-05)

## THE PERCEPTION OF SCIENCE AND SCIENTISTS IN THE YOUNG PUBLIC

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Common people watching the world through a special glance. This is the image that Italian youth has on scientists, while disagreeing with them on study and commitment involved by work. These are amongst the outlooks emerging by a research carried out by ICS (Innovation in the communication of science, International school of advanced studies, Italy) during 2003, over a sample of boys and girls aged 14-15 in Italian schools.

The interest stands in the need to know public attitude towards science as a first step for communicating science itself in a proper and effective way. In particular, choosing teenagers is requested by the importance of understanding which science image have those ones who bring ideas and reflect debates' core of adult world. The point is that they are next decision makers in the comparison between science and society. In this way, 5230 boys and girls throughout Italy answered 50 questions set in 6 areas: scientist figure, the image of science, scientific thought (the role of mathematic language, of experiment and method), the relationship between science and nature, the awareness with scientist work, confidence on scientific progress.

Outlooks sketch a scenario which can't be taken for granted: scientist emerges as character provided with genius inspiration while descending his ivory tower to carry on his work with other social groups. On the other hand, science has a significant role in our history and it will solve many future problems. Nevertheless, at the same time, it won't win challenges such as poverty, hunger, wars. Starting from the Italian experience, the description of these outlooks has the fundamental objective of raising a comparison among the participants from other PCST member states.

PCST NO.254

(TA1-06)

## CHILDREN AND SCIENTISTS: PERCEPTION AND ATTITUDES

Yuriy Castelfranchi, Yuriy Catelfranchi, Daniele Gouthier, Irene Cannata

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Children's and young people's perceptions of science can represent important dimensions of analysis for studies on public understanding of science. Some images and attitudes about science and scientists seem to form quite early and to be relatively stable during the life, so that studying children's perception means also studying part of the cultural representations of science and technology. We propose here a qualitative analysis of drawings and tales by 8 and 9 years old Italian children, produced in the context of focus groups activities and by reformulating in a novel way the traditional Draw-a-scientist-test.

This approach allowed to investigate less explicit, underground aspects of such perceptions and attitudes, which can play a relevant role in order to understand better what science communication and science literacy mean today.

Mythical images, representations of scientists in action, space, time and social dimensions of scientific practice, as well as gender difference in children stories and drawings are discussed, revealing intriguing levels of deepness and complexity.

For example, the "otherness" of scientist is strongly perceived by children, but not in a banal way: unlike to the most of adults, children think that everyone can become a scientist, choosing "to be a scientist". Together with features of "social normality", that we noted to be more stressed in females than males, the scientist maintains an aura of exceptionality: he/she carries out the activity by his/her own or surrounded by his/her likes and spends a life deeply focused on lab. Moreover, the scientist activity is often brought back to a *technological and ethical dimension*, in which science assumes a rescuing connotation or, even if more rarely, a destructive connotation, both strongly mediated by the fiction world.

Starting from this point, we will show the development of the qualitative research aiming to raise the debate with other national experiences.



PCST NO.351

(TA1-07)

### SCIENCE COMMUNICATION ACTIVITIES IN KOREA FROM THE YEAR 2000 TO 2005

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One of the objects of our study is to analyze the process Koreans are being informed with scientific knowledge and the way Koreans are accessing to scientific culture. And we compare the Koreans' science communication activities in the year 2000 and those in the year 2005. With the basis of the analysis and comparison we discuss the current challenges to deepen and broaden public understanding of science in Korea and give some suggestions to solve these challenges.

PCST NO.1318

(TA1 - 08)

### GOVERNMENT OFFICERS AND THE PUBLIC AWARENESS OF SCIENCE IN THAILAND: A CASE STUDY ON BIOTECHNOLOGY

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This study was conducted in 2002-2004 among government officers who work closely with the general public in the areas of agricultural biotechnology and medical biotechnology, particularly in regional areas of Thailand. The results indicate that even though the majority of the government officers in this study acknowledge that public awareness of biotechnology is very important, their knowledge of biotechnology is slight. They have commented on the problem of not having enough information themselves to be of assistance to the public. Problems about lack of networks between the government organizations, which lead to problems of availability and accessibility to the sources of information, and the lacking of professional training, were also raised. This study has indicated that the first priority in the mission of raising the public awareness of science is to improve the competencies of the government officers in their awareness of important science issues. It has underlined an urgent need of a more proactive approach to bridge the gap between scientists and other government officers to help in raising science awareness and competencies among the government officers in order that they can consecutively and successfully complete their mission in raising the public awareness of science and technology.

PCST NO.250

### EDUCATION PROGRAM ON PCST: CoSTEP'S CHALLENGE

Shigeo Sugiyama

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This paper explains an education program in science and technology communication at Hokkaido University in Japan. The program, called "Communicators in Science and Technology Education Program (CoSTEP)", was established in 2005 and aims to educate people to be public communicators in science and technology. Public communicators in science and technology are expected to take an active role in bridging the gap between science and society.

Our educational program is unique in following two aspects. First, the educational method of this program is practice-based learning. Lectures and seminars provide not only scientific knowledge but also communication skills. Communication skills taught in CoSTEP are wide-ranging from writing skills, oral presentation, design, and workshop creation. Also, students can immediately apply acquired knowledge in actual practical settings such as publishing, broadcasting, public events, education, and web design. To support practice-based learning, there is specially appointed staff of 8 having broad experience in practical fields such as science journalism, science writing, science museums, and participatory events.

Second, this program is aiming at collaboration with the local community. For example, we give classes in the weekends in order to attract wider publics. Consequently, the current students come from various backgrounds and age groups. In addition, we are gradually establishing the collaborations with neighboring community. Hokkaido University is next to the city centre, so we have already established some links with a local bookshop, café, schools, NPOs, and student groups. Of course, our project is creating internal networks and activities within the university community.

We believe that nurturing citizenry with science literacy and communication skills through such education program leads to a greater public communication in science and technology.



## TA3 - Informed Citizen

PCST NO.158

(TA3-01)

### SCIENTISTS AS CITIZENS: TALKING ISSUES VERSUS TALKING SCIENCE

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This project was funded by the Economic and Research Council, UK Science in Society Programmed. The author would like to acknowledge the help of support of her project partners in the writing of this abstract and paper.

What happens when you invite an academic scientist and a non-scientist member of the public to talk to each other one-to-one about environmental issues? This project developed and piloted a new forum, the deliberative exchange - a facilitated one-to-one conversation between two persons from very different backgrounds, in which the participants discussed important scientific, ethical or policy issues. The two groups of participants were academic scientists (6) and members of the public (6) recruited from the local community in Newcastle upon Tyne.

The one-to-one exchange provided an unusual context to study communication between scientists and non-scientists. None of our non-scientists had previously had an opportunity to talk at any length to a scientist about science related issues. All of our scientists had some previous experience of public engagement but a detailed discussion with a single individual was quite a different proposition. In this structured yet relatively informal context where they were being asked to talk about subjects on which they were often not experts with non-scientists that they had not met before, the scientists had to construct their own role.

The research presented here reports on the experience of the academic scientists during the six deliberative exchanges they took part in. Three of the six scientists, at least part of the time, took on the role of "science communicator" - they were consistently willing and able to talk science and to engage in science explanation across a range of issues. In contrast, the other three scientists deliberately avoided talking science. They restricted themselves to discussing "the issues" with the non-scientists and did not draw on their own research experience or engage in detailed science explanation. For the "science communicators", science - or, at least, relevant environmental science - was not that special: it was more systematic than lay knowledge but not difficult to understand. The "issues only" scientists had a more esoteric conception of science, which may have discouraged them from trying to explain science to the non-scientists.

PCST NO. 163

(TA3-02)

### SCIENCE NEWS IN EUROPEAN TELEVISION. A STUDY OF QUANTITY, AIRTIME, AGENDA AND JOURNALISTIC VALUES

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This article presents the main results of a comparative research study on science in prime time European television news, in the five largest markets: Germany, United Kingdom, France, Italy and Spain. Firstly, it focuses on the number of items and time allocated to news about *science and technology*, *health and environment*, in the main news broadcasts of the leading public and the leading commercial channel, in each country.

According to polls, citizens are deeply interested in science. However, the results of our study confirm that *science and technology and environment* are relatively marginal topics to the news agenda. On the contrary, *health* is a relevant topic. Date on airtime and length confirm the status of each topic.

The most frequent journalistic values mentioned are public *relevance and timeliness*, whereas the least frequent were *visual interest and proximity*. As far as the agenda of topics covered, there is little coincidence among countries.

**Keywords:** Science television news, Airtime, Agenda, Journalistic values.



PCST NO.165

(TA3-03)

## COMMUNICATION OF SCIENCE ENABLING SOCIETAL EFFECTIVENESS

Ylva Sjönell & Sven Hamrefors

Organisational effectiveness is related to the ability to execute activities that make it efficient to exploit its present domain and gradually develop new activities exploring new domains in which the organisation will be efficient in the future. A similar perspective can be applied on the effectiveness of the society. One important role for science is to enable this societal effectiveness.

This model can be applied on the communication of scientific knowledge; how can communication of scientific knowledge enable opportunity action initiating both the opportunity creation as well as enabling counteracting the emergence of threats? In order to have this impact on societal behaviour the communication of science must meet some quality criteria:

1. Degree of accuracy. Therefore the degree of significance given by a certain test may not be the right measure of accuracy but rather how relevant and inspiring the knowledge is in a certain setting.
2. System dependent. Often science is produced under an ideology developed within the natural sciences and consequently the scope of attention is often restricted to limited systems. This perspective may therefore be difficult to apply in reality with its complexity and open systems. Another system dependence occurs when the science is too much adapted to specific applications. In this case it may lose its societal relevance because it is based upon a too narrow practical perspective.
3. Time limitation. "Good" science is perceived to be knowledge based upon phenomena already existing. This makes science backward looking, while it should have its effect in the societal forward looking.
4. Origin of knowledge. The scientific community is not always good at implementing knowledge from practitioners.

By improving in these four criteria science may develop its effectiveness in society.

PCST NO.171

(TA3-04)

## INFORMING THE CITIZENRY AND STUDENTS THROUGH PUBLIC OUTREACH PROGRAMS MAKING USE OF SCIENCE AND THE ARTS

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The medium is the arts; the message is the joys of science. The performing arts are being used by this project to make science and technology accessible, relevant, and exciting in ways that provide both scientific content and significant artistic values. Since many societal issues - medicine, global warming, the environment and energy - have a major scientific component, it is essential for public policy making in a democracy that citizens be informed and engaged. Moreover, as we reach out to young people through our SOS (Science Outreach Series) program, children are introduced to science in new, creative, ways that will encourage scientific literacy and lead increasing numbers of young people into science endeavors. The performance series *Science and the Arts* has been developed and tested at the Graduate Center of the City University of New York (CUNY) in mid-Manhattan for more than five years, see <http://web.gc.cuny.edu/sciart/>. The National Science Foundation (NSF) recently acknowledged our accomplishments in science outreach by awarding the Graduate Center a major grant. The purpose of the grant is focused on implementing the development of science outreach programs at colleges and universities throughout the United States inspired by the *Copenhagen Symposia* and the *Einstein Centennial Celebration*. To replicate similar program nationally we make use faculty and staff in science and performing arts departments committed to public outreach in their disciplines. Our extensive science and the arts outreach projects will be described, as well as the author's role in producing two musical versions of a play, *Einstein's Dreams* based on the novel by Alan Lightman in Lisbon, Portugal and Philadelphia, Pennsylvania. Increasingly, science outreach through the arts is becoming an international venture, as evidenced by the author's experiences working collaboratively with scientists and artists in Portugal, Macedonia, Greece, South Africa, England, Spain and Brazil. We look forward to adding South Korea to our list of partners.



PCST NO.177

(TA3-05)

## THE DEVELOPMENT OF A NEW OBJECTIVE INSTRUMENT TO MEASURE DIFFERENT LEVELS OF INTERACTIVITY

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Interactivity is a characteristic of communication situations that is drawing more and more attention. Many researchers suggest that communication is most effective if a high level of interactivity between participants is involved. As yet, however, there is neither consensus on how interactivity is defined, nor on how it can be measured. Some studies on interactivity refer only to computer-mediated communication, whereas others refer exclusively to mass media or face-to-face communication. The present study is aimed at finding an operational definition of interactivity that can be used in almost all communication contexts. To that end, a distinction will be made between how people perceive interactivity subjectively and how it can be measured objectively. Based on three recent reviews on the concept of interactivity, the study will propose an objective measurement instrument for interactivity that includes the scoring of a set of interactivity characteristics such as synchronicity, timing flexibility, control over content, and the physical presence of participants. In addition, the instrument includes the extent to which participants in a communication situation use their senses. For example, do participants use sight and/or hearing in the communication process? Using two examples of communication situations, the applicability of the new instrument is demonstrated by determining the level of interactivity regarding the set of characteristics in a parsimonious and quantitative way. Future studies can then establish how strongly the scores obtained with the objective instrument correlate with subjective perceptions of interactivity.

PCST NO.189

(TA3-06)

## ON JAPAN'S WAYS OF SCIENCE COMMUNICATION

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We need to improve the public awareness of science and technology to solve many of the problems we face today. Merely providing easy-to-understand information is not enough in order to solve these issues. An approach that makes S&T feel more familiar to people is required. In short, in addition to the recognition that "S&T is useful," and "science is basically interesting," we feel that it is important to actively push the viewpoint that science is both fun and beautiful. However, promoting the idea that S&T is interesting and fun is in itself also insufficient. We need to nourish an environment in which technological topics, including their good and bad points, are talked about on an everyday basis. This is the goal toward which scientific communication aspires. If we think of these activities aimed at promoting how interesting and fun S&T can be as the "foothills" of scientific communication, or in other words activities to "reduce the size of the group with little interest in S&T," then later scientific communication activities could be called the "mountainside." For example a scientific café is supposed to be an effective way to dialogue about hot issues of S&T. But in Japan we had not such a culture as a café in western culture. Therefore we need to invent a new way of dialogue. In Japan's culture we have had a Japan's way of dialogue. It is Idobata Dialogue (Well-side Chat). Idobata Dialogue means having a friendly gossip with neighbors around a common well. It must be easier to dialogue in such a situation than in a café, though Idobata is a metaphor. I am discussing our idea and some trials for Japan's ways of science communication.

PCST NO.195

(TA3-07)

## CLIMATE CHANGE, SCIENCE COMMUNICATION AND PUBLIC ENGAGEMENT PRESENTED AT THE 9<sup>TH</sup> INTERNATIONAL CONFERENCE ON PUBLIC COMMUNICATION OF SCIENCE AND TECHNOLOGY

Hepeng Jia  
SciDev. Net & CHINA DAILY

China has been widely attributed as a major emergent emitter of greenhouse gases and its role in the post-Kyoto global climate negotiation is pivotal. However, compared with the rising importance of China in the global climate change, the public understanding of the issue has been extremely poor. In this thesis, the methods of media content analysis, randomized questionnaires as well as interviews with climate scientists and activists are combined to reveal social, political and scientific factors leading to the one-sided media coverage of climate change and the poor public reactions to the issue. While profit-oriented atmosphere and the rapid growth of China have led the intellectuals, media, and the public to shun any discussion on China's obligation in the global climate change, the rising nationalism is inducing an even hostile attitude towards the international criticism against the country's rapidly growing emission. Scientifically, the lack of independent Chinese researches in climate change and an insufficiency in the institutional science communication have resulted in the barren public knowledge of global warming and low interest in the theme. In the general social, political and scientific context, the efforts to improve the public awareness of the global warming and China's immediate obligation in the field have to be based on more systematic approaches involving reflection on China's development model, free public discussion and participation, and more relevant research and proper communication in the field of climate sciences.



PCST NO.349

(TA3-08)

### SCIRAB: SCIENCE IN RADIO BROADCASTING

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SCIRAB (Science in radio broadcasting) was born as a one year EU funded-project (FP6-Science and Society programme) aimed at constructing a network of journalists, scientists and researchers in order to exchange knowledge and experiences and set up a benchmarking process to evaluate the role of the radio in science communication. SCIRAB has surveyed science radio programs broadcasted throughout Europe, made contacts with journalists, scientists and producers, and constructed a website devoted to communication within practitioners. A high quality, on going communication between science radio programs will help sharing best ideas and best practices, and developing an international dimension of science communication through the radio. Through a survey of science radio programs and three meetings, SCIRAB has provided guidelines to evaluate different approaches on how to deal with science and technology on the radio and assess their impact on public perception of science.

SCIRAB aims at giving a contribution to the literature specifically discussing the role of the radio in science communication, through the study of the potential of radio in stimulating the dialogue between scientists and society at large. In radio programs, scientists have the opportunity of directly presenting their work, in a much less structured framework than TV; listener often have the opportunity of directly pose questions to the scientists; the deep concerns, hopes and motivations of both have a great chance to emerge, beyond the mere transfer of scientific information: the radio provides a unique opportunity to breed familiarity between scientists and public.

Quantitative and qualitative results of the radio survey conducted in 2004 are presented, along with some comments on the way editorial choices reflect views and assumptions on the role given to science communication.



**TA6- Scientific Contribution & Communication to Global Problem  
Solving / Indicators of Public Engagement with S&T**

PCST NO.207

(TA6-01)

**THE DISCRETE CHOICE ANALYSIS AS A VALUABLE TOOL FOR ESTIMATING  
CONSUMER ATTITUDES TOWARDS GENETICALLY MODIFIED FOOD IN EUROPE**

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Previous research has demonstrated that gene transfer techniques in food production and in pharmacology are perceived differently by different people and that the acceptability of biotechnologies depends considerably on risk-benefit considerations. Judgments on Genetically Modified Products (GMP) are first made individually and subsequently made explicit by specific behaviors, for example, the choice to purchase, or not, a specific Genetically Modified (GM) food.

Despite the prospective benefits claimed by GMP promoters, public acceptance of GM foods remains low. European citizens are asking for assurances on the safety of these novel foods, and would like to have an active role in governing technology transfer from laboratories to markets. Understanding social responses to novel technology applications is essential in bringing new products to the shelves and in defining strategies for scientific research and development. Individual preferences are affected by many factors, including: personal utility (price, improved nutritional characteristics), risk perception, and beliefs (sustainable development). Consequently, purchase behavior is a suitable indicator of attitudes in GMP choice. In this respect, Discrete Choice Methodology proves to be a valuable tool for estimating such attitudes. This methodology assumes that people purchase goods by comparing the costs and benefits of each alternative. The final choice is the product that maximizes the consumer's utility and the one for which she or he is most willing to pay. The use of Discrete Choice Analysis helps to identify the key variables that affect purchase decisions—in this specific case, for GM foods—by providing information on preferences for various aspects of a complex food system. Aside from their usefulness as market survey, the results of our analysis may provide valuable guidelines for scientific research itself, as well as for governance and decision making in the delicate question of introducing novel foods. Research supported by Autonomous Province of Trento, Project EcoGenetic.Com

PCST NO.208

(TA6-02)

**“ ECO-FRIENDLY ” GENES: FROM SCIENTIFIC RESEARCH TO RISK MANAGEMENT,  
ETHICAL ISSUES AND COMMUNICATION**

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The scientific community needs to take into account increasing social demand for safety in plant gene-transfer techniques by exploiting “sustainable” practices based on technological progress and risk-management expertise. In addition, the adoption of a bioethical approach is becoming more and more critical in determining laboratory practices. Finally, the need for good communication and dissemination of scientific results is, today, an essential tool for properly managing conflicts among the various actors of the debate on plant transgenic research. The acknowledgment of these issues constitutes a milestone of the integrated project EcoGenetic. Com. The project was conceived as a way to develop multidisciplinary research on the question of risk management for plant exogenous gene transfer techniques. The project aims to provide the scientific community and public institutions with safety procedures, tools, and strategies for suitable risk management. This project brings together the expertise of genetics, social sciences, bioethics, communication and dissemination of scientific results to promote research that thoughtfully considers environmental questions, biological risk management, and the complex relationship between science and society. In our laboratory activity, we are actively assessing potential approaches for exogenous gene transfer into plants based on “clean” tools (i.e., the elimination of the antibiotic resistant genes, transfer of alternative marker genes, etc.). At the same time, we are conducting social research to analyze the scientific community's perception towards exogenous gene transfer hazards and their management. Moreover, we analyze—from a bioethical point of view—the concept of “sustainable development” and the implications of scientific research on nature. We are also looking at experience with approaches that actively involve the public in the scientific progress. Finally, the project EcoGenetic. Com is attempting to work out strategic guidelines for a good scientific communication. This research is supported by Autonomous Province of Trento, Project EcoGenetic.Com



PCST NO.209

(TA6-03)

### SEMIOTICS OF NATURAL CATASTROPHE DISCOURSE IN A POST - TSUNAMI WORLD: REPRESENTING THE SCIENCES IN MEDIA

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Korea University

Tsunami, Katrina, Kashmir, we have rarely witnessed human tragedy on these scales. Contemporary natural catastrophes are often represented in the media with rhetoric and imagery taken from the Tsunami. This paper is not about the visualizing of the event of the Tsunami itself, but about the cultural and political consequences of the use of Tsunami images for the representation of sciences in the media. It reads natural catastrophes as an image and discourse of enormous cultural capital. Tsunami has also come to provide ideas how to disseminate and construct a scientific understanding of global problems. In the global appropriations of the image of natural catastrophes an epistemological shift has happened from the natural catastrophe as event to natural catastrophe theory: the use of the natural catastrophe and its cultural representation as a political and critical tool, as well as its commodification within and for contemporary cultural production. Such a politics of meaning about sciences also necessarily undergirds the representation of imagined social realities and relations around which the discourses of science are perceived, articulated and appropriated. This paper will problematise the politics of meaning concerning the representation and production of sciences in the disparate contexts of media writing. With this shift, the Tsunami has been integrated into global scientific consciousness. According to Marc Augé, it signaled the planetary consciousness of global threats. With increased removal from its primary referent, the natural catastrophe and the uses of its images turns more and more into an 'imaginaire' as the constructed landscape of collective aspirations. The question is what kind of scripts are formed out of natural catastrophe imagery about how to represent, think and experience science in the face of natural catastrophe.

PCST NO.214

(TA6-04)

### THE FIRST DECADE OF AIDS IN BRAZIL: THE TV PRESENTS A NEW DISEASE TO THE PUBLIC

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This work analyses how the Acquired Immune Deficiency Syndrome (Aids), the most extensive epidemic of the 20<sup>th</sup> Century, has been broadcasted by the TV show *Fantástico*, from the Brazilian television network Globo, in the first decade in which the disease appeared in the Brazilian media (1983-1992). Television, as the main source of information for the population, played a key role in presenting Aids to the public, well before governments, health professionals and scientists had reliable answers about this disease. Out of 105 pieces of news, 26 were selected as those giving priority to the scientific aspects of the syndrome. Aids has naturally found a privileged space in *Fantástico*, in large account due to its unknown, lethal, sexually transmitted nature, which fits well into the TV show scope, with emphasis on the extraordinary, bizarre or even grotesque, inspired in the *fait divers* genre. *Fantástico* was a pioneer program in spreading the name Aids in the Brazilian news media, when it broadcasted a show in which the disease was already called the "20<sup>th</sup> Century epidemics" on March 27, 1983. The coverage has emphasized the national scenario and the scientific discourse, giving a reasonable space for the diffusion of information concerning the disease, informing the available means for its prevention, the scientific advances towards understanding Aids and the quality of the Brazilian public health system. However, it is clear that it has also contributed to the strengthening of myths and metaphors concerning science, the history of diseases, as well as prejudices and stigmas against its patients, a factor that has probably played a role in drifting away the spectator from the disease crude reality. *Fantástico* has filled in important gaps in the knowledge of the population at large, but at the cost of leaving aside the great moral, bioethical and ideological issues.

PCST NO.88

(TA6-05)

### CLONING GOES TO THE MOVIES

Craig Cormick  
Biotechnology Australia

Public attitude research shows that one of the major sources of information on human reproductive cloning is movies. Traditionally understanding of new and emerging technologies has come through the mass media, but human cloning, being so widely addressed through the popular culture of movies, is more effectively defined by Hollywood than the news media or science media. But how well is the science, or social issues, of cloning portrayed in movies? Using short film clips and references to key movies, including *The Boys from Brazil*, *The Island*, *Godsend*, *Multiplicity*, *The Sixth Day*, *the Fifth Element* and the Korean film *Yesterday*, this session will analyze the key messages relating to human reproductive cloning that are being portrayed through the medium of cinema, including the science, its regulation and issues of social trust, which will be compared with attitudes towards human cloning obtained from public attitude research.



PCST NO.95

(TA6-06)

## PUBLIC ENGAGEMENT ON EMERGING TECHNOLOGIES: THE GENETICS TOWN HALL MODEL

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Public opinion plays an important role in political debate and policy decision-making. Indeed, it is impossible to read about any policy debate in the popular press today without the results of a recently administered poll informing us of how the public currently weighs in on the subject. But public opinion research about science policy often is criticized for asking individuals to comment on complex technologies and ethical issues about which they may have little knowledge or few opportunities to consider in depth. Public engagement strategies that include some kind of tutorial presentations often are touted as an alternative method to assess public attitudes toward emerging technologies. The Genetics and Public Policy Center at The Johns Hopkins University undertook a deliberative public engagement activity in six American cities during the summer of 2004 using face-to-face discussions complemented by expert “minilectures” on various topics in the field of reproductive genetic testing. Reproductive genetic testing provides parents more options in having healthy babies; it also raises troubling questions about future uses of testing technologies and thus offers a good topic area for exploring public engagement in an emerging technology. Overall, our experience with this form of public engagement was extremely positive and we believe it helped participants become more informed about these issues: more than 70 percent of participants felt that the forum helped them clarify their own views and more than 90 percent found the forums personally valuable. The most striking was a change in attitude about regulation; support for regulation, especially to ensure safety and accuracy, increased significantly over the course of each Town Hall. The opinion that reproductive genetic testing helps parents make informed reproductive choices did not change significantly, but concern about unregulated technology getting “out of control” increased from 72 percent to 85 percent.

PCST NO.166

(TA6-07)

## PEOPLE'S SCIENCE MOVEMENT IN LATE XXTH CENTURY INDIA PRESENTED AT THE 9<sup>TH</sup> INTERNATIONAL CONFERENCE ON PUBLIC COMMUNICATION OF SCIENCE AND TECHNOLOGY

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The People's Science Movement (PSM) wants to use science as a tool for social emancipation and as an agent of social transformation. However, this paper takes up the issue of people's science movement which sees science as social activism in the framework of popularization of science, science as a means of social and cultural criticism, teaching science as a method of inquiry, promoting indigenous knowledge, making science and technology socially relevant and people-centered, stimulating mass creativity, science communication etc. The origin of the people's science movement in India may be traced to the early 1950s when a number of organizations emerged with the aim of creating scientific awareness among the general public. The Kerala Shastra Sahitya Parishad (KSSP), the Marathi Vidnyan Parishad (MVP), the Delhi Science Forum (DSF) and the Bhopal-based Eklavya are the more prominent among them. They began dissemination of information about science and technology (S&T) by publishing literature in various Indian languages. These emergent science communication organizations became the obvious forums which enable people to have more say in how and where science, should be used. It is the use of science, in one way or the other, in the activities of these organizations which has created a common thread bringing them together under the banner of PSM. The paper based on the sociological perspective of New Social Movement (NSM) i.e. from mobilization to institutionalization, analyzes the people's science movement in India since 1950s that has gradually been transformed into institutions and these shifts can be seen as part of an historical trajectory i.e. life cycle of a movement. People's science movement is a significant event which asserts that a culture of 'people's science' is emerged in this region in South Asia; that knowledge created in institutions alien from the people is returning to the people.



## TC1 - Practicing Scientists: Key Actor for Global Citizenship

PCST NO.293

(TC1-01)

### REQUIRED SKILLS AND TRAINING PROGRAM FOR SCIENCE COMMUNICATORS

Naoko Yamashina, Hiromi Yamamoto, Sachi Ito, Noyuri Mima  
National Museum of Emerging Science and Innovation (Miraikan)

#### INTRODUCTION

The training grounds for science communicators has been increasingly provided their public role is widely recognized. However, sufficient discussions on the required skills and activities for science communicators have not been made.

In order that the science communicators play their role adequately, it is essential to identify the required skills for them as the common understanding, and to establish the training system for them.

#### OBJECTIVES

National Museum of Emerging Science and Innovation (Miraikan) has social function as the trainer for science communicators. Miraikan also has human resources and opportunities for the promotion of public understanding of science and technology, which can provide the ideal environment for science communication practices.

In this study, the investigation was implemented aiming to clarify the required abilities and skills for science communicators, and to establish the training program using Miraikan's environment to provide skilled science communicators to the public.

#### INVESTIGATION

At the inception of the investigation, we picked 11 organizations including universities, research institutes, and science museums that have the training programs for science communicators in Japan. The investigation was carried out by interviewing with the managers of those programs.

#### RESULTS AND DISCUSSION

The investigation indicated that the public expects mainly the skills for science communicators as below;

1. Presentation and communication skills,
2. Research and information coordination skills, and
3. Management skills

At the same time, it revealed that there is no the clear criteria for these skills to be satisfied, and that the training programs for practical science communication are not sufficiently established and provided yet.

Based on these results, we, at Miraikan, are now preparing the training program to learn above skills with on-site exercises for science communicators, as well as working on establishing the evaluation criteria for these skills.

PCST NO.302

(TC1-02)

### PCST PROGRAMS BY 3 KOREAN RESEARCH INSTITUTES AND THEIR MEMBER S PERCEPTION ON THE PARTICIPATION IN RELATED ACTIVITIES

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Recently in Korea it has been emphasized that the participation in public understanding of science and technology (PUST) is science communities' duty or responsibility. Some of the state-backed scientific research institutes are trying to participate in PUST activities. While science communities are regarded as one of the main bodies participating in PUST activities, their own views on the participation have been rarely studied. The purpose of this study are to show the current PUST activities of three representative state-backed scientific research institutes in Korea and to investigate their members' perceptions (such as on the necessity of involvement in PUST, factors encouraging or discouraging the involvement, on the difficulties of participation). Three scientific research institutes run several programs (such as science class, research experience, guided tour, astronomical observation, and in- service programs for science teachers), develop materials or web-sites for the youth and the general public, and participate in National Science Festival and so on. And there are some gaps between the perceptions on PUST activities of the president, of the public relations officers, and of the researchers and between the policy and system from the institutional level to the individual level. The presidents of the institutes tend to think that PUST activities of the institute are very important because PUST is helpful to inform the institute's role and to appeal to the government and public for the support to their institutes. Thus the PUST activities are included as one of the goals of the institute and the achievements of the PUST activities are annually evaluated. On the other hand, even though some of the researchers personally might be interested in PUST activities, they think that participating in PUST activities is just an extra work for them. That is because individual's participation in PUST is not a serious evaluation item when researchers are evaluated at the end of the year. This paper suggests how to encourage the involvement of science communities in PUST and to improve their PUST activities.



PCST NO.305

(TC1-03)

### “ MOBILE SCIENCE LAB ” FOR COMMUNICATING SCIENCE AND TECHNOLOGY WITH TEENAGERS

Jung Hoon Choi, Bookkee Hwang, SungWon Hwang  
Hanyang University

Recently in Korea, the decrease of teenagers' interest in science has raised among scientists the significance of their public communication than ever. The “Mobile Science Lab” is one of the most distinguished public science program developed to bring teenagers to be engaged in activities of science and technology. Since 2002 Hanyang University has visited middle and high schools all over the country with a specially designed trailer. In 2004, it was expanded to cover elementary schools with the support of a private company (LG Chemistry). The “Mobile Science Lab” program consists of several activities. First, Science Show presents scientific phenomena with associated scientific theories in the form of drama. Second, in Experiential Experiment, students participate in directly manipulating materials. Third, Mini Science Museum introduces high-technological instruments to students. And finally in Science Lecture, scientists explain science in famous movies with educationally designed demonstrations. Above all, the program is designed to extend textbook science to everyday science and high-technology and thereby to provide students with opportunities to expand their understanding of science. In this presentation, we provide concrete examples of “Mobile Science Lab” and discuss our model for public science program relevant to our local situation in Korea.

PC

ST NO.360

(TC1-04)

### RECENT SEA LEVEL RISE IN THE EAST/JAPAN SEA

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Korea Ocean Research & Development

Patterns of recent sea level rise in the East/Japan Sea (EJS) are investigated through the analyses of TOPEX/Poseidon (T/P) sea level anomalies, thermosteric sea level (TSL) and tide gauge data. The 9-year long T/P analyses reveal average trends of  $5.4 \pm 0.3$  mm yr<sup>-1</sup> for all of EJS, which is much larger than the global rates of  $3.1 \pm 0.4$  mm yr<sup>-1</sup> found by Cabanes et al. [2001]. This T/P rate compares relatively well with those from TSL data and tidal sea level gauges, indicating that sea level rise in the EJS is mainly due to thermal expansion [Kang et al., 2005]. The southern EJS shows a non-uniform sea level trend pattern, with larger rates in the Ulleung and Yamato basins. This non-uniform pattern is discussed in terms of variable thermal expansions arising from a recent decadal trend in the temperature anomaly in the upper layer of the two basins. The 40-year-long TSL time series also reveals a decadal oscillation in the Ulleung and Yamato basins. It is hypothesized that the long-term oscillation in the southern ESS may be related to decadal variability of the heat content anomaly in the upper 300 m of the Pacific Ocean, as reported by Levitus et al. [2000], and to eddy fluctuations in the southern EJS.

The recent results for the global mean sea level rise are also reviewed and discussed in the presentation. The next stage of research for the change of mean sea level in the East/Japan Sea is to be carried out as a basic research program of Korean Ocean Research and Development (KORDI).



PCST NO.239

(TC1-05)

## GENOME RESEARCH AND COMMUNICATION WITH THE PUBLIC IN JAPAN

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Relationship between genome science and society has changed dramatically in the last several years. Human genome research is focusing on the diversity of individual genomes. For the organisms other than human, complete genome sequences of more than 200 species of animals, plants and microorganisms have been released. Genome research now has influence on much wider areas of society than before.

In order to get maximum benefit of genome research, it is necessary for genome science community to communicate with people in a variety of sectors of society. The genome science group (GS) supported by the Grant-in-Aid program for Scientific Research on Priority Areas from the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan consists of more than 150 research groups of scientists. Among them, eight groups are dealing with social issues of genome science. Some are studying ethical, legal and social issues (ELSI) and others are conducting surveys of opinions of the general public and researchers. Our research group, as one of the eight, is focusing on the practical method of public communication between genome scientists and non-specialists. We have organized a public event, 'Genome Square' from 2002 to 2004, which consists of lectures, panel discussions and exhibitions by genome scientists. More than 1300 scientists participated and the number of visitors was about 9700 in total. Next events are due to be held in the autumn of 2006. Based on the past experience, we plan to modify the program to have more bi-directional dialogue and exchanges of opinions between scientists and non-specialists.

In this presentation, we will report: 1) How the GS deals with the ELSI and communication with the society, 2) What we learned from the 'Genome Square' event and how we plan to improve it to have more effective communication.

PCST NO.430

## AN EVOLUTIONARY MODEL OF COMMUNICATION AWARENESS AMONG LAB RESEARCHERS: UNDER POLICY REINFORCEMENT OF " ORGANIZATIONAL OUTREACH "

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This paper discusses a newly required role of lab researchers to communicate their research with the public. As the National Science Foundation (NSF) stated in 2001, lab researchers of today need to communicate 'research' as uncertain and ongoing activities as well as 'science' as established and systematized knowledge. We argue such a hybrid role has been emerged through an evolutionary process, in which lab researchers try to adapt themselves to the change in their surrounding institutional environment. In this paper we focus on micro phenomena of lab researchers' behavior. We construct a case study basing on a fieldwork at a national laboratory of the Information Technology Research Institute (ITRI). In Japan the national government started to reinforce a new concept of "organizational outreach" directed by universities and research institutes in the new policy guidelines of public understanding of science and technology (PUST) promotion programs launched in the summer of 2005. This means that lab researchers should participate in outreach activities not only as a voluntary but also as a compulsory matter. However, lab researchers cannot easily recognize interests of their direct contribution to promoting relationships with the public. The case study mainly analyzes text-based archives of discussions and conflicts among researchers on policy and plan for public relations and communication, coding from records of meetings and e-mailings over three years, 2003-2005. The results present a historically evolutionary process of communication awareness of lab researchers as follows; 1) only publicizing research: orthodox public information and non-academic publications; 2) new additional pressure of selling research: promotion of intellectual properties and academic-industry alliances; 3) new stage of communicating research: pursuing hybrid method to integrate existing different purposes. In conclusion we propose both academic and practical implications and problems of this evolutionary model.



## TC2 - Societal & Educational System in Diverse Culture

PCST NO.82

(TC2-01)

### FOR BETTER PUBLIC UNDERSTANDING: WHAT MAKES PEOPLE STAY IN MUSEUMS ?

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The purpose of this study was to explore characteristics of natural history museum exhibits from the viewpoint of science education focusing on public understanding. A total of ninety exhibits for this study were examined in national science museums of Korea and Japan. Exhibits of Tokyo national science museum were again divided into two groups: the old and traditional types, and the new and renovated ones. Even though analyzing data was not undertaken through quantitative statistical process, the interpretation of the data was valid enough to fulfill the purpose of the research. While there were clear changes and differences between the old and the new types of exhibits in Tokyo national science museum, the old part of Tokyo museum was similar to one in Korea. Based on analyzing the new types of Tokyo museum, the current movement in the field of natural history museums of Korea explicitly has been toward utilizing more science education concepts and ideas. We intend to contribute, with this study, to better understanding the potential of museum as public learning and its functions of communicating with scientists.

PCST NO.159

(TC2-02)

### DEVELOPING A GOOD PRACTICE OF AN IN-SERVICE TRAINING FOR A SCIENCE TEACHER TO ACQUIRE COMPETENCE AS A SCIENCE COMMUNICATOR FOR THE PARENTS

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Recently, Japanese government intends to develop science communicators. A science teacher might be a science communicator for student in the school. But he/she is not a science communicator for parents in the school. The purpose of this case study is to develop a good practice of an in-service training for a science teacher to acquire competence as a science communicator for the parents. This practice is developed under the partnership with science museum staffs, university staffs, and a junior high school science teacher. The practice has four phases: (a) indoor training at museum, (b) outdoor training, (c) discussion on the teaching plan for “*Katei-Kyouiku-Gakkyu*” (Home Education Class: Japanese popular educational programmes for students’ parents held at schools) by a junior high school science teacher, and (d) implementation of “*Katei-Kyouiku-Gakkyu*.” These phases were designed to cultivate a teacher’s pedagogical content knowledge of teaching parents in the school. In this paper, we report overall research plan and overview of the practice.

PCST NO.276

(TC2-03)

### SEMIOTICS OF CHEMISTRY POSTERS

JaeYoung Han  
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The posters are the tools to communicate authors’ idea with others by visual image and a little word. The Korean Chemical Society had held the feast of drawing chemistry posters by students nationwide in 2004 and 2005. In two years, more than three thousands of posters were submitted, and about one hundred and fifty posters were selected as the prize winners. The award was divided by the grade levels of elementary, middle, and high school. Every discipline has its own sign with specific meaning shared by the members of the discipline. Chemist and students learning chemistry, therefore, will communicate with each other by specific chemical signs (codes). This study explores the codes of chemistry used in students’ posters. The visual and verbal elements of posters were analyzed in a semiotic perspective. The “chemistry” is depicted with experiment apparatus (such as a flask and a beaker), structural formula, the symbols of chemical elements, the graduations (as in a graduate cylinder), and the liquid (such as water or oil). The topics of posters were environment, life, development, future, etc. There were some differences in the elements of posters by the year (e.g., 2004 vs. 2005) and by the grade level.



PCST NO.288

(TC2-04)

### ANALYZING THE USE OF THE WEBSITE AND DEVELOPING THE WEBSITE EVALUATION FRAME THROUGH TASK-BASED PHYSICS LEARNING ACTIVITIES

Sung-il Kwak, Jin-Woong Song  
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This study examines the availability of internet access, patterns in use, and user satisfaction in physics class of an eleventh grade in Korea. The authors analyze the use of the websites concerning science learning and carry out the extraction of indicators for the websites evaluation through the submissions of the task-based science learning activity. The websites for students' tasks were chosen by the students but occasionally guided by teacher's recommendation.

The results can be summarized as follows. Firstly the characteristic of using websites was not different in terms of gender and achievement levels generally. Girls appeared to have more experience in the submission of web-based tasks in the class. They recognized the website more with the convenience and the usefulness. Secondly, the websites evaluation framework developed has two evaluation areas, the usefulness and the accessibility. While the usefulness has four evaluation items (i.e. contents, interactivity, data/information and practical use), the accessibility has seven evaluation items (i.e. search, management, construction, function, intelactivity and data/information and practical use). Thirdly, the authors constructed the 54 usefulness questionnaires and the 70 accessibility questionnaires using the indicators of the framework and applied to the students. The 13 evaluation factors were extracted in the usefulness, and the 18 evaluation factors were extracted in the accessibility by the factor analysis to the students' responses.

PCST NO.298

(TC2-05)

### A CASE STUDY ON DYADIC INTERACTION IN NATURAL HISTORY MUSEUM

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This study was to explore how visitor learning is constructed, especially the interaction between visitors in natural history museum. Natural history museums are places where people see and enjoy the exhibits, and talk and learn from each other. A growing number of educators have perceived and expected that informal institutional settings like natural history museums could play a more active role in science teaching and learning. Whereas only a few years ago it could be fairly stated that it was unclear whether visitors to museums truly learned, today the same could not be said. There have been researches examining individual student's cognitive and affective gains from experiences at museums. However, visitor learning as complex experience of the exhibits cannot be understood in detail without understanding the dialogue which the visitors with their family or friends share through dynamic interactions. Contextual Model of Learning was used as a theoretical construct for exploring visitor learning. For this study, the participants were two university students. They moved naturally through the exhibition with no predetermined path in a natural history museum in Korea. Data were gathered in the form of audio-recorded dyadic discourses at and between exhibits. The discourse data were transcribed and analyzed based on contextual model of learning. The findings included several influential factors for museum learning experiences. The factors in the contexts of personal, sociocultural, and physical are partly interrelated, and sometimes they influence on the visitors' experiences.

PCST NO.301

(TC2-06)

### SCIENTIFIC UNITS FOUND IN SCHOOL TEXTBOOKS AND EVERYDAY LIFE

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In this research, we surveyed how scientific units are used in textbooks and everyday contexts and also if there is any discordance between the learning of the units and the using of them in everyday life. We found out that even if the units are something regularly contacted with in everyday life, they are often learned later in the textbooks. The textbooks presented only examples of a small part of the units used in everyday contexts. On the other side, we could find a variety of units in everyday contexts. For example, distance, time, electricity, temperatures, and speed units are used in the streets, while volume and weight units in grocery shops and electricity-related, computer-related, and pressure units at home. Inscription regulations of the SI Units are well followed in the textbook, but even the basic inscription regulations are often not kept in everyday contexts. Also, Non-SI units are presented in the textbook in an introducing way and still Non-SI units were used in everyday contexts. Students were confused about scientific units with unscientific units, and units with non-units. This seems to be not only because the students do not have proper understanding over the characteristics of units, but also unscientific units are mingled and used with scientific units in everyday contexts. In conclusion, it seems that the discordance between scientific units in textbooks and units used in everyday life would cause considerable difficulty for students to use units as basic tools for scientific communication.

**Keywords:** Scientific units, Textbooks, Students' activity, Everyday contexts.



PCST NO.180

### THE FACTORS AFFECTING THE PROFESSIONAL DEVELOPMENT OF BEGINNING TEACHERS: COMPARATIVE STUDY BETWEEN KOREAN AND U.S. BEGINNING TEACHERS

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The purpose of this study is to identify and compare the major factors affecting the professional development of beginning science teachers in Korea and U.S. Participants are four beginning secondary science teachers in Seoul Metropolitan Area, Korea and four in the Midwest, U.S. We videotaped science classes and conducted semi-structured interviews. We collected instructional materials, too. All data were carefully transcribed and analyzed.

The major findings are as follows.

First, the major factors affecting the professional development in both countries are designated identity and school contexts such as assessment and preparing for tests. Several contextual factors, such as, science textbooks and clerical duties affected Korean participants, whereas, mentor teachers during internship affected the U.S. beginning teachers.

Second, the major difficulties and concerns of participants in both countries are classroom management and strengthening their own content knowledge.

Third, designated identities played an important role in deciding current and future classroom practices.

Fourth, participants in U.S. were heavily affected by mentor teachers during their internship. However, Korean participants were not affected by mentor teachers during student teaching but affected by more various factors than teachers in U.S.

PCST NO.200

### THE ANALYSIS OF SCIENCE AND TECHNOLOGY ARTICLES APPEARED IN NEW YEAR'S ISSUES OF KOREAN NEWSPAPERS (1946~2005)

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The purpose of this study was to examine how science and technology have delivered to the general public through Korean newspapers. As a way of doing this, the study carried out a comprehensive analysis of 444 articles of science and technology appeared in New Year's Issues, from 1946 to 2005, of three major Korean newspapers (i.e. Dong-A Ilbo, Chosun Ilbo, and JungAng Ilbo). The most popular topic areas of the articles were information/communication and health/medicine. The use of 'information graphics' (e.g. illustrations, cartoons, charts, maps) and 'article group' (i.e. grouping several sub-articles into one article group) became gradually the main format of the articles. The way of the participation by scientists and engineers changed from direct (e.g. contributions) to indirect (e.g. quotations, interviews, introductions) one. Nearly all scientists and engineers who participated in the articles were male (93.0%). The viewpoint of Deficit Model has been adopted more frequently than those of Rational Choice Model and Contextual Model, but latter viewpoints are being increased gradually. It was also shown that each viewpoint of the articles favors certain contexts of the articles: for example, 'scientific-technological context' and 'industrial-economical context' by the Deficit Model, 'personal context' by the Rational Choice Model, and 'sociocultural context' by the Contextual Model. Despite a severe limit of analyzing New Year's Issues only, this study could illustrate how the image of science and technology through popular newspapers has been changed over the period of 60 years.



## TC3 - Nexus of High - Tech and Society

PCST NO.84

(TC3-01)

### INFRASTRUCTURE OF SCIENTIFIC AND TECHNOLOGICAL KNOWLEDGE FLOWS IN SOCIETY: Polish experiences, 1989-2004

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In 1990, fundamental politico-economic transformations started in Poland with a primary purpose to introduce the free-market economy into the country. As a legacy after the previous system, there existed - among other things - two separate 'worlds' in the Polish economy: i.e. science and production (in the broad meaning). In the field of science and technology, we inherited: bad communication between science and society, low level of public understanding of science (PUS), weak co-operation between the science sphere and the production sphere, small scale of science commercialisation, practically non-existent infrastructure of scientific and technological knowledge flows in society.

At present, the market reforms are far advanced. So now, the main direction is to build the knowledge-based economy/society. Here, 'knowledge' is obviously understood as a scientific and technological (S&T) one. Achieving this purpose requires a significant intensification of the knowledge flows. There exist two basic sources of this knowledge: (1) a domestic science and technology sector/system, and (2) inflows of S&T knowledge from abroad. Both sources are equally important, however, in my paper I deal mainly with (1).

A broadly developed, well organized and functioning infrastructure of scientific and technological knowledge flows is a basis for the knowledge-based economy or society. However, in the Polish conditions, due to historical occurrences, science-production (S-P) linkages have a crucial role to play in the desired intensification of scientific and technological knowledge flows. Therefore, a special attention must be paid to institutional intermediaries between science and production. I call them 'uttis' (units making up technology transfer infrastructure).

As in other numerous countries, there exist three main types of institutional science-production links:

(1) Science parks, innovation incubators, technology centres, (2) bridging institutions, and (3) spin-off firms.

A big progress has been achieved in this field during the Polish transformations. Nowadays, we have twelve science parks, three of them in the course of organization; a quite well developed network of bridging institutions, nevertheless, not all of them working properly; and a certain, but not too big, number of spin-offs.

Of course, not only uttis participate in scientific and technological knowledge flows in the Polish society. Also, the other elements of the infrastructure are engaged in such events organized in the country every year as, for example, science festivals, scientific picnics, a national day of science, scientific and technological exhibitions and fairs, etc.

PCST NO.96

(TC3-02)

### THE IMPACT OF TISSUE ENGINEERING ON THE HIGH - TECH SOCIETY

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In the coming decades, as our high-tech society develops, tissue engineering will have a profound impact on biomedicine, quality of life, and society as a whole.

Tissue engineering is an interdisciplinary field that applies the principles of engineering & the life sciences towards the development of biological substitutes that restore, maintain or improve tissue function (National Science Foundation, USA, 1988). In addition tissue engineering is now also been seen as a way to develop non-medical tissue constructs for *in vitro* meat and leather production, as well as for engineering and military uses (such as real muscle actuators, biological computing and sensors). Longer lifespan, lower health care costs, less morbidity, and overcoming ethical issues associated with treatments such as organ transplantation will be what tissue engineering promises to achieve.

Tissue engineering has also pushed to public attention the role of biosciences and bioengineering in developing our high-tech society. Issues that have been raised in these areas have included (1) the ethics of stem cells and their use, (2) organ transplantation and donation, and (3) the changing identity and extent of intervention and manipulation of the human and animal body in the 21<sup>st</sup> Century.

Science communication and biological art has been utilized to explore these issues. By blending techniques in bioscience, bioengineering, design, and artistic disciplines, researchers and artists are working together not only to develop new creative methods for tissue engineering research, but are more importantly also promoting and sparking public reflection and discussions on the impact of biosciences, society, and ethical issues. This has been achieved through public installations of biological artworks, research collaborations, and public awareness initiatives.

This is paramount to ensuring that our high-tech society develops and maintains an informed perspective on these new technologies and their impact on our lives.



PCST NO.183

(TC3-03)

### - ETHICAL CONSIDERATION OF NEUROSCIENCE: NEUROETHICS AND ITS PERSPECTIVE

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Recent development of neuroscience has provided remarkable scientific discoveries, as well many newer philosophical, ethical, legal and social issues. For example, the consequences of the progress of non-invasive neuro-imaging technologies, such as functional magnetic resonance imaging (fMRI) and near infrared spectroscopy (NIRS), have caused a several issues. Can we “read” the mind of others by using these methods? One of the other examples is the advancement in the ability of manipulation of nerve system. Current products of neuro-engineering, neuro-technology, and neuro-pharmacology seem to remove the gap between “treatment” and “enhancement” of our quality of life. The development of brain-machine interface technology makes it possible for quadriplegia patients to control his/her own artificial arm. Certain kind of chemical medicine can enhance memory of Alzheimer’s patients, as well of young students straggling with school examination. Many of us are supposed not to oppose the former “treatment,” while to, or should, the latter “enhancement.” However, where is the border between these two, and who decide it, how? This paper provides a historical and current overview of the “neuroethics,” an emerging interdisciplinary field which treats and discusses these topics. First, academically, neuroethics is a hybrid of several related fields, such as bioethics, philosophy, religion, techno-ethics, and science communication. Second, politically, the USA and EU has showed strong interest in this topic and already started relating projects. We also launched Neuroethics Research Group in Japan (NeRGJ) last year as a part of larger research project of the cohort study, funded by Japan Science and Technology Agency (JST). Third, culturally, we need our own principle and philosophy of neuroethics in East Asian area, because of the several cultural differences between us and the western countries. We will also discuss how to share the ethical problems across neuroscientists, mass media, and public.

PCST NO.201

(TC3-04)

### MEDIA COVERAGE OF EMERGING TECHNOLOGIES: LESSONS FROM THE COVERAGE OF BIOTECHNOLOGY AND NANOTECHNOLOGY

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Recent studies have suggested that media coverage of biotechnology was similar to nuclear energy and other “emerging technologies.” To move beyond individual cases and towards a broader theory, this study looks at a new emerging technology—nanotechnology—and explicitly compares coverage of it to coverage of earlier emerging technologies. We will present a content analysis of nanotechnology coverage in the United States from 1986 to 2004, with some comparisons to coverage in other developed countries. We will discuss the appearance of social and ethical issues in the coverage, including the international implications of nanotechnology research for developing countries. We will present tentative suggestions about the implications of these findings for science communicators worldwide.

PCST NO.203

(TC3-05)

### BEFORE AND AFTER SCIENCE: SCIENCE AND TECHNOLOGY IN POP MUSIC, 1970-1990

Massimiano Bucchi

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Popular discourse about science and technology is too often described as a degraded, diminished simulacrum of specialist discourse. In this light, media contexts other than news (e.g. fiction) are also frequently neglected by scholars and practitioners in the PCST field. The paper uses the example of pop music to describe how the rich articulation of popular culture with regard to science and technology can interact in non linear, unpredictable ways with specialist knowledge. Pop music can thus become a significant source for understanding images and visions of science; examples can be provided of how the uses and appropriation of science issues and social meanings of science and technology in this context - from the ‘de-evolutionary’ theory underlining Devo’s pop songs to Kraftwerk’s ‘man machine’ ideology - have often preceded more explicit concerns for the implications of science and technology which have later become visible in other contexts like the news media.



PCST NO.205

(TC3-06)

### DEVELOPMENT OF A LEARNERS PARTICIPATORY INTERACTIVE VIRTUAL BOTANICAL GARDEN: SUPPORTING COLLABORATION BETWEEN SCIENTISTS AND LEARNERS WITH MOBILE PHONES

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Our project team has developed “clippicKids,” an information sharing support system using mobile phones. In this study, a virtual botanical garden was developed, through the “clippicKids” system, to develop interactive observation activities involving plant ecology specialists and general learners. The key feature of this virtual botanical garden is that general learners can upload their observation results to the garden using their mobile phones. In other words, general learners can participate in constructing the virtual botanical garden in cooperation with plant ecology specialists. To evaluate the efficacy of this virtual botanical garden system, demonstration experiments were conducted with college students, most of whom gave positive evaluations. Conventionally, scientific knowledge has been transferred only on a one-way basis, from scientists to the general public. Compared to the virtual garden development in this study, conventional botanical books consist of pre-packaged scientific knowledge, formulated by scientists. Therefore, members of the general public are assigned the role of mere users, and they do not participate in creating such books. On the contrary, the virtual botanical garden of this study is quite unique in providing the general public with opportunities to take part in compiling a botanical book.

PCST NO.339

(TC3-07)

### ESTIMATION OF DESIGN WAVE HEIGHT AND COASTAL DEFENSE: CONSIDERATION OF GLOBAL CLIMATE CHANGE

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Two types of long term wave climate information are desired for many marine and coastal applications especially for the design of coastal structures: the design waves and operational waves. In conventional method of design criteria estimation, it is assumed that the climate is stationary and the statistics and extreme analysis using the long-term measured or hindcasted data are used in the statistical prediction for the future. However, such assumption of steady state is argued recently due to the global climate change.

Since the availability of the field wave data for the waters around Korean peninsular is limited to cover climatically significant period of time to provide a reliable wave statistics, the wave climate information needs to be generated by means of long-term wave hindcasting using available meteorological data. Design wave height for the return period of 30, 50 and 100 years for 16 direction at each grid point of 18 km grid size for the waters around Korean peninsular has been estimated by means of extreme wave analysis using the detailed wave simulation data for major typhoons that affected Korea since 1951 and the continuous hindcasted wave data since 1979.

The methods of extreme statistical analysis to consider the recent extreme events like typhoon Maemi in 2003 was evaluated for more stable results of design wave height estimation for the return periods of 30-50 years, which is commonly applied in designing coastal structures like breakwater. The impact of global climate change in the estimation of design wave height for the return period of 30 and 50 years was analyzed and discussed



## TC6 - Science Discourse/Science Museum or Science Center /Reaching the Opinion Leaders

PCST NO.110

(TC6-01)

### RESEARCH ON NEW METHODS AND LANGUAGES FOR PUBLIC COMMUNICATION OF ASTROPHYSICS AT THE INAF NATIONAL INSTITUTE

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INAF ([www.inaf.it](http://www.inaf.it)) is the central administration institute that in Italy promotes and coordinates the research activities in astrophysics and must, by law, contribute to the basic and advanced education from schools to university level, and to the public outreach of astrophysics and space science.

Astronomy has always been one of the most diffused sciences among people, also in the past centuries, mainly because of the charm exerted on the general public.

For this reason and thanks to its consolidated experience in this field, the fact that INAF has the duty to communicate its research is not an issue. The questions to answer are rather: what should we communicate, how and to whom?

In this paper we are going to describe in detail the experience we made trying to answer these questions, and we are going to present our activity in the form of case studies of public communication.

**Keywords:** Astrophysics, Communication, Information, Science, Space, School, Public

PCST NO.432

(TC6-02)

### WHAT MAKES A STORY AN INTERESTING WAY TO COMMUNICATE SCIENCE?

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To understand how narratives organize, represent and convey information, it is an important task to evaluate the advantages that this media offers for the communication of science. Narratives include several characteristics that make them memorable, understandable, enjoyable and a good way to present and communicate knowledge. Some of these attributes are achieved through narrative structures, including literary devices.

People are familiar with the narrative structure of a story. Schemas for these narrative structures allow identification, induce emotions and promote understanding - important elements for the learning and memory process. Individually the narrative resources (or literary devices), in addition to their aesthetic value, can also work as mnemonic structures and as conceptual models that enable us to perceive, apprehend, construct and communicate meaning out of reality.

I conducted an experiment to explore the capabilities of narratives (short stories) to convey and preserve scientific information. I carried out a critical analysis of two short stories (Nitrogen by Primo Levi and The Crabs take Over the Island by Anatoly Dnieprov) to examine narrative structures and literary devices included in these texts. Following Propp's narrative analysis, I looked at characters, spheres of action and narrative functions. The functions and spheres of action proposed by Propp provided me the basis to contrast the stimulus narratives (short stories) with the reproductions of these narratives performed by the participants in the experiment.

The results suggest that there is a relationship between how central the scientific information is to the development of the story and how memorable it becomes. In other words, the closer the scientific information moves to the important moments in the narration (e.g., revelations, peripetia, anagnorisis, outcome, central functions, spheres of action and literary tropes), the more likely it is to succeed in communicating and making such scientific knowledge memorable.



PCST NO.117

(TC6-03)

### TEXTUAL ANALYSIS OF A SCIENCE CENTER: EXPRESSIVE MODES AND POSITIONING IMPLICATIONS

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The design of the exhibits in a science centre has specific effects as far as the socio-epistemic positioning of its visitors. Therefore in this paper, science centres are considered as 'texts' that employ a variety of semiotic modes (e.g. written language, two dimensional and three dimensional representations) for constructing their own messages. These messages refer to three distinct dimensions of the socio-epistemic positioning of visitors, i.e. the degree of the techno-scientific content specialization (positioning with respect to the techno-scientific subject matter), the degree of specialization of the corresponding expressive codes (positioning with respect to the specialized techno-scientific codes employed) as well as the interpersonal relationships that tend to be established (social positioning with respect to status of techno-scientific knowledge). These three functions, inspired by a systemic functional linguistics approach, become operational by applying a specific socio-semiotic scheme of analysis. As an example we analysed a thematic unit hosted in the Greek Natural History Centre-Gaia. The analysis shows that in this case science is presented as a specialized body of knowledge, expressed in vernacular and realistic codes and consisting of elements that can be discovered through active personal involvement and investigation (characteristics of a science center of the first generation).

PCST NO.184

(TC6-04)

### ACTIVITY TRENDS OF COMMUNICATING WITH NATURE IN NATIONAL SCIENCE MUSEUM OF KOREA: A KOREAN CASE STUDY

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This research is a case study based on a program entitled "Exploring the Nature" to analyze trends of out-of-school activities in National Science Museum of Korea. This activity has been prepared for elementary and middle school students, accompanied by parents from 1994 to enhance interesting and understanding about nature. From 1991 to 2005, this program was operated on 138 times and 11,040 students were educated. The fifteen-year period was divided into the stages I (1991~1993), II (1994~1997) and III (1998-2005) based on relative activities such as operating times and educated students. The number of students educated annually in the stages I, II, and III averages 0, 370, and 1,194, respectively, which shows a marked increase in quantity during the period. The program was provided only in summer and winter vacations in early stage. But from 1999, the program has been also run in 1st and 2nd academic terms, and operated throughout the year from 2002. The contents of the program were composed of birds, insects and fishes in the beginning but gradually extended to the plants, seas, fossils, and cave. This implies that the role of the Science Museum is extended to support school education by giving youth such an experience, which is useful in training and promoting their ability of scientific thinking and mind.

PCST NO.284

(TC6-05)

### SCIENCE COMMUNICATION FOR ADULTS AND COMMUNITY - THROUGH EXAMPLES OF JAPANESE SCIENCE RELATED MUSEUMS-

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One of the effective measures to promote public understandings of science and technology can be museums in that museums are places for all to learn beyond their nationalities, languages, values, and ages. In Japan, as defined the basic plan of Science and Technology (published by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). insists on the importance of connecting people with science through informal learning. There are more than 1000 of science related museums all over Japan. Why don't we make use of those museums as places for promoting science? When we develop new ways for promoting public understanding of science, the following two points arise: how to involve community and how to draw larger adult audiences

In order to diffuse science into people's everyday lives at the national level, community or local involvement is crucial. Thus, exhibitions and programs with local issues or resources should be great measures to draw community interest to the museums. In Japan, museums and science centers in general have been good at serving children. However, exhibitions, programs, and events oriented for adult audiences have not been fully developed. So there is still room to develop adult oriented programs and contents for adults.

Based on research results from questionnaires distributed to 632 science related museums\* in Japan (December, 2005) and interviews (January & February, 2006), this study analyzes today's effective measures involving community and adults as well as current problems to be solved. Also, in conclusion, the study gives some suggestions to promote science communication at the museums, reflecting Japanese museum's current activities.

\* Retrieval rate is 59% (368 of 632 museums responded).

**Keywords:** Museum, Science Communication for Adult, Community



PCST NO.961

(TC6-06)

### THE DEVELOPMENT OF THE EXHIBITION THEMES AND THE DISPLAY TECHNIQUE ABOUT THE CUTTING EDGE SCIENCE AND TECHNOLOGY

Goansu Jeon, Chung Taek Park, Jae Hyup Oh, Hyunsoo Tahk, Hyunmi Song  
National Science Museum

The rationale for this research is to development exhibition themes and display technique with respect to exhibitions on rapidly expanding field of cutting-edge science and technology and its applications; in an attempt to contribute to the proliferation of a scientific culture of appreciation, understanding and interaction for the museum's patrons.

We have planned a total of three stages of research (duration of two years for each stage). Currently, one stage of research has been completed in the first year encompassing ten items including "Introduction to Nano-technology", "Exploring the world of nano", "The usage of applied nano-technology" and "What are nano related to?" Three items including "The usage of applied nano- technology" are already installed in the National Science Museum.

In the second year, exhibitions featuring specialists on screens explaining the synergy of nano- and bio-technology in diagnostic, treatment and materials areas. Currently, we have installed exhibitions on "Nano-coating" and "Aesthetically immaculate nano-materials" ; thus far the reactions from museum patrons have been extremely positive.

In conclusion, this research is the first and only of its kind to be attempted in Korea in the area of development exhibition themes and display technique of cutting-edge technology exhibitions, and in the future we hope this research will be positively applied to disseminate the awareness of cutting-edge technology.

PCST NO.121

(TC6-07)

### INTERACTIVE COMMUNICATIONS WITH SPECIFIC TARGET GROUPS. EXAMPLES CONCERNING EDUCATION POLICY, AND SOCIO-ECONOMIC POLICY IN LARGE CITIES IN THE NETHERLANDS

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For a long time the major concern of science communicators has been: How do we reach our target groups? Nowadays, we wonder how we can involve and engage these groups. Not only can the target group learn from scientific research results, the researcher can learn from the target group as well. Most of the time there is a joint problem.

Two major programmes in the field of social sciences; financed by the Netherlands Organisation for Scientific Research, are STIP (Urban Innovation Programme) and PROO (Dutch Programme Council for Educational Research). These are perfect examples of mutual concern of researchers and specific groups in the public domain. The latter is about educational research in the broadest sense of the word. The former deals with intractable social and economic problems and the dynamics of innovation in large cities. This paper shows how the two research programmes were established, what topics were chosen, and which of these were transformed into research questions. The projects combine fundamental and applied research. Moreover, the paper explains how the involved parties are coping with the translations of empirical evidence into innovations and problem solving. The close alignment between academic research and issues practitioners have to deal with on a daily bases, ensures a surplus value. It surpasses just a formal form of cooperation, usually only at the end of the research project. Interactive workshops have proven to be useful communication instruments, as well as the use of internet and other new media, and city specific reports. The involvement of all parties is guaranteed during the whole research process, from brainstorm sessions to the actual implementation.



## FA1 - Informed Citizen

PCST NO.211

(FA1-01)

“ INFORMATION TRANSFER ” , “ TRANSLATION ” OR WHAT?  
A CONSTRUCTIVIST CONTRIBUTION TO THE THEORY  
OF SCIENCE COMMUNICATION  
PRESENTED AT THE 9<sup>TH</sup> INTERNATIONAL CONFERENCE ON PUBLIC  
COMMUNICATION OF SCIENCE AND TECHNOLOGY

Hans Peter Peters, Arlena Jung  
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Frequently, scientists complain about inaccuracies and biases in the public communication of science. Classical analyses (e.g. accuracy studies) interpret these communication problems as regrettable side-effects of simplification, prejudices or incompetence of science communicators (e.g. science journalists). From a constructivist point of view, however, these “distortions” are just the tip of an iceberg and point to the more general phenomenon that scientific and public constructs of science and its research objects differ - and need to differ in order to make sense in their respective contexts.

The paper wants to contribute to the discussion about the theory of science communication. It starts with the provoking proposition that scientific knowledge is usually incomprehensible and meaningless outside of science. It criticizes common metaphors like “information transfer” or “translation” that hinder a true understanding of science communication, feed unrealistic expectations, and lead to suboptimal communication strategies. The paper then outlines an alternative concept of science communication that accepts the fundamental difference of scientific and lay constructs and makes suggestions for the possible contributions of science and the role of scientists in the formation of public constructs.

In this concept the audiences of science communication and their information demands are the crucial points of reference. Unlike the information transfer model, in which “accuracy” serves as internal criterion of successful communication, the constructivist communication model lacks internal quality criteria. Such criteria thus have to be defined externally. The paper argues that the utility of knowledge constructs for their users is the key to assess the quality of science communication. However, since there is no universal way to define that utility it has to be determined either empirically - what do users expect from science communication? - or normatively, drawing on concepts like the “well-informed citizen” or “scientific citizenship” .

PCST NO.216

(FA1-02)

## THE USE OF FICTION FOR PRESENTING SCIENCE TO THE PUBLIC

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In recent years new trends in presenting science to the public have emerged. Scientific novels (*The State of Fear* or *Prey* by Michael Crichton or *L'île du jour d'avant* by Umberto Eco), science fiction movies (*The day after* or *Welcome to Gattaca*), drama based on science (*Copenhagen* by Michael Frayn) have been great international successes. The extent to and the modalities through which science is integrated within fictional narratives may vary from one piece to the other.

The ways science has been, and still is, usually unsuccessfully presented to the public is largely inspired by a top/down approach of knowledge transmission (deficit model). Such an approach put the emphasis on factual results which are supposed to provide the lay audience with a new representation of the real world. The consequence of this approach is the spreading of a “scientific ideology” which prevents people to be reflexive about such representations of the world. As a matter of fact, the authority of science makes impossible the questioning of the relation between the world and what science tells them about it.

The use of fiction which only pretends to entertain us by appealing to our imagination and our ability to dream for presenting science to the public allows us to integrate more concretely the human dimension of scientific activity. It permits us to put an emphasis not so much on the results of science than on its procedures. It aims at picturing “science in the making” rather than “ready made science” .

The important point here is to go from an ideology which conveys tacit representations and values, which are difficult to change, to what could now genuinely be named “culture”, which gives back to people the capacity to formulate their own questions about science. This is the necessary condition to the establishment of a truly democratic dialogue about science.



PCST NO.225

(FA1-03)

## THE UNDERSTANDING AND THE ATTITUDE OF THE KOREAN PEOPLE FOR THE SCIENCE AND THECHNOLOGY

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The understanding and the attitude of the Korean people for the science and technology was surveyed in 2005. The results from the two age groups, 13-17 and above 18, were analyzed, and compared with the survey results from US and Europe. Seventy % of Korean is interested in new scientific discoveries; significantly lower percentage than in US (92%) and Europe (78%). Similar trends were observed in the interests in the use of new inventions and technologies; Korea (44%), US (64%), Europe (64%). They are not interested in science because i) it is not necessary (Korea adults 30%, youth 16%; Europe 16%) and ii) it does not give fun; Korea (24%, youth 46%), Europe (31%). These data are reflected in the public understanding of science, Korean people obtained lower points (50% in 2005, 43% in 2004) in the understanding of new scientific discoveries compared to the people in US (71%) and Europe (61%). Understanding in the use of new inventions and technologies was also compared; Korea (44%), US (64%) and Europe (64%) Both adults (95%) and teenagers (96%) in Korea consider that scientists play a most important role in the development of the society. They think that scientists contribute more than medical doctors (91%, adults) and teachers/professors (77%, adults).

PCST NO.243

(FAI-04)

## SOCIAL DECISION MAKING PROCESS FOR SITING OF NUCLEAR POWER PLANTS IN JAPAN - CASE STUDIES ON MAKI- MACHI AND HOKKAIDO -

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This paper looks at new social decision making processes in Japanese local communities in dealing with nuclear power plant siting and draws lessons for future processes (but not intended to analyze nuclear policy itself). The paper analyzes two cases. One is Maki-machi in which nuclear project was cancelled by the local referendum. The other is Hokkaido in which siting of new plant was allowed by the decision of governor after the deliberation at the inquiry committee. We try to grasp the whole processes of these cases from the view point of the "Social Decision Making Process", not "Policy Making Process".

Our major findings can be summarized into three points as follows. First, these cases confirmed the importance of broader look at social decision making process, incorporating both "formal" and "informal" one. Second, these cases suggest three basic functions of "intermediate" process (the process between the agenda setting and the final decision), that is, Assessment of Options, Renewal of Agenda, and Social Learning. Thirdly, the issues of how to and who design the "arena" of such decision making process are very important.

We focus on the "Process" of the social decision making, and try to propose the way of improvement of it. We would recommend five points for design and management of better decision making process as follows.

- (1) Common understandings among stake holders
- (2) Designing of the process to match the objective
- (3) Effective utilization of "informal" process
- (4) Securing "fairness" of the process
- (5) Careful consideration in utilizing expert knowledge

Additionally, Hokkaido case suggests that "non-binding" expert committee could generate very substantial discussion on the issue. It would be important for designer to facilitate exchange of opinions through establishing such ad-hoc committee.



PCST NO.249

(FA1-05)

## AN ANALYTICAL PANORAMA OF THE FUNCTIONS OF PSYCHIATRY COMMUNICATION

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Psychiatry, considered by Alexandre Minkowski as “the most scientific of the human sciences and the most human of sciences”, saw a institutional and therapeutic revolution since about thirty years and especially, more recently, a communicational revolution. The improvement of the life quality became a priority for a large majority of citizens. So the interest which arouses psychiatry in our society motivates an important development of the dissemination of psychiatric knowledge and acculturation.

Based on the study of the psychiatry popularization stakes - of a social, individual, or professional nature - and of its social representations, this original and innovative work borrows a methodological tool from management: functional analysis.

Inspired by works of Jean-Marie Albertini and Claire B  lisle worried by some questions related to science popularization in the broad sense, our method aims to identify, to list and to analyze the functions of psychiatry popularization in order to organize them in a functional, structured and synthetic graphic representation.

By this free and detailed functional analysis, we show that psychiatry popularization counts a characteristic among the functions called “of service” \*, which is the therapeutic function. So we highlight two meanings:

- psychiatry popularization is a support for the care (to communicate while taking care of),
- psychiatry popularization is a care, in the sense where it configures and determines this one (to care by communication).

We can see hear one of the explanations of the success gained by psychiatry popularization near its “users”, public, patients, patients’ families and associations of patients as near its “actors”, psychiatrists, psychiatric institutions, laboratories, pharmacists.

\*those which answer needs expressed by public, patients, patients’ families, and associations of patients.

PCST NO.274

(FA1-06)

## PROMOTING DIALOGUE AROUND DEVELOPMENTS IN STEM CELL RESEARCH

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Stem cells hold great scientific and medical potential for the understanding and treatment of disease. Since the creation of the first human embryonic stem cell lines in 1998, research using human embryonic stem cells has been an area of social, ethical and regulatory complexity. Accessible and creative science communication, based on dialogue, is essential to allow the broadest possible community of stakeholders to engage with stem cell research. Working collaboratively with stem cell scientists, social scientists, students, teachers and filmmakers, we have developed a role-play and short film to facilitate this engagement.

The proposed scenario for the role-play is that of an Open Public Hearing of a Research Ethics Committee, appointed to decide on a clinical trial into the use of human embryonic stem cells to treat spinal cord injury. While in character, each participant raises several issues, including the source of stem cells, risk and the regulation of stem cell research. After the role-play, participants come out of character and discuss the issues raised. The aims are to examine the participants’ views and to empower them to engage in the debates surrounding stem cell research.

The 15-minute film, “A Stem Cell Story”, aims to foster public engagement by making the science behind the issues accessible. Taking as a starting point the questions stem cell scientists are asked by the public, the film presents the fundamentals of stem cell research in a stimulating and visually innovative way. Preliminary evaluation indicates that this collaboration between scientists and filmmakers has produced a unique and useful tool for teachers, patient groups, and other interested stakeholders - including scientists themselves in their own outreach work.

Both the role-play and film have been piloted at schools in Edinburgh, and are being made available to a broader audience via the web, festival screenings and DVD distribution, with ongoing evaluation.



PCST NO.275

(FA1-07)

## A NEW CENTER FOR PUBLIC LEARNING AND UNDERSTANDING OF SCIENCE(CPLUS) IN SWEDEN

Ilan Chabay

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University, Göteborg (Gothenburg), Sweden.

The Erna and Victor Hasselblad Foundation is providing funding for a new center and program in public learning and understanding of science (PLUS) to be established jointly between Chalmers University of Technology and Göteborg University in Göteborg, Sweden. The purpose of the program is to identify and ameliorate barriers that hinder communication between scientists and all members of society. As the first Hasselblad Professor, I am planning to conduct research on how ideas and processes of science are communicated between scientists, media sources, educators, and the public and to use the research findings to improve strategies and methods for public learning and understanding of science. Working within two excellent universities with strengths in many disciplines promises to lead us to new insights through dialogue and collaboration. PCST-9 in Seoul affords an excellent opportunity to open new dialogues and further opportunities for collaboration between the new Hasselblad program and colleagues from around the world on strategies, methods, and issues needed to improve communication of science.

In this presentation, I will outline my plans for research, including asking how children and adults from diverse communities learn to understand science from non-didactic experiences, what kind of mental models form the basis of their understanding, and how they learn and use processes of science. My students, colleagues, and I will use design experiments in informal settings and make connections to current research in the physical and biological sciences, social sciences, and communications. We will conduct research in public and commercial spaces, after school settings, and science museums (including the Universeum Science Center and Museum of World Culture in Göteborg). Our methods will include storytelling with children, video recording of children and adults as they use conceptually related exhibits, and using new computer adventure games to probe adolescent learning of science concepts and processes.

PCST NO.458

(FA1-08)

## ANALYSIS OF THE 'INFORMED CONSENT' AS A MERGING POINT BETWEEN THE NETWORK OF MEDICAL SCIENTISTS AND THE NETWORK OF LAY PATIENTS

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The 'informed consent' is a terminology that denotes the process of providing medical knowledge to the patient and getting his signed consent/agreement. The patient who usually lacks medical knowledge needs to be provided with sufficient information about his condition and the treatment he will go through. This information should include all possible side-effects and other alternate treatment choices he can choose from. And the scientific information is provided by the doctor who is in charge of caring the patient.

My view is that, therefore, the informed consent is the point where two different and separate knowledge networks merge into. These two networks are the professional knowledge network of medical scientists and the lay knowledge network of the patient. Using the concept of actor-network theory (ANT) developed by Bruno Latour, Michel Callon, and John Law, this paper argues that the importance of 'informed consent' not only lies in the ethical matters, but also in the power structure of these two networks. The more a medical theory or a treatment method is being used, that theory or method, along with the medical scientist who developed it, gains more power among the professional networks of doctors. In this gaining process, the network of the patient is also converted (or 'translated') and being used to empower the theory/treatment, in other words, the network of medical scientists.

The second argument of this paper is that, the informed consent is extremely important because it is one of the few meeting points of medical science where *bi-directional* communication between experts and lay public is produced. Other meeting points this paper analyzes are: printed material such as books [*uni-directional*], mass-media such as TV [*quasi-unidirectional*], interactive media such as internet [*quasi-bidirectional*].



PCST NO.235

DO YOU TRUST WIKIPEDIA?  
-- RELIABILITY AND ACCEPTANCE OF WEB RESOURCES ON SCIENCE  
AND TECHNOLOGY IN JAPAN

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This study focuses on Japanese academic resources on the Internet, mainly science articles of Wikipedia Japan: How much scientists and/or general users place trust in the accuracy of information in it? This freely editable “encyclopedia” has been rapidly penetrating into the public since it was substantially started in 2003. While other major encyclopedias in Japan are keeping closed membership system on-line, Wikipedia grew to include 167,676 articles by the end of 2005 with its open system, though the credibility are still controversial.

In December 2005 Hotwired Japan held a vote online “Do you trust Wikipedia?”. There were 1398 answers of which 1032 were “yes” and 366 were “no”, namely 74% of people answered “yes”. Also 281 supplementary comments suggest that there’s a common opinion among the voters to regard Wikipedia’s descriptions on science are relatively more trustworthy than these on humanities or social science. How are scientists evaluating the entries on their own fields?

After a false content regarding the Kennedy assassinations in English Wikipedia was widely reported in November 2005, Jimmy Wales, the founder of the project announced to tighten submission rules but major medium pointed the revision would not prevent people from posting inaccurate information. Besides, a science journal “Nature” compared 42 entries of Wikipedia and Britannica, and concluded that “the difference in accuracy was not particularly great” (15 December 2005, “Nature”). According to the report an average science entry in Wikipedia contained around four inaccuracies; Britannica, about three. How about Wikipedia Japan, then? Some Japanese experts indicate that entries about scientific areas in Wikipedia Japan are generally less reliable than those of English version. To confirm the accuracy and acceptance of Wikipedia, this study extracts several entries from Wikipedia explaining terms of science, and asks scientists through qualitative evaluation method such as interviews and questionnaire surveys.

PCST NO.260

PUBLIC UNDERSTANDING OF SCIENCE AND SCIENTISTS:  
THE LOSSES AND GAINS FROM HWANG CLONING SCANDAL

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The mental representations of a concept are clearly not invariant. Recent observations of contextual effects in categorization have revealed that people’s understanding of encountered concepts depends on the context. In this respect, we argue that the activation of Hwang cloning scandal can serve as a context that alters public understanding of science and scientists. In the experiments, this study examines the biasing influences of Hwang cloning scandal on the property-verification task (Barsalou, 1982<sup>2</sup>) and the triad task (Savitsky & Izard, 1970<sup>3</sup>). It is expected that the activation of Hwang cloning scandal may not only bring negative thoughts and feelings to mind in response to various concepts of science and scientists (the property-verification task) but also influence which features of science and scientists are selectively attended, resulting in different momentary concepts of them (the triad task). Besides, the impacts of Hwang cloning scandal on participants’ attitudinal reactions to science and scientists are investigated. The findings are discussed from the perspective of science-informed citizen relationship.

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<sup>2</sup> Barsalou, L.W. (1982). Context-independent and context-dependent information in concepts. *Memory & Cognition*, 10, 82-93.

<sup>3</sup> Savitsky, J.C., & Izard, C. E. (1970). Developmental changes in the use of emotion cues in a concept-formation task. *Developmental Psychology*, 3, 350-357



## FA2 - Scientific Contribution & Communication to Global Problem Solving

PCST NO.326

(FA2-01)

### SCIENCE COMMUNICATION AS A MEANS OF PREVENTING INFECTIOUS DISEASES: COMMUNITY SELECTION AND DEVELOPMENT OF THE COMMUNICATION PROGRAM

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Can we use science communication as a tool for preventing infectious diseases? Previous studies have shown that health education interventions increase the level of *knowledge* of the population. However, modification of risk practices are less apparent, suggesting that changes in knowledge does not necessarily modify behavior. The objective of this project is to develop a communicative program that promotes rational thinking in the participants encouraging team work for thinking, defining and developing action and intervention plans to solve health problems in their community. Moreover, through a process of knowledge appropriation, we seek that the program promotes risk behavior modification in the community. Although the program is aimed at young people between 12-25 years old, participation of all the community is required. As a model disease we chose taeniosis-cysticereosis (TC) caused by *Taenia solium*. *T. solium* is endemic in México, being neurocisticercosis the most important human parasitic disease. TC, as many other parasitic diseases, is closely related to poverty and a low level of education of the population, which results in deficient hygienic practices. We selected a rural community where the risk factors associated to the prevalence of TC are present (deficient sanitary infrastructure and pig-raising practices that results in pigs access to human excrement, ineffective inspection of pig meat, etc). We established contact with local authorities, made a census of human and pig population, determined the prevalence of porcine cysticereosis by tongue examination and assessed hygienic practices and sanitary conditions by direct observation. Also a preliminary ethnographic study was done as well as interviews with key members of the community. Branding for the project was developed (concept, naming, identity, logo, etc) and the young participants were selected. With gathered information we developed a communication program and initiated preliminary work with the participants. This project is supported by a grant from the Fondo Sectorial en Salud CONACYT 2004-C01-086.

PCST NO.359

(FA2-03)

### DEVELOPMENT OF THE INDEX OF EFFECTIVE SAFETY IN NUCLEAR DOMAIN OF KOREA

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There exists a so-called “experts - lay people” gap in discourses about nuclear safety. Experts and lay people do not understand each other because each has a different definition of ‘safety’. However, it is getting increasingly important for experts and other related nuclear agencies to understand the lay people’s subjective perception of nuclear safety. Nonetheless, Korean society does not have any valid measure of such a subjective perception of nuclear safety. We developed the effective safety indicators and indices in nuclear domain of Korea in order to devise the communication tool between the local inhabitants and nuclear industry or regulation body.

In order to develop the effective safety indicators (ESI), we conducted the survey on eight hundred people lived around 4 sites of nuclear power plants such as Kori, Younggwang, Ulchin and Wolsung. The ESI are based on results of the public opinion survey of local inhabitants around nuclear power plants, not based on expert judgment. Using the ESI, we calculated the index of effective safety (IOES), ranging from 0 to 100. And we also surveyed the technical staffs of nuclear power plant(NPP) to compare the IOES between local inhabitants and employees of NPP.

The research results are as follows:

- 1) We extracted four sub-factors for effective safety indicators: Communication, Trust, Coping Ability of nuclear power plants, Emergency Coping Skills
- 2) The IOES was 38.22, which was extremely low, indicating that residents near nuclear power plants were feeling very insecure about the safety of nuclear power plants. The scores of each sub factor were: communication 36.43, trust 45.20, coping ability of nuclear power plants 49.39, and emergency coping skills 22.04. Most notably, self-perceived coping skills in emergency was seriously low.
- 3) The IOES was a sort of an ‘absolute’ index. However, it is not realistic to expect that one can achieve a score of 100 in the IOES because it is hard to imagine that people feel ‘absolutely’ safe regarding nuclear power plants. Therefore, a more realistic index seems warranted. We devised a relative index of effective safety (RIOES), which is basically a proportion of residents’ IOES to that of the employees of nuclear power plants. The RIOES was 56.77, meaning that the level of effective safety of residents was only 56.77 % of that of the employees.
- 4) We found a consistent pattern of regional difference in IOES. Namely, Younggwang was significantly lower than Wolsung, Kori, Ulchin in IOES.



PCST NO.411

(FA2-04)

## WORKING COLLABORATIVELY: THE CASE FOR THE HUMANITIES, ARTS AND SOCIAL SCIENCES TO WORK WITH SCIENCE

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Science on its own is not enough for solving some of the complex problems of today. How solutions are developed, who is involved in developing them and the way people behave are all very important. The humanities, arts and social sciences need to work with the natural sciences to devise solutions to compelling problems, and develop the industries of the future.

The low life expectancy rates of indigenous populations in developed countries such as Canada, Australia and the US are caused by a combination of destructive personal behaviours such as the excessive consumption of alcohol and tobacco, and limited access to modern medical care. This one example suggests that solutions to problems like these require a partnership of the humanities and the sciences.

Collaborations between the disciplines are also essential for the industries of the future. New media is a high growth area, and requires a combination of technology and content - the sciences and the arts working in partnership.

Collaborations can be a powerful communication tool. Increasingly artists are working in partnerships with scientists. The Cape Farewell project takes teams of scientists, artists, oceanographers, journalists and teachers on a voyage into Arctic seas. Collectively they interpret and explain global warming, reaching a wider international audience than scientists alone could achieve.

This paper will give a progress report on a major Australian study, which sets out to describe multi-disciplinary collaborations. What issues are they working on? How did the partners find each other? Have they found it difficult to work with people from other disciplines? What communication issues arise in such collaborations? How can we do things better? The paper draws on examples and case studies from around the world, and describes the progress made towards developing a 'best-practice' manual for those involved in collaborative activities.

PCST NO.477

(FA2-05)

## FOOD INTAKE AND BIO-PHYSIOLOGICAL INDICATORS AMONG KOREAN RURAL ADULTS

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**Objective:** To identify the relationships between food intake and bio-physiological indicators: blood pressure, body mass index (BMI), waist hip ratio (WHR), cholesterol and urine sugar among rural people.

**Method:** The subjects were 890 inhabitants (men = 438, women = 452) from 14 towns of G county in Honam province. Data were collected by interview and self-reported with structured questionnaires; Unistix GT and Accutrend Cholesterol sticks; and portable scale and ruler by trained health workers and Community Health Practitioners from April 6<sup>th</sup> to 30<sup>th</sup> 2005. Data were analyzed with the frequency, percentage, t-test,  $\chi^2$ -test, and ANOVA using SPSS 12.0 program

**Result:** Pre-hypertensive and hypertensive group was 27.0%, overweight and obese 27.1%, more than 0.90 in WHR 42.0%, more than 20mg/dl of cholesterol 23.9%, and positive urine sugar was 8.7% in general. Among nine food groups, fruits ( $F = 15.486$ ,  $p = .001$ ), and milk products ( $F = 12.300$ ,  $p = .001$ ) intakes were more in normotensive group than in the others. Meats ( $F = 4.258$ ,  $p = .014$ ), vegetables ( $F = 3.472$ ,  $p = .031$ ), fruits ( $F = 5.914$ ,  $p = .003$ ), and milk products ( $F = 8.972$ ,  $p = .001$ ) were more in normal WHR ( $\leq .85$ ) than the others. Urine sugar negative group took more meats ( $t = 2.058$ ,  $p = .040$ ), fruits ( $t = 2.356$ ,  $p = .019$ ), and milk products ( $t = 2.937$ ,  $p = .003$ ) than the others. Only milk products ( $F = 5.355$ ,  $p = .005$ ) in underweight ( $\leq 18.5$ ), and cereal ( $F = 6.156$ ,  $p = .002$ ) seaweed ( $F = 4.216$ ,  $p = .015$ ) in low cholesterol group ( $\leq 170$ ) were more than in the others.

**Conclusion:** Bio-physiological indicators are related significantly only with fruits, milk products, meats, and cereal among nine food categories. Further study on physical activities, smoking and drinking habits with bio-physiological indicators be suggested



PCST NO.651

(FA2-06)

## ON THE SPECIAL SCIENCE CLASS PROGRAM OF SCIENCE AND CULTURE CITY, CHANGWON

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Changwon National University

Changwon National University Regional Science and Technology Developing Center plays an important role in the program relating on the Korea Science Foundation. The center takes care of science class once a week about 400 elementary school students who enroll in the 15 different Dongs, all of the Cbangwon city. Usually science relating graduate students or teachers teach them, we call this class as a regular course. On the other hand, the center also offers classes such as visiting scientific institutes or factories, visiting scientific exhibition and places around the Changwon city, holding on special colloquium on science, offering an open laboratory and giving the chance to the students on the science relating experience. We say these as special science programs. This study considers on this special science program of Changwon city which was held on 2005. We also consider and analyze to improve the difficulties of this special program for the future.

PCST NO.686

(FA2-07)

## WHO WERE SCIENCE COMMUNICATORS IN HWANG'S SCANDAL?

Keun-young Lee

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It is necessary of the second mediator who connect scientists with journalists for the science communication. This mediator must make symmetrical and definite information of science and must give the interpretation of special knowledge and must have a ability to have the journalists to understand the complex structure of science knowledge. There were several second science communicators in the scandal of Dr. Hwang. They are the news sources, members of scientific information internet site, anonymous informers, existing science communicators.

**Keywords:** Science communicator, Mediator, PEST, Hwang's scandal

PCST NO.762

(FA2-08)

## THE KOREAN TYPE LARGE - SCALE ASTROFEST

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KASI (Korea Astronomy and Space Science Institute) has held star festivals from the beginning and 2006, this year, meets the 32nd. KASI has been in charge of the star festivals of its own till now and also has supported the star festivals by local astronomical organizations. However, the festival in April of 2006 will be jointly held by 10 organizations relevant to the stars and the universe parts. This large-scale astrofest can be considered an unique type in star festivals.

The program of the festival, not to mention the traditional star observation, will be made up of the star observation contest for the elementary, middle and high school students, the concert with the stars in the night sky, 'Challenge! Golden Byul', the quiz game for learning astronomical knowledge, and the lecture answering the mysteries of the universe. In the festival, each participating organization is supposed to provide the public with various things by opening an exhibit or by displaying PR materials.

Also, KASI is planning to support local star observation meetings actively in union with all the astronomical organizations in Korea and to promote the distinguished observation meetings according to the local characteristics.

The meetings mentioned above is expected to give astronomy wider publicity, to help increasing the amateur astronomers, and moreover to improve the scientific minds of the public. In this presentation, we are going to examine how this large-scale astrofest works to the public and how it influence the science popularization



PCST NO.338

COMMUNICATING COMPLEX AND CONTROVERSIAL SCIENCE: LESSONS FROM THE  
LAUNCH OF A REPORT ON TRIPLE BOTTOM LINE ACCOUNTS FOR 135 SECTORS OF  
THE AUSTRALIAN ECONOMY

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Science communication plays an important role in informing government, industries and communities of scientific issues, particularly for the 'big' environmental and social issues of national and global importance. This paper investigates the planned launch of a report, *Balancing Act - Triple Bottom Line Accounts for 135 sectors of the Australian Economy* in May 2005.

The *Balancing Act* report is a lengthy, complex and relatively controversial scientific study that provides new information to assist Australian government and corporate decision-making and priority setting in building a sustainable economy for Australia. It uses ten indicators to give an overview of triple bottom line issues across the 135 sectors that make up the Australian economy. These include four environmental indicators - greenhouse emissions, water use, land disturbance and primary energy use; three social indicators - employment, government revenue and incomes; and three economic indicators - imports, exports and operating surplus. These indicators are referenced against one Australian dollar of 'final demand' - approximately the consumption dollar an Australian would spend in every day life.

This paper describes the communication planning process developed for the launch of the report and compares the desired with actual communication outcomes. It also uses a content analysis of the newspaper coverage following the release of the report to look at how the report was covered by the Australian print media. We discuss what lessons can be learned for release of similar complex and controversial scientific research results. These include lessons for putting together the launch team, planning the launch event and gaining media coverage of a complex and controversial scientific issue. We draw on literature on risk communication and agenda setting for environmental issues.



## FA3 - PCST in the World and in Asia

PCST NO.281

(FA3-01)

### PRACTICAL USE OF EXPERTISE BY ORDINARY CITIZENS

Akifumi Ueda

Citizen Science Initiative Japan

Practical use of expertise by ordinary citizens

Governments decide policies, enterprises commercialize new technologies, universities instruct expertise, and journalists explain for general. The solutions of the majority of social issues related to science and technology are difficult when caught in this diagram. The independent role that ordinary citizens play in science and technology communications has to be considered. How can citizens access well in special expertise in science and technology areas, and put it to practical use for solving the problems they are facing? The question is examined referring to the activities of "Citizens Science Initiative Japan" (incorporated nonprofit organization) in which the author serves as the representative.

PCST NO.292

(FA3-02)

### THE IMPORTANT ROLE OF CORPORATION SCIENCE POPULARIZATION IN FOSTERING CORPORATE CULTURE

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Corporate culture is considered as a complex of belief, value, ideal, highest goal, behavior criterion, traditional habit. It is a kind of spiritual force which can be used to encourage workers to contribute themselves to the development of corporations. Corporate culture includes "explicit culture" and "implicit (tacit) culture". The former refers to cultural facilities, cultural education, technical training and recreational activities. The latter refers to the value standard, moral guide line, working attitude, behavior criterion and living concept which are proposed and asked to be followed by the main goal. It can also refer to the staff spirit or corporation culture which is composed of all those above-mentioned contents.

In China, the corporation science popularization activities are divided into two kinds: inside science popularization and outside science popularization according to the different target audiences. The former mainly includes science and technology education and skill training for corporations' own employees in order to improve the ability of technical innovation; the latter, on the one hand, aims at the social consumers (consumption groups of products), and holds the technical consultation and service activities on sale of products; on the other hand, it provides lots of manpower, material resources and pecuniary resources to support and engage in the social science popularization activities.

So science popularization is the important component of corporate culture. With the development of economic globalization, corporations will be involved in international competition, so to foster corporate culture will be very necessary. Corporate culture will play an important role in fostering corporate culture.

PCST NO.304

(FA3-03)

### BEAUTIFUL GUIDES - THE ROLE OF PROFESSIONAL EXPLAINERS AND YOUNG SCIENTISTS IN SCIENCE AND SOCIETY DIALOGUE

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Museums, science centres and research institutions use explainers (otherwise called guides, pilots, animators, helpers... ) in different contexts and roles: exhibitions, informal learning settings, science shows, outreach activities, etc. Who are they? What is their added value to science communication? How their position (part-time jobs, graduates with temporary contracts, etc) and their background affect their role? How are they trained?

The explainers are the main interface between the institution and its public, and thus often the only reliable source of feedback. Moreover, they are in most cases undergraduate or PhD students, and thus will-be scientists: this experience with the public is a great occasion to improve their communication sensibility and skills. In order to disseminate the culture of science/society dialogue, they can represent a very large group of players and have a relevant impact.

DOTIK - European Training for Museums Explainers and Young Scientists is a project funded by the European Union under the Sixth Framework Programme for Research and Technological Development.

Through a two-years activity, DOTIK develops and tests methodologies for training explainers for a most effective science/society dialogue. The first year (2005) has been dedicated to planning and testing the training scheme; the first Experimental School was organized in Trieste, Italy (12-19 September 2005). During the winter 2006 experimental activities will be held in three science centres. In September 2006 the DOTIK - School for 50 explainers from all over Europe will be organized in Trieste (Italy). The results of a qualitative and quantitative research on explainers status, that accompany the training development and testing, will be processed in spring 2006.

DOTIK partners are: Innovations in the Communication of Science, SISSA, Trieste, Italy; Immaginario Scientifico Science Centre, Trieste, Italy; Hisa Eksperimetov, Ljubljana, Slovenija; At-Bristol Science Centre, Bristol, United Kingdom.



PCST N0.315

(FA3-04)

### SCIENCE COMMUNICATION IN SOUTH ASIA: CHALLENGES AND PROSPECTS

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SAARC countries live in various layers, such as social, cultural, political, religious, scientific, economical, and natural. The bilateral and multilateral sharing, exchange, interaction and communication between these layers can mark a turning point of the process of overall development of the region and role of public communication of science and technology could be crucial and vital in this regard. Though, there exist a variety of programmes and activities for taking science to masses and inculcating a scientific bent of mind into them, generally, it was observed that all these layers are working in isolation and there is hardly any interaction. The present study discovers a range of modes and means of science communication prevalent in these countries and tries to identify some common threads amongst them to make them more interactive and communicative to each other so that they can also share the power of scientific knowledge and scientific wisdom. It emerged that science communication through various media, be it print, broadcast, digital, folk or interactive in developing countries like Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri-Lanka deserves much more serious efforts to be able to enhance their abysmally low level of scientific literacy, irradiate superstitions, and achieve a baseline understanding of science. It is the high time to draw advantages from the programmes like Sixth Framework of the European Union especially meant for scientific cooperation (including science communication) between EU and developing countries. A close interaction and communication between these layers would make them more responsive to each other as well as paving the way to develop better understanding and cooperation leading to sustainable development.

PCST NO.329

(FA3-05)

### COMMUNICATING SCIENCE AND TECHNOLOGY IN BRAZIL: RECENT ACTIONS AND ATTEMPTS FOR ESTABLISHING A NATIONAL PROGRAM

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In the last few years, a debate has been holding in Brazil on the formulation of a national program for communicating science. Federal government, scientific institutions and societies are making now a tentative for organizing nationally integrated activities for the popularization of ST. Between the main purposes are to promote the scientific culture, to collaborate with the improvement of the scientific education (a very serious problem), to attract young peoples for ST careers and to stimulate the public engagement in science. The rich cultural diversity, the enormous social inequalities and the high levels of illiteracy in the population put many challenges to these intentions. Although the recent and substantial increasing of governmental funds for these activities they are yet clearly insufficient. Large events for discussing and promoting the public communication of science were organized as the IV World Congress of Science Museums (2005), national and regional meetings of the Brazilian Society for the Advancement of Science and many activities around the country in commemoration to the World Year of Physics. A program for stimulating the creation of new science museums started in 2004, including a Science Mobile Project. The creation of a Committee in the CNPq, the most traditional agency for funding research activities, was a significant step for the academic valorization of communicating science, usually a problematic question within the scientific community. The main recent initiative has been the establishment of the National Week of Science and Technology. In its second version (October 2005) about 7000 activities were organized in 350 cities or small towns, with the involvement of 850 research institutions, universities, scientific societies, agencies, enterprises and high schools. In this communication we will discuss the present status of communication of science in Brazil and the dilemmas and challenges for developing a national program for popularization of science and technology.



PCST NO.347

(FA3-06)

## INNOVATIONS FOR SUSTAINABLE DEVELOPMENT: THE NEED FOR KNOWLEDGE SHARING

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Science is a powerful means to enhance socio-economic development. Many strategies to alleviate poverty involve science. One of the strategies is to build local scientific capacity to generate environment-friendly innovations adapted to the needs and knowledge claims of local communities and institutions. However, in most projects information on needs and constraints is only collected and integrated during the planning and evaluation stage of the project. We argue that in order to develop sustainable technologies for local communities, knowledge sharing between science and society should be involved throughout the innovation process. Such a process faces four major challenges; the integration of non-academic and academic knowledge, the methodology, the skills of the scientists, and the institutionalization of the approach within organizations. The objective of this study is to gain greater insight into the strategies to realize knowledge sharing throughout the innovation process. We describe a case study on the initiatives of a Bangladeshi NGO to share knowledge between science and society. We analyse the case-study on numerous interviews, informal dialogues and direct observation. The experiences and lessons learnt contribute to the development of strategies for realizing knowledge sharing throughout the innovation process. An interactive approach was selected. The organisation applied the interactive approach for the development of a locally suitable agricultural technology. This led to a fundamental change in how the NGO communicated with the local farmers with regard to technology development. One of the activities was the adaptation of the True Potato Seed technology to the situation of the local farmers. The case study shows how local community's scientific literacy can be enhanced. We discuss the achievements and reflect on the challenges faced by this process. An important conclusion was that sharing knowledge between local farmers and scientists influenced and adapted the research and policy agenda at the local research institutes.

PCST NO.450

(FA3-08)

## THE 'EUROPEAN RESEARCH AREA' AS A CHALLENGE TO SCIENCE COMMUNICATION

Michel Claessens  
European Commission, Directorate-General for Research

The presentation will first review the way European citizens perceive science and technology today, as reflected by a public opinion survey conducted in 32 European countries in 2005. It will also include some comparison with similar surveys conducted recently in the US and in China.

Against this background, the presentation will address the challenges and difficulties of science communication in Europe today. As the European Research Area becomes a reality, Europe is sorely lacking a mechanism enabling it to draw full benefit from its 'home grown' research activities. At present, there is no structured mechanism for informing the media in one Member States of scientific activities going on in another and giving the highest possible profile to European research.

Finally, the talk will present recent initiatives taken by the European Commission in improving communication in general and science communication in particular. The EC's Directorate-General for Research is actively involved in communicating the results of EU-funded research to the media and the general public. Support and help are provided to assist project coordinators and team leaders to generate an effective flow of information and publicity about the objectives and results of their work. Initiatives taken by the European Commission to improve communication, outreach and dissemination of research results, such as the recent 'Communicating European Research 2005' conference in Brussels, will be presented and discussed.



## FA4 - Dialogue between Tradition and Science

PCST NO.190

(FA4-01)

### COLLABORATIVE RESEARCH WITH MAINLAND CHINA: THE TOP PRIORITY OF EXTERNAL IMPACTS OF HONG KONG SCIENTIFIC CONTRIBUTION AND COMMUNICATION DURING 1994-2003

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#### Introduction

According to U.S. National Science Foundation's *Science and Engineering Indicators 2002*, China and U.S. shares of Hong Kong internationally authored articles in 1999 were 40.6% and 29.1% respectively. This paper examines patterns of Hong Kong scientific contribution and communication during 1994 to 2003 and explores prominent collaborative ties among Mainland China. Data for analysis was collected from the *ISI Web of Science - SCI-EXPANDED* database.

#### Findings

##### *Academic Productivity*

The search (Timespan=1994-2004) supplied a total of 42275 bibliographic records contributed by Hong Kong authors, from which 6163 (14.6%) and 4589 (10.9%) were coauthored by China and U.S. partners respectively. The processed data for a valid window of 10 years demonstrates that Hong Kong collaborated on 5814 sci-tech research publications with mainland China and, despite irregular annual growth rates, scholarly output in 2003 is more than seventeen times what it was in 1994. The chronological distribution also reveals an upward tendency in recent years.

##### *Research Population*

As many as 8280 unique authors participated in Hong Kong and China S&T cooperative research activity during the past decade, but more than half (4382 or 52.9%) only wrote one paper. The size of labor force has increased by 1600% for the duration, and a rising trend will continue evidently. Three to six members are typical authorship patterns. The University of Hong Kong, Chinese University of Hong Kong, and City University of Hong Kong are top three prolific institutions.

##### *The Collaboration Network*

Hong Kong has extensive scientific ties to all provinces, regions and municipalities of Mainland China. Beijing is the most prominent partner which coauthored 2805 articles, followed by Shanghai with 1216, while others, taken together, count 2307. Consequently, the alliance of Hong Kong and Beijing leads scientific collaboration.

##### *The Investigation Area*

Up to 1397 titles of serials in all covered these 5814 cited articles. No evidence of a correlation between impact factors of journals and numbers of articles published correspondingly is given (Pearson's  $r = 0.1356$ ,  $p = 0.018$ ). *ISI Journal Citation Reports* subject categories indicate the special interests of collaborative research in Physics, Chemistry, Mathematics, Electrical & Electronic Engineering, Computer Science, and so on. Specially, Polymer Science and Operations Research & Management Science are the dominant disciplines of Chinese University of Hong Kong and Hong Kong Polytechnic University respectively.

#### Conclusions

Since 1999 Hong Kong has emphasized scientific collaboration with Mainland China. This action effectively promotes the international visibility of academic and innovative findings in the fields of basic and applied sciences. However, Hong Kong engineering and technology research, e.g., ICT, did not benefit from scientific collaboration with China a great deal. Simultaneously, the imbalance in establishment and development of institutional partnership is overwhelming. As such, geographic restrictions of scientific ties occur seriously.



PCST NO.244

(FA4-02)

USEING TRADITIONAL KNOWLEDGE WITH SCIENCE:  
A “ PARDYP’ NETWORK EXPERIENCES FOR COMMUNITY DEVELOPMENT

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The People and Resource Dynamics Project (PARDYP) is an integrated research for development project comprising of research and development institutions and individuals from China, India, Nepal, Pakistan, Canada and Switzerland working on the problem of the Hindu-Kush Himalayan region. Working with the communities at the region the project, has been able to contribute towards initially identifying practical needs particularly those related to food, fuel, fodder, and water, as also identification of opportunities for increased income, followed by implementation (through participatory means) of a few, well tested on farm interventions, such as, poly -house technologies for off season vegetable production, irrigation through drip, and bio composting etc., in the PARDYP watersheds of the HKH region. This paper describes the findings of the research, efforts using simple scientific principal for improving traditional knowledge and methods used by the project to spread and disseminate the findings among different community living in diverse social, cultural, agro-climatic set up of HKH with taking special impasses on the marginalized people living in the region.

PCST NO.296

(FA4-03)

TWO PUZZLES OF LATE DEVELOPER COUNTRIES  
ENTERING GLOBALIZATION OF SCIENCE  
—THE CASE OF CHINA

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There is a tension between universality and locality of scientific knowledge, which is a puzzle issue in front of late developer countries entering globalization of science. In China, it also connects another puzzle issue which caused by tension between scientific culture and cultural tradition, the former introduced ab extra and the later charactered by humanity and ethics. This paper discusses these tensions mainly based on recent *Survey Reports of China Civic Scientific Literacy*.

PCST NO.323

(FA4-04)

THE DARK SIDE OF THE UNIVERSE:  
FOSTERING THE DIALOGUE BETWEEN ANCIENT  
ANDEAN COSMOLOGY AND THE ALMA PROJECT

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This paper reports a case study of interaction and multicultural dialogue between a large scientific project such as ALMA (Atacama Large Millimeter Array) and the local communities belonging to the Lican Antai culture, at the Chilean Atacama Desert. ALMA is a global scientific project promoted by United States, Canada, Europe and Japan, in cooperation with the Republic of Chile. It is currently under construction in northern Chile, at the Llano de Chajnantor (a plateau located at 5,100 meters of altitude). When finished around 2012, it will be the largest radio observatory on Earth, with around 66 antennas or radio telescopes to explore the dark regions of our universe.

Close to Cbajnantur area, there are a series of small villages whose inhabitants live mainly from agriculture and tourism. They are descendants of the Lican Antai culture, part of the rich Andean heritage. Most of them have traditional understandings and knowledge of the world, usually mixed with Western traditions.

We will describe the challenges faced of ALMA Project in the first interactions with local communities. Then we will present the strategies and specific actions designed to foster a true exchange, based on a communication model of equality between the actors. Among some actions, we can mention: anthropological/archaeological studies; ecological research; open-sky public events; promotion of sustainable astronomical tourism. Of particular interest is the link between modern radio astronomy and ancient Andean cosmology: they both emphasize the dark areas of the sky, thus constituting an important bridge for both visions of our universe.



PCST NO.422

(FA4-05)

### WHEN TRADITIONAL CULTURE MEETS MODERN SCIENCE AND TECHNOLOGY

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In the 21<sup>st</sup> Century we are searching for a new horizon of science and technology. The possibilities of new findings are not only in the future, but also in the past. When Japanese traditional culture meets modern science and technology, new idea or product might be born. For example, inside mobile phone you can find various emerging technologies derived from Japanese traditional arts and crafts; manufacturing skill and knowledge of paper, porcelain, and golden foil. Another case is related with integrated medicine; combination of modern medicine and traditional medicine. We show several case studies in Japan. This research is sponsored by Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan.

PCST NO.752

(FA4-06)

### BODY MASS INDEX AND SELF-PERCEIVED BODY WEIGHT AMONG KOREAN RURAL ADOLESCENTS

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Chonnam National Univ. CRINS

Objective: The purpose of this study was to identify obese level by BMI and self-perceived method among adolescent at a rural province in Korea.

Method: The subjects were 1,131 adolescents (middle = 785, high = 346) from 20 schools (middle = 15, high = 5) at Jeonbuk province. Study instrument was structured questionnaire and body mass index (BMI): underweight as less than 18.4, normal as 18.5-24.9, and overweight and obesity as more than 25.0. Data were collected by self-reported method from February 12th to March 5th 2005 and analyzed with the frequency, percentage, t-test,  $\chi^2$ -test, and ANOVA using SPSS 12.0 program

Result: Rate of overweight and obese by BMI was 7.4% (7.5% in middle, 7.2% in high school), but 29.5% (27.4% in middle, 34.4% in high school) by self-perceived. Body weights by BMI and by self-perceived were same in 82.2% in underweight, 67.6% in normal and only 27.6% in overweight and obese group in middle, and 43.6%, 80.2% and also only 21.0% in high school students, which showed considerable part of those who perceived themselves overweight classified in normal or underweight by BMI ( $F = 343.26$ ,  $p = .001$ ) in middle school students and the result was almost same in high school students ( $F = 90.27$ ,  $p = .001$ ). Regardless to gender, there were also significant differences between body weight by BMI and by self-perceived in boy ( $F = 290.73$ ,  $p = .001$ ) and girl ( $F = 196.54$ ,  $p = .001$ ) students.

PCST NO.648

(FA4-07)

### PLAN FOR MANAGEMENT AND GROWTH OF GWANGJU REGIONAL SCIENCE CENTER

Sunah Kim and Sang-Hee Kim  
WISE Center in Chosun University

The Regional Science Center Project supported by The Korea Science Foundation in accordance with the 2004 <Science Korea> movement has three objectives: 1. To make it possible for all people to experience and enjoy science in their everyday life 2. To promote interest and learning in science among young people and motivate them to go into fields in science and engineering 3. To spread the grass-root level scientific culture and contribute to nation's science and technology development

Gwangju Regional Science Center started off in November 2004; classes in mathematics and science were held once a week, first in four resident-operated social centers, and now, in ten resident-operated social centers and in two welfare facilities. Every 6 month we invite all the participants of the program to the University and hold classes that concerns timely and costly experiments which could not be covered during regular sessions. Our program is distinguished from the programs in other Regional Science Centers with our focus in mathematical as well as scientific experiments and highly qualified lecturers. In response of requests for more classes, we attempt to conduct research on future management of the Center and ways of maximizing the effect of our program.



PCST NO.425

## RELATIONSHIP BETWEEN MATHEMATICS AND VISUAL ART FROM A PERSPECTIVE OF CHAOS THEORY

Young-Hee Kye  
Kosin University

This research focuses on the relationship between mathematics and visual art from a perspective of chaos theory which emerged under the influence of post-modernism. Culture and history, which transform dynamically with the passing of time, are models of complexity.

Especially, when the three periods of Medieval, Renaissance, and Modern times are observed, the Renaissance period is phase transition era between Medieval and Modern times. The transition stage between the late Medieval times and the Renaissance; and the stage between the Renaissance and the Modern times are also phase transitions. These phenomena closely resemble similarity in Fractal theory, which includes the whole in a partial structure.

Phase transition must be preceded by *perturbation or fluctuation*. In addition to the pioneers' prominent act of creation in the fields of mathematics and visual art serving as drive behind change, other socio-cultural factors also served as motivations, influencing the transformation of the society through interdependency.

In particular, this research focuses on the fact that scientific minds of artists in the Renaissance stimulated the birth of *perspective geometry*, and scrutinizes the modern spirit which adopted time, movement, velocity as subjects of study, giving rise to the painter who records the moment and analyzes the light in visual art as well as *differential and integral calculus* in mathematics



## FA5 - Societal & Educational System in Diverse Culture

PCST NO.83

(FA5-01)

### THE PICTURE LIBRARY - BUILDING THE FIRST BRIDGE BETWEEN SCIENCE AND THE GENERAL PUBLIC

Gary Evans  
Science Photo Library

Before entering into a dialogue with the public, the practitioners of science and technology must first engage the public's interest. To do this means competing with outlets of mass entertainment, and working within a realm of short attention spans. Engagement must be instant; the ideal vehicle for this is the image. A picture may be said to be worth a thousand words, but it speaks them quickly, crosses language barriers and speaks at different levels to different people. The media provide the public face of science and technology by publishing images, but this is often limited to the specialist news media or book publisher. Image buyers in other media outlets are often unaware of the existence of much scientific imagery, or are looking to illustrate a concept rather than a specific object. The way to reach this vast potential audience is through a picture library, a company that specializes in forming a link between the image maker with the image buyer. The image maker benefits from the exposure of their pictures to people who want to use them, with minimal time investment, and with the safeguards of effective rights management. The image buyer benefits by having a wide choice of images available at a single point of contact, in a database featuring a choice of subject-based and conceptual searching, and supplied in industry-standard formats with instant rights clearance. Best of all, the public benefits from being exposed to exciting images, making science and technology a more comfortable and familiar experience. At their very best, great images lead the individual to ask questions, and can inspire them to learn.

PCST NO.98

(FA5-02)

### USING HYBRID LEARNING MODEL TO ENHANCE PUBLIC'S SCIENTIFIC LITERACY

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Informing public's scientific literacy via the World Wide Web is increasingly emerging. As such, this paper provides insights on a hybrid learning model for multimedia design conceptualized from the Piagetian science learning cycle model and the Kolb's experiential learning cycle model. This hybrid learning model represents learning as a cognitive process and is intended to address both conceptual understanding and learning styles inclinations. The inquiry-based pupil-centred science learning cycle represents an inductive application of information processing models of teaching and learning. Indeed, results from cognitive studies have revealed that the model that is closest to the way we learn is that of the science learning cycle. For the experiential learning cycle model, the central idea is that learning requires both a grasp or figurative representation of experiences and some transformation of that representation. Research studies on multimedia design have found this experiential learning cycle model to be a useful framework for organizing interactive multimedia activities to address learning styles. Global warming as an example is used to illustrate the application of this hybrid learning model to develop an e-learning product to enhance public's scientific literacy. Instructional storyboarding is provided to illustrate some of the processes elicited such as thinking skills, self-questioning as well as the science of instruction in multimedia learning design principles.

PCST NO. 115

(FA5-03)

### RAISING PUBLIC AWARENESS ABOUT SCIENCE AND TECHNOLOGY: ORMALAND INFORMAL EDUCATION PROGRAMS

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The aim is to explore the relation between (a) the initiatives for raising public awareness about science and technology exemplified here by those of science and technology museums and (b) the type of education programs - formal and informal - devised from various agents and institutions since the post world war period.

One can identify two ideal-type education programs. The first (corresponding to the prevailing socio-cultural climate of the period about up the mid-seventies) is characterized by: epistemic criteria for the selection of the content, employment of formal and technical expressive codes and explicitly hierarchical social relationships. The second ideal-type program, (which seems to reflect the socio-cultural climate prevailing today) is characterized by selection of the content on the basis of social and market criteria, employment of more vernacular and non technical codes and implicitly hierarchical social relationships.

Furthermore, we can discern three phases in the historical evolution of science and technology museums. These phases are: a) the science and technology museums as 'object displays', b) the hands on interactive science centers and exploratories and c) the contextual science centers.

Finally, the two ideal types of education programs are discussed vis-a-vis three phases of science and technology museums revealing a trend of parallel shifting agendas of these two knowledge reproduction systems.



PCST NO.317

(FA5-04)

### COMMUNICATION IN SCIENCE CENTERS AS SEEN THROUGH 'CONTEXT DIAGRAM OF LEARNING EXPERIENCE (CoDiLE)'

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The visitors to science centers get considerable experiences related to science, communicating with other visitors, exhibits and surroundings. Thus, many researchers have emphasized the communicative nature of science centers. To understand the communication in science centers, the context should be considered as an essential element for the investigation since the communication always occurs in a specific context. In this study, the communication in science centers was analyzed through 'Context Diagram of Learning Experience (CoDiLE)' which was developed by the authors from the previous studies. CoDiLE is a method to analyze and understand the relationship between an individual visitor's learning experience with science exhibits and multiple contextual factors. Although the main motive for us to develop CoDiLE was limited to the learning experience in science centers, the authors suggest that the idea and structure of CoDiLE can also be used to the issue of communication in science centers. The learning in science centers was divided into three contexts: personal, sociocultural, and physical ones. On the other hand, the communication in science centers is divided into three levels: intrapersonal, interpersonal, and exhibit-mediated ones. Intrapersonal level corresponds to personal context, interpersonal to sociocultural, and exhibit-mediated to physical. The authors completed forty CoDiLEs for three seventh-grade students, who visited three science centers, based on the observations and interviews. From the analysis of the forty CoDiLEs in terms of the communication level, various relationships between the contextual factors were examined. The research leads us to conclude that CoDiLE can be applicable to analyze the communication in science centers from a holistic point of view for 'visitor-in-context'.

PCST NO.452

(FA5-05)

### THE FORMATION AND IMPLICATIONS OF SCIENTIFIC DISCOURSE AMONG STUDENTS IN LEARNING SCIENCE: A CASE OF EXTRACURRICULAR SCIENCE CLUB ACTIVITY

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Many educational researchers have generally accepted the fact that education is a kind of discursive process. Accordingly, it can be said that science education is relevant to co-construction of appropriate discourse about scientific topics among learners. This investigation explores how scientific discourse is formed among students in learning science and what implications it gives us with regard to communication among them. The study is focused on a case of extracurricular science club activity in which 15 middle school students and one science teacher participated. Their activities were regularly performed for about two hours after school once a week all the year round and were mainly concerned with interesting experiments relevant to scientific concepts or principles dealt with in formal science classes. Data came from the video recording of their activities and individual interviews with the participants. Transcripts were developed and analyzed in a qualitative way that identified the process of formation of scientific discourse. Several characteristics of scientific discourse that the participants co-constructed were found through this qualitative content analysis and they were described in detail. Main factors for formation of active scientific discourse among students were also revealed. In addition, the implications were discussed from the view points of science education as science communication. Finally, it was suggested that the formation of scientific discourse communities would be as an ideal for science communication. This case study would offer some important information for the improvement, qualitative as well as quantitative, in communicative competence as one of inquiry skills required in science learning.

PCST NO.579

(FA5-06)

### SCIENCE ON STAGE - TOWARDS A REJUVENATED SCIENCE TEACHING IN EUROPE

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Several studies, such as the SAS and ROSE studies, as well as every-day experience of many science teachers suggest a 'disconnect' between the tenants of traditional, formal science teaching and contemporary youth culture. Clearly formal science teaching fails to stimulate the interest in science and technology among wider groups of youth. This has led to numerous proposals on how to improve science teaching at school and how to make it more attractive to pupils. Suggestions include the involvement of extra-curricular activities, e.g. in science centres, engagement by the media and by the scientific community itself. However, while functioning well on an individual basis, many of these proposals are hard to implement in a formal way and on a large scale because of 'systemic' or institutional barriers. This talk will describe a practical approach, led by the European Intergovernmental Research Organisations (in the EIROforum partnership), to foster innovative science teaching in a bottom-up approach across the European Union, while trying to embed this in a larger framework involving education administrators and policy-makers.



PCST NO.682

(FA5-07)

## COMMUNICATING SCIENCE AND TECHNOLOGY IN THE MAKING: A CASE STUDY OF “ MANIA CONTEST ”

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“Science and Technology Mania Contest” is a public program organized to provide teenagers with opportunities to design high-technology-based artifacts and thereby to increase their interest in science and technology. The task given is to design a model ship propelled by the Lorentz force (Lorentz ship), which allows wide range of approaches and thus takes features of science and technology in-the-making. In this year, one hundred forty teams participated in the contest and presented their model ships. In this study, we attend to opportunities for communication that the artifact designing activity provides to the participants. Particularly, we analyze students’ communicative interaction in the oral session in which they talked about their model ships to expert scientists and engineers. We show that students’ concrete design practice constitutes referent the scientific language would direct toward and therefore resources for developing legitimate discourse of science and technology.

PCST NO.921

(FA5-08)

## WHAT MADE KOREAN STUENTS SCORE HIGH IN THE INTERNATIONAL COMPARISON STUDIES?

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Korean students achieved high scores in the international comparison studies (Third International Mathematics and Science Study; TIMSS, Programme for International Student Assessment; PISA). Many foreign science educators are interested in the reasons of high achievement of Korean students. We examined the reasons as in-school factors and out-of-school factors through the analysis of the international comparison studies, educational system of Korea and in-depth interview with science teachers. In-school factors are composed of centralized educational system, school hours & content, concept-centered teaching and assessment with a multiple-choice exam. Out-of-school factors are composed of social atmosphere to eager to pursue higher education, desire to step up one’s social hierarchy through academic clique, and widespread private tutoring after school hours. It was found that these factors significantly influence on Korean students’ high achievement. However, such high achievements may not imply Korean students’ real understandings of scientific knowledge and scientific literacy.

**Keywords:** International comparison study, high achievement

PCST NO.91

## SCIENCE ON THE WEB

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The Swedish Research Council  
Steinar Q. Andersen  
forskning.no (Norwegian science website)

Forskning.se and forskning.no is examples of disseminating science information and making it accessible to the general public through a modern and cost-effective method, the Internet. We want to present experiences from two somewhat different approaches to science communication on the Internet and hopefully inspire others that are planning to use the Internet as a channel for increasing the public’s interest in science.

Forskning.se and forskning.no are owned by Swedish and Norwegian public authorities on science and research. The general purpose of the websites is to generate interest in research as a source of information, insight and development - both for the individual and for society.

Both forskning.se and forskning.no seeks to:

- promote the beneficial use of research results both in working life and in society
- stimulate debate and discussion
- facilitate the finding and understanding of research information
- help all those who work with research communication
- create synergy effects
- initiate cooperation

Forskning.se has the only real overview of the Swedish Research & Development system, and is an invaluable resource for students and anyone working in the field of science. forskning.se are intended for anyone who wishes to find out about research. Priority groups are upper secondary school pupils, teachers, university and college students, journalists and knowledge-intensive organisations.

Forskning.no has a somewhat different approach in communicating science, it is organized as an independent editorial website owned by universities, colleges and research institutions. Target groups are set to 15 years and upwards. Each month forskning.no has 400.000 unique visits.

As a success story we want to present Infact an educational system for production of large, general summaries of knowledge. The purpose is to increase interest in research, and to work for the results of research being of use to society. Infact is applicable in this work through its general educational character, interesting set-up presented with the latest technologies.



FC1 - Indicators of Public Engagement with S&T  
(Session organised by Prof. Martin Bauer)

PCST NO.295

(FC1-01)

A FUNCTIONAL ANALYSIS OF EDITORIAL FRAMES ON SCIENCE ISSUES

Kyun Soo Kim, Seung Ho Cho, Jinmyung Choi,  
University of Alabama,

Ideological standpoints of the media have exerted extensive influence on framing political issues. However, it is little understood whether such ideological influences can be extended to science issues. This study analyzes editorials dealing with science and technology issues, in the particular context of Woo-Suk Hwang's scandal in 2005 and the general issue of stem cell research over the last few years, in two Korean newspapers, *Hankyoreh Sinmun* and *Chosun Daily*, to uncover the effects of media ideologies on the framing of science issues. The findings partially support that editorial frames may reflect media ideology, in particular as shown in the first period analyzed. Future research is warranted to see if there is any difference in qualitative or discursive practices by media ideologies during the entire period, in particular the period of the Hwang scandal, when there was no significant difference in the use of frame quantitatively.

PCST NO.336

(FC1-02)

LEARNING SCIENCE IN THE DARK: ACCESSIBILITY AND INCLUSIVITY OF EXHIBITS  
IN SCIENCE CENTERS TO YOUNG VISITORS WHO ARE BLIND  
OR VISION IMPAIRED

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The question of accessibility and inclusivity of exhibits to young visitors who are blind or vision impaired (VBOVI) in two popular science centers in Australia, namely the National Science and Technology Centre (Questacon) in ACT and Science Works Museum in Victoria were explored. Five young visitors with varying degrees of visual impairment visited Questacon; four, in Science Works Museum. This is in coordination with Canberra Blind Society and the Royal Victorian Institute for the Blind (RVIB).

The nine VBOVI evaluated the exhibits after engaging in them. Similarly, the exhibit designers of the two science museums/centers also made self-evaluation of their exhibits in the light of the accessibility-inclusivity issue. The exhibits are "accessible" if they provide structures to facilitate the movement of VBOVI in the exhibits. They are "inclusive" if the needs and interests of the VBOVI were factored in designing the exhibits, thus resulting in blind or vision-impaired-friendly exhibits.

As far as the young visitors who are blind and vision impaired are concerned, "learning in the dark" in science museums/centers, will be facilitated if the issue of accessibility and inclusivity are addressed.

**Keywords:** accessibility, inclusivity, blind, vision impaired, "learning in the dark"

PCST NO.414

(FC1-03)

TOWARDS POST - INDUSTRIAL PUBLIC ENGAGEMENT WITH SCIENCE: REVISITING  
A 10-YEAR OLD HYPOTHESES FOR EUROPE 2005

Martin W. Bauer  
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January 2005 saw the largest European survey of public perceptions of science ever, spanning 32 countries, EU-25 plus several candidate countries including Turkey. The survey covered traditional grounds of interest, knowledge and attitudes to science and technology, and included an entire module of items on social values. By exploring the variation across 32 national contexts for a number of key indicators, the paper will revisit the 'post-industrial hypothesis' of public understanding of science (Bauer, Durant & Evans, 1994) on the historical dynamics of PUS. This thesis suggests that with the transition from an mainly (pre)industrial to a post-industrial knowledge society (a) popular knowledge of science specializes, (b) interest in science is stable or even decreasing from a certain level of development because knowledge of science is increasingly taken for granted. What is already part of everyday life is no longer of particular interest. And (c) the correlation between knowledge and attitudes is declining. In post-industrial knowledge societies, higher knowledge is no longer a predictor of positive attitudes to science, to the contrary, knowledge fosters polarization on controversial developments in science and technology. The paper will address issues raised by Pardo & Calvo (2004) on psychometric properties of the scales that might interfere with the evidence.



PCST NO.416

(FC1-04)

## PUBLIC UNDERSTANDING OF SCIENCE AND TECHNOLOGY: RESULTS FROM FIRST INDIA SCIENCE REPORT

Rajesh Shukla

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The growth of any nation not only depends on the impact of its S&T efforts on technology exports but also on the lives of the common man. This first India Science Report marks a pioneering attempt at seeking to inject new dynamism in the country's database and statistical system related to science and technology. Such efforts are consistent with India's growing emergence in the global economy as well as her attempts at becoming a substantial player in the new knowledge-based services and products. One of the major issues covered in the report is the Public Understanding of Science and Technology (PUST), and is characterized by a first- ever primary data household survey.

The First India Science Report was aimed to focus on three major issues, namely, science and engineering education, utilisation pattern of human resources and public attitude towards science and technology. To achieve this goal a nationwide survey called 'National Science Survey- 2004' was undertaken to generate a statistically appropriate database to generate reliable estimates of various parameters related to these important issues. Although this was a household survey, the ultimate unit of selection and collection of primary information was the individual over ten years of age as he/she belongs to a society that is diverse in culture and socio-economic development.

Results show that despite the poor interest in science and technology (S&T) programmes, most Indians have great faith in science; over three fourths feel S&T is important for education, 58% feel the same way about the economy, and 72% about agriculture. The report also found that the level of knowledge the population has about scientific concepts is very high. India scores slightly lower than the US on attitudes towards science and technology. Overall, the perception is that the benefits of S&T are higher than its deleterious effects. This is a positive trend in a country that is poised to make a mark for itself in the field of science and technology in the next century.

PCST NO.435

(FC 1-06)

## NEW TOOLS AND DIRECTIONS TOWARD A BETTER UNDERSTANDING OF SOCIAL PERCEPTION OF SCIENCE IN IBERO- AMERICAN COUNTRIES

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The social perception of science & technology in Ibero-American countries seems to be acknowledged with growing interest by researchers and policy-makers as quite relevant for strengthening science communication activities and promoting qualified citizenship. In very recent years, several countries of the region (Argentina, Brazil, Colombia, Mexico, Panama, Portugal, Spain & Venezuela) have been carried out studies and national surveys to investigate the issue. This current scenario has been supported in part by institutions like the Organización de Estados Iberoamericanos (OEI), the Red Iberoamericana de Indicadores de Ciencia y Tecnología (RICYT/CYTED), the Fundación Española de Ciencia y Tecnología (FECYT) and Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP). These organizations have been working as catalyst for researchers and countries in the region to review concepts, instruments and share methodologies. Despite the fact that Ibero-American countries have entered this research field later than several Northern countries, and that they have adopted, in part, the usual, standard methodologies and questions of classical surveys, they have been able to conciliate the need for international comparisons with the attention to local context, putting data and methodologies within the context of the recent critical debates about scientific culture. Currently, as a part of this process, RICYT, FECYT & OEI have started a new project to develop a set of common indicators for the region, working in network with experts and policy-makers. This presentation will focus specially on both a review of the historical development of this field in the region and its current situation in terms of shared experiences, methodologies and conceptual debate. The common framework conceives public attitudes, beliefs, behaviors, knowledge and information as a part of a composite model of scientific culture where S&T interact with the whole of culture and society.

### 9<sup>th</sup> International Conference on Public Communication of Science and Technology (PCST-9)

Symposium on 'Indicators of Public Involvement in Science and Technology: new developments' Promoters: Dr Martin W Bauer (LSE) & Rajesh Shukla (NCAER, Delhi)



PCST NO.474

(FC1-07)

### PROPOSING A NEW INDICATOR OF PUBLIC ENGAGEMENT WITH SCIENCE: PEP/IS

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KIM Hak-Soo's PEP/IS model stresses the public's perspective and processual behavior for communicative effectiveness of science. It posits that the public is likely to engage with a collective problem or issue more readily than directly with science, and "subsequently," the public could engage with science for solving the problem or resolving the issue. Communication is supposed to be more effective in facilitating the process of engagement than in enhancing the public's scientific literacy. The PEP/IS model has been developed and tested in Korea. Here, we will report part of a recent survey study that measured differences between the public's engagement with collective problems and the scientists' one and measured how much the public or the scientists relate science to solving those problems and what specific sciences they think could contribute to solving them.

PCST NO.578

(FC1-08)

### AGE, GENERATIONAL, AND EDUCATIONAL EFFECTS ON BASIC U.S. ADULT CIVIC SCIENCE LITERACY

Susan Carol Losh

Florida State University

Most countries emphasize an effective science education, in part with the expectation that science-literate adults will understand and often participate more fully in science-related policy decisions. However, in assessing adult basic civic science literacy over time, many factors change simultaneously, making definitive conclusions difficult. For example, more recent generations often have more formal education and more exposure to science teachings and communications than earlier cohorts. They are also more facile with and exposed to various forms of information technology. Age and generational effects are confounded in "one-shot" cross-sectional analyses but can be disentangled to some degree in repeated cross-sectional sample designs

In these analyses, I employ multivariate analyses of the American National Science Foundation Surveys of Public Understanding of Science and Technology, 1979-2003, a total sample of over 23,000 adults, to examine how recency of educational exposure, generation (e.g., "baby boomer"), educational factors, and media exposure affect basic science factual knowledge and inquiry understanding. Overall, general levels of inquiry understanding were somewhat greater than basic factual knowledge, although both showed some increase by time and generation. Both more recent cohorts and younger people typically, but not always, showed higher civic science literacy. More recent cohorts had greater secondary school and college exposure to science. I propose that more sophisticated presentations through the media and in science education have increased U.S. basic science literacy across time, over and above an adult's formal degree level accomplishments. Implications of these findings are discussed.

PCST NO.427

### BRAZILLIAN SURVEYS OF PUBLIC ENGAGEMENT WITH SCIENCE AND TECHNOLOGY: FROM 1987 TO 2006

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Brazil will have conducted by early 2006 a nationally representative survey of public engagement with science and technology. In the last 10 years Brazil has seen a very active scene of science communication, including science festivals, public debates, science exhibitions, and the institutionalization of scientific referencing across the mass media: newspapers, magazines, science centres, television and even soap operas. This Brazilian survey It covers concepts like interest, informedness, exposure to various forms of science communication, trust in various actors, attitudes toward science, images of scientists, awareness of and opinions about the national science base and its achievements. The presentation will offer preliminary highlight results from this most recent investigation. We will diagnose detectable changes between 1987, when the first national survey was hold, and 2006 and put these in the context of other, more local surveys conducted in Brazil. We will also attempt comparisons of the results with studies conducted in Argentina, India and Europe.



PCST NO.472

INQUIRY into PEST THROUGH A STUDY ON PROCESS OF CHANGE AND  
SETTLEMENT OF SCIENTIFIC TERMINOLOGY IN KOREA  
[ PEST INDICATOR – “ SCIENCE TERMINOLOGY ” ]

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In non-English speaking countries, they use scientific terms translated into their own languages as they are introduced in other languages such as English, German, and others. Such translation process incurs more complicated consequences than one can expect in the perspective of communication of science. The point is that the translated terms of the same definition change often by the time and view, the masses, the press, policies of the government, and other factors. For instance of Korea, it was inevitable for the terms of the period that were influenced by China to radically change into Japanese-style terms as the country was occupied by Japan and the national effort to overcome the situation itself has also left influence. People and the press should choose to use terms that are easy to understand and the government should present the standard language that to be applied nationally out of various terms.

In Korea, there are currently as many as 5 different terms that can be used for one idea. They are English style, German style, Japanese-style Chinese characters, Chinese-style Chinese characters, and Korean. 'Genome', meaning a set of chromosome, is written as '■ ■ (ginom)' in English-style, '■ ■ (genom)' in German-style, and '■ ■ ■ (染色体, yeum seck che)' in Korean. The Korean government recommends using '■ ■ ■' and the press is presenting different views by the company between using '■ ■' and '■ ■'. Furthermore, '■ ■ ■ ■ (NaCl, yeumwha natrium)' is changed to '■ ■ ■ ■ ■ (sodium chloride)' and '■ ■ ■ (eteer)', '■ ■ ■ (ider)' or '■ ■ ■ (iser)' to '■ ■ (eter)' for 'ether'.

Which terms are used to communicate with the masses about scientific technology is very significant. This can lead people to serious mistakes at times and radical changes can also hinder the communication between generations. Through studies on the process of settlement of the scientific terminology such as this, it gives a chance to closely look into the aspect and results of serious interference on scientific technology and it can be used as the representative index of the people's interference on the scientific technology. Establishing scientific terms and standardizing of official terminology in one's own language could require much financial cost in the near future. PEST should pay more attention to this area and take proper actions before it gets too late.

Keywords

Science Terminology, PEST, Korean Science Terminology, ■ ■ (hangul)



## FC2 - Science in Massmedia

PCST NO.78

(FC2-01)

### SCIENCE JOURNALISM IN LATIN AMERICA HOW SCIENTIFIC INFORMATION FROM A SCIENTIFIC PRIMARY SOURCE IS ACCAOMODATED IN A JOURNALISTIC STORY

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Our study aimed to investigate how is the process of settling the scientific information provided by a primary scientific source into a journalist discourse. As study cases, we analyzed four scientific papers published by the peer-reviewed scientific journals *Nature* and *Science* which were simultaneously used as primary scientific source by Latin American newspapers, focusing on the transformations to which the information was submitted to.

The choice of the four scientific papers was done based on our wider project, in which we analyzed, using both quantitative and qualitative tools, all the stories published by the science section during the whole month of April 2004, in the following newspapers: *La Nación*, Argentina; *El Mercurio*, Chile; *Mural*, Mexico; *El Comercio*, Ecuador; *O Globo*, *Folha de S. Paulo* and *Jornal do Comercio/Pernambuco*, Brazil.

A total of 482 texts were collected. From the total, we identified 17 groups of stories published on the same theme, written based on the same primary source provided by the scientific community, including press-releases sent by research institutions and papers published by peer-reviewed journals. We sought the themes published by at least four of the studied newspapers, obtaining then six groups of stories. We excluded two press-releases (one produced by Nasa and the other by a French institution), focusing on four papers published by *Science* (two articles) and *Nature* (two articles), since we considered that this would allow us to have more homogenous study cases, due to the fact that the journals have similar purposes and their articles are sent to the journalists through similar strategies. In our study, we analyzed the transformations to which the original texts were submitted to, considering the journalistic “pegs” used; the information that appear, disappear and was transformed in the process; mistakes, lack of attention and inconsistencies were also observed.

PCST NO.92

(FC2-02)

### ANALYSING THE PRODUCTION OF UK NEWSPAPER COVERAGE: THE CASE EVOLUTION/CREATIONISM

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The question of whether religious explanations about the origin of life should be taught alongside scientific accounts in compulsory science education has sparked controversy in several countries for decades. An important and visible site for these controversies is media reporting. For example, in spring 2002 a case of teaching creationist ideas alongside evolution theory in schools generated extensive coverage in the UK press.

The research in this paper focuses on the role of expertise in news production and is informed by current developments and discussions in science education, science communication and the field of public engagement and understanding of science.

The methods used are semi-structured interviews conducted with media professionals that reported this issue in UK newspapers. The research tries to answer questions about how media professionals select and assess the credibility and information provided by their sources and experts, as well as what makes this issue newsworthy for these journalists.

The paper presents some illustrative results from this part of the research, investigating questions of expertise and representations of science education and the case of teaching creation/evolution from the point of view of the media professionals. The results show that a range of specialist correspondents, e.g. educational, scientific, political or religious affairs correspondents reported this issue, and different emphases have been prioritized in the coverage. There are also differences on how the stories have been produced depending on whether journalists write for local or national newspapers. Some of the local correspondents, for instance, argued that they had a greater responsibility for the local community and the representation of the voices of community members than correspondents writing for national papers.

The conclusions will consider whether this study can provide insights about how science education is presented in the media more generally.



PCST NO.103

(FC2-03)

## CONSTRUCTING STEREOTYPES CONCERNING GENDER AND HEALTH IN THE MASS MEDIA

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Several works performed in our university institution: Science Communication Observatory, research centre specialised in the study and analysis of the transmission of scientific medical and technological knowledge to society has showed that in the scientific community the sexism in the stereotyped vision of the scientific activity has been put in evidence in multiple occasions.

A work about woman, health and newspapers carried out in our institution reached the conclusion that the language, the images and the centre of attention of the news published in analyzed newspapers were contributing in perpetuating stereotypes on the roles feminine and masculine. Moreover, the analysis of the media coverage and the information content generated in the radio, TV and the Spanish press, and also in the international press, with regard to the Conference during the XIV Aids Conference held in Barcelona in July 2002 showed that some gender stereotypes were present regarding how the epidemic problem was presented in the mass media. Finally, taking in account the results obtained in the mentioned preliminary experiences, an analysis of the stereotypes contained in the informative programs on TV which could be seen in the Catalan territory (country located in the East of Spain) concerning health and disease has been performed recently.

For the audience, TV and daily press are primary sources of information about topics involving health and disease, such the case of the aids epidemic, which in turn reproduces the language used in the media. In this communication, we would like to emphasise how local and global stereotypes are socially being constructed in very different medias (radio, TV, press) and in diverse contexts (disease, public health, conferences) and in dissimilar cultures (Spain, Europe, Asia) related to gender and health.

PCST NO.109

(FC2-04)

## EVE'S SONS. THE DEBATE ON HUMAN CLONING IN THE ITALIAN PRESS AFTER RAE LIANS' ANNOUNCEMENT

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The possibility of cloning a human being still arouses great attention in the public sphere, especially when the media cover stories about this. Subsequently to Dolly's birth and after the cloning of other mammalians, the public debate has been particularly sensitive to the theme of reproduction through the technique of cloning.

It is therefore not surprising that the announcement of the birth of Eve, the first baby-girl allegedly cloned by scientists in association with the Raelians' sect, made at the end of December 2003, caused a sensation. The paper focuses not on the causes of such sensation, but on the attempt to use controversies about Eve's birth to let emerge the connections which tightly bind, in our cultural system, reproduction with the processes of construction of identity, both at individual level and that of humankind. Particular attention will be devoted to genetic engineering's role in the re-definition of this connection and to the ways in which regulation has been put forward.

Through the analysis of the 112 articles published on the main Italian newspapers in the period between the 28<sup>th</sup> December of 2002 and the 13<sup>th</sup> January of 2004, the main actors involved will be highlighted, together with main the themes discussed, in order to give an overview of the framework where the theme of cloning couples with the theme of assisted fertilisation, with the theme of human reproduction and, at large, with the theme of identity. Finally, in such a context, the problem of regulating scientific research and the problem of responsibility of scientists together with that of the public construction of the "expert" role will be addressed.

PCST NO.113

(FC2-05)

## BIOTECH, PUBLIC OPINION AND THE PRESS: FRANKENSTEIN'S COPYCAT SOLDIERS AT WAR?

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When looking at opinion polls, one can see a clear distinction between attitudes towards reproductive cloning, green and red biotechnology. Where red biotechnology is considered useful and benevolent, green biotechnology and reproductive cloning are seen as dangerous and unnecessary. With our research, we wanted to find out if there were possible parallels in the popular press. This would also mean that for the first time, data from non-elite press were used in research considering the representation of biotechnology.

In the first stage of our research, we selected all articles within a five-year range from the three most popular Flemish newspapers that dealt with biotechnology, and encoded them. The selection of the newspapers was based on the most recent CIM-numbers. The results indicated a clearly distinct discourse for the green biotechnology, red biotechnology and reproductive cloning-themes. Issues on green biotechnology and reproductive cloning were clearly portrayed in a more negative way than red biotechnology, where the 'good news'-articles clearly outnumbered the rest.

An interesting find however was the fact that the negativity of the articles on green biotechnology and reproductive cloning was not due to the mentioning of risks. Both themes still possessed more benefits than risks, although in smaller amount than with red biotechnology. The negativity thus was not based upon facts.

This lead to the second stage of our research: a metaphor-analysis of all the articles. Here we found that for specific biotechnology- terms, like cloning, a specific set of metaphors was almost consequently used. In the case of green biotechnology and reproductive cloning, most of the metaphors used had strong negative connotations, whereas this wasn't the case with red biotechnology.



PCST NO.162

(FC2-06)

### THE MEDIABILITY OF GENOMES A STORY FROM THE “BOOK OF LIFE”

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The changing relationship between science and the mass media has been characterised in theory as an increasing orientation of science towards the media. This study aims at supporting the media orientation concept empirically for the field of human genome research.

German and British print media coverage of the final phase of the human genome sequencing provided an empirical basis in looking for indicators of a media orientation. Using a quantitative content analysis, 386 articles from four German and four British newspapers have been studied. The appearance of articles in almost any newspaper section illustrates the intertwining of the scientific with political, economic and ethical discourses in the media debate. The media attention peaks indicate the success of events such as a White House press conference. A public presentation of the sequence drafts occurred prior to their scientific publication. Individual scientists became media stars.

Triggered by its far reaching implications, its “Big Science” nature and the competition of publicly and privately funded scientists to finish the first drafts of the human genome, human genome research is indicative of the media orientation of science. It is therefore highly likely that the rationalities of the media system gain an influence on the research field or even beyond it.

PCST NO.272

(FC2-07)

### A TALE OF TWO MISSIONS: UK NEWSPAPER REPORTING OF THE BEAGLE 2 AND CASSINI/HUYGENS SPACE MISSIONS

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Although astronomy and space science is quite well regarded by the public, and has a considerable presence in the mass media, there are not many academic studies of how it is portrayed. Here we present a preliminary study of the UK newspaper coverage of two space missions, one a failure and one successful - the Beagle 2 mission to Mars and the Huygens mission to Saturn's largest moon Titan - which arrived at their destinations almost exactly a year apart. Press coverage of the Beagle 2 failure, in December 2003, overlapped that of the Huygens success in January 2005. There were reports of tension and concern, and the need for a success to make up for the failure. But by and large the tone was universally positive. We also look at how scientists involved with science as research and events have to make comments on the hoof, without waiting for peer review, and how then the media (and the public?) treat these. Our conclusion is that journalists and their readers have a more sophisticated understanding of science-in-the-making than is often supposed.

PCST NO.669

(FC2-08)

### MAKING NEWSPAPERS IN BIOLOGY CLASS -CASE STUDY ON AN ACTIVITY-BASED BIOLOGY CLASS

Jun-euy Hong

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The fundamental starting point of science education is inducing motivation. If classes are based on situations that are closely related to one's thoughts, experiences or interests, it would be possible to induce a positive attitude towards science. While the present educational system emphasizes independent study of students, there are many traditional classes in which teachers play a major role. It is not consistent with global trend in science education stress not only on scientific knowledge but on problem solving related science. Instead teacher prepare all things for the lessons and the only things students needs is listen carefully teacher's mention, we need very active bidirectional communication on student to student(s), teacher to student(s), such as students centered activities and it can make they can realize scientific knowledge and principles. And, it is very important thing to make student have a positive point of views to science. For this purpose, after studying 'the characteristics of life' and 'the structure and functions of cells', I carried out a 'making science newspaper' program based on the studied topics with 150 science high school students. Students formed groups of 3 or 4, and each produced and presented a newspaper filled with various items such as comments, reviews, and cartoons. The students' attitude towards this program were generally positive, as one can see from the following responses: 'I believe that making a science newspaper using what we've learned was an interesting project that promoted creative thinking, and was great'; 'The best thing of making a science newspaper was the fact that I could apply ideas and principles I'd learned from books to real-life situations and thus could better understand what I had learned and get more interested in science classes.'

index terms: interest for the science, bidirectional communication, students centered class, science newspaper



PCST NO.370

(FC2-09)

## STEM CELL SCANDAL POTRAYALS IN SOUTH KOREAN MAJOR NEWSPAPERS: A QUALITATIVE AND QUANTITATIVE ANALYSIS

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It is undeniable that the stem cell scandal is regretted deeply by Korean people. However, the news coverage of this issue is such a big publicity of science, especially biotechnology. Moreover Korean mass media gives an extensive space on this issue.

This study explores three English-language newspapers in Korea: The Korea Herald, The Korea Times, and JoongAng Ilbo. By utilizing framing theory, we examine how the three papers differed in their presentation of the issue and perform both quantitative and qualitative analysis. The samples are taken from both paper and internet media, from October until January 2005. This period is determined based on the first unleashed issue in the stem cell scandal to the last decision where finally all the suspected cases were acknowledged.

The quantitative component of the analysis in this study involves tabulating articles related to this issue, amount of article per day, placement in the newspapers and other parameters. The qualitative component identifies the main ways of portraying this stem cell scandal: as the mistakes of an individual, a group, the whole research system in Korea, or even the general culture of Korean people.

The media exposure of this issue does not only report about the ethic scandal, which was easily comprehended by the common people, but also scientific affairs, which is rare to be found published daily in general newspapers. These increasingly popular scientific issues among common people's comprehension will facilitate the construction of scientific citizenship.

PCST NO. 119

## SCIENTIFIC EXPERTISE ON DEMAND

Tina Zethraeus

Swedish Research Council

Follow the media in Sweden, and notice to what extent the media covers science. Not only by presenting scientific news, but also by using scientists for a commentary, a second opinion or a new angle. For five years the media service Expertanswer (Expert svar in Swedish) has helped to facilitate contacts between scientists and reporters in Sweden. The service is expanding in Scandinavia, and other groups like politicians are knocking on the door, wanting the same kind of fast contact service. Expertanswer in Sweden, "Sök Xperti" in Finland and a pilot in Norway are new initiatives helping reporters to find scientific expertise. The idea behind the web based service with some 5 000 journalist members is that media queries need help to find their way through the academia. Information officers at the universities channel the interdisciplinary questions and look for matching scientific expertise. Normally journalists get several answers from different research institutions. The Tsunami Catastrophe in South East Asia 2004 could serve as an illustration of the complexity of an event that generated questions for scientific expertise not only on tectonics and oceanography, but also on risk assessment, politics, religious beliefs, politics, rituals, human values etc. The web portal Expertanswer also contains research news from the member institutions, the whole university sector in Sweden. A selection is translated for international science portals in the US and Europe. The international channels are added value for the institutions who pays a yearly fee to uphold the service. The fact that interest for science is high in Sweden was recently demonstrated in the EuroBarometer. To what extent the increased visibility of science in media has helped is an open question. But certainly, the contact between scientists and journalists has been simplified by Expert svar and other initiatives for reinforcing the contacts between science and society.



## FC3 - Societal & Educational System in Diverse Culture

PCST NO.330

(FC3-01)

### THE LEADING PART OF SCIENTIFIC KNOWLEDGE IN THE FORMATION OF THE PRE-SCHOLARS TEACHERS AND EDUCATORS

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The long-life learning for everyone is the most important educational challenge for this century. Education for the future must prioritarily go up to people unable to accede to a basic knowledge. The new discoveries in branches like neurophysiology, psychology of cognition, neurobiology of the brain open better prospects to understand how the humans organize themselves to develop their abilities to learn.

A democratic government has now to furnish ways to spread useful information to help parents and educational staffs to adjust their practices. On another way, the recent researches in linguistics help to understand the verbal's interactions and the misunderstandings coming from the socio-cultural context. With the approach of the communication by the process, it's not yet an utopy to be able to explain (being understood!) complex scientific knowledge and the impacts of the new technologies in the day-to-day's life of the citizens. With the advances of the sciences, we can communicate rightly to the culture of our audience, avoiding problems and incomprehension.

Therefore, it's absolutely essential to a democratic government to provide reliable founts of scientific data. To achieve performants results, the organizations in charge of the cursus for the educational staff and educators have to deploy new strategies to offer permanent opportunity to the students to actualize their competencies, during the cursus and after the cursus. Today the quality of the teaching is strongly dependant of the capacities of the teacher but also depends of his relationships with the student and his family. We all know that we can count with the natural and marvellous inquisitiveness of human mind. To give this capacity opportunities to be developed, the institutes in charge of the cursus will require more flexibility, mutualisation of know ledges with commune norms of education. To achieve that, a strong background of general culture is essential and a very good understanding of other cultures will be an obligation. To prepare the teachers and the educators to such purpose, a new way to see their career must be planified by the Ministries: if they accept formation during their professional career, they are entitled to receive an advantage for that cooperation. Unfortunately, the citizens have a very bad perception of the teaching job and it's not unusual to hear people complaining about the laziness of the teachers because they have two months of holidays. So if they don't resent a very strong vocation for that job, they don't resist the pressure and the difficulties of the teaching conditions: they leave for other laboural opportunities. A democratic government has the duty to turn the tables on that perception because it makes the profession unattractive. If we are honest people, we will recognize that a study seems harder if it doesn't offer the possibility to dream or to be fascinated by the idea of the professional's practice induced by the cursus. An education for a sustainable world has to intensify the notions of quality, passion and pleasure: it's the human nature to search pleasure and we don't reject that ability. It's a strong incitement for seeking higher quality in our pedagogical skills. In the media we often hear about globalisation or mundialisation but for education, it's better to speak about universality of the knowledge to allow the future generations to form a community on various degrees. With the new technologies we must be practical and use them to prevent a bigger division between countries and continents. To avoid that, it's important to spread the technologies all over the world to reduce the gap opened some years ago. With the new technologies, it becomes a real pleasure to explain sciences to everyone and it's not so problematic if the child doesn't live near a town where he would see "in vivo" scientific experimentations because the teacher can use various networks providing high quality materials therefore. Even if the child lives in a very isolated country, he will be participant of the discoveries of the mysteries of the earth.

Therefore, we will present a project for the curriculum of the teachers, insisting on the most innovative points.

PCST NO.333

(FC3-02)

### SCIENCE COMMUNICATION IN UNIVERSITY EDUCATION - ITS SIGNIFICANCE AND DIFFICULTIES IN JAPANESE SOCIETY -

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Osaka University Center for the Study of Communication-Design (CSCD) was established on April 2005. The mission of the center is planning and designing a communication circuit to connect people with expertise and people without.

As a part of the CSCD projects we are developing some courses for graduate school students to promote the capabilities of the science communication. Now two courses are under the test run; one is a lecture course and another is an exercise.

The purposes of those courses are mainly

1) to find out by themselves that their knowledge gained through graduate school education is "special" or "biased" rather than "natural".

2) and then, to build up their basic capabilities to communicate with concerning citizens.

In the test run of our exercise course, graduate students from different specialties are mixed and discuss about issues like BSE. Through this discussion exercise, they become aware their style of reasoning and explanation, concepts they use are strongly constrained by each disciplinary framework.

Increasing uncertainty related to techno-scientific problems such as BSE is a global matter. Nevertheless all of those global issues have also different meanings depending on each local situation.

In this paper, I explore Japanese situation related to techno-scientific issues and science communication in practice. Then, some difficulties to build up the public sphere under the constraint of locality and cultural diversity will be discussed



PCST NO.348

(FC3-03)

## COMPARISON OF COMMUNICATION PATTERNS IN SCIENCE CLASSES BETWEEN KOREA AND USA.

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Developing student's scientific thinking skills is one of the main goals in science education. The purpose of this study is to compare the communication patterns in science classes between the two countries: Korea and USA. We are all live in many different social environments and all of these environments impact our communication patterns. In the USA, student who are encouraged to think creatively will have that ability nurtured but its cost times to communicate with students. In American teaching style is good for creativity while Korean teaching style is ideal for knowledge delivery. In Korean science classes, teachers lecture the scientific contents very effectively, but almost no communications with their students. Science teachers in USA ask open questions to their students while Korean teachers ask closed questions. Most eminent people can point to at least one great teacher or mentor who greatly influenced their lives. High quality science teacher or mentor is one of the key factors for the success of science education.

Key Words: science education, communication patterns, open questions, closed questions

PCST NO.412

(FC3-04)

## ROLE OF REGIONAL PRIVATE SCIENCE AND TECHNOLOGY PROMOTION ORGANIZATIONS -CENTERING AROUND THE ACTIVITIES OF THE FEDERATION OF BUSAN SCIENCE AND TECHNOLOGY

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Though Busan is the second largest city in Korea, its awareness of science and technology is so low that the 2001 budget for science culture, five years ago, was only four million won corresponding to 1 won for each of its citizens. However the level of awareness of science and technology has rapidly enhanced for the last several years, and various science cultural projects such as the Busan Science Festival have been held in full swing. Furthermore, the Science Korea campaign, designed to strengthen Korea's science capabilities is very proactive in Busan. As such, Busan became the first 'Science Culture City' among Korea's 16 autonomous metropolitan organizations in March 2005.

To understand such development, the role of the regional media and the activities of the Federation of Busan Science and Technology (FOBST) should be mentioned. The development of Busan's science culture movement can be divided into the four stages.

First, during the infant stage (1999 to 2001), the Kookje Newspaper, a daily newspaper in Busan, created a scientific boom in the region with special series such as 'Meetings with Scientists', Korea's first public science lectures and 'Busan's Scientists' series, designed to promote regional science and technology.

The preparation period (2002 to 2003) refers to a time when Busan City and the Busan Metropolitan City Office of Education joined the effort to boost a scientific boom, jointly holding the public and private Busan Science Festival (annual participation by 50,000 to 70,000 people), establishing the Busan Science and Technology Award, and institutionalizing science and technology promotion through ordinances.

A consultative body was formed in the rise period (2004 to 2005). The Federation of Busan Science and Technology was mainly founded by Busan City, the Busan Metropolitan City Office of Education, and media agencies, and also participated by regional universities, companies, and even political circles. It has been engaged in regional science promotion activities, backed up by independent budgets and human resources.

Finally, mid- & long-term science culture plans, based on the past activities, will be drawn up and put into practice in a comprehensive way during the take-off period (2006 to 2010). During the period, science culture infrastructure will be expanded to an innovative level such as establishing the national library, diversifying various science culture programs including daily-life science classrooms, and increasing the budget of the 'grassroots science and culture budget' to 1,000 won per one citizen.

Keywords: Science and Technology, FOBST, Science Education, Science Culture



PCST NO.562

(FC3-05)

OPERATION AND PROSPECT OF  
“ WOMEN S SCEINCE CLASS IN DAILY LIFE ” AT POHANG

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“Women’s Science Class of Daily Life” started at Seoul and Pohang in 2005, with cause to promote understanding about science and technologies in modern society for women and to stimulate scientific mind. Though it is difficult to evaluate its result due to short period of its operation, it is thought that the class induced good interest from women by the fact that the number of audience and their enthusiasm. Because of easy topics which usual women can look and use or experience in daily life the class seems to be successful. If topics will be deepened step by step with time, this program is expected to make very important role in level-up of scientific sense and knowledge for usual women.

This paper is the report operation of Women’s class of scientific life.

**Key word:** scientific mind, women’s class of scientific life, parents training

PCST NO.654

(FC3-06)

SCIENCE DREAM TREE PROJECT

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The Women’s Network for Science & Engineering in Gwangju-Jeonnam, Co. invited the teenagers, we called them Dream Trees, to our laboratories to do experiments for a week. We had 30 students in 6 labs. We ran the program twice in 2005, January and August. Each group concentrated on a single topic from enzyme assay and inhibition study, DNA manipulations, and extraction of antibacterial substances from medicinal plants and the activity tests, etc. We think this Science Dream Tree Project is an excellent model to boost the youngsters to have a science-oriented mind so that they will study with even clearer goals and zeal for the future.

PCST NO.676

(FC3-07)

THE ROLE OF LOCAL AUTONOMOUS ENTITIES IN DEVELOPING THE SCIENCE  
CULTURE  
(THE PRACTICAL SCIENCE CLASS PROGRAM)

Jong Yeon, Choi, Chung Chin,

Young Deng Po Gu, the self governing district in Seouli that is the capital city of Korea and also the world city that is famous for the hosting of Olympic Games in 1988, ASEM Conference in 2000 and World Cup in 2002, is running a program called “The Practical Science Class”. Until September 2003 when a staff of “The Korean Science Culture Organization” volunteered to initiate and implement the science program, the concept of science was pretty much non-existent in this part of Seoul. However, after receiving a remarkably favorable response from the district residents, this program was developed to an official science program aiming to educate the district residents and at present, the program has been spread to some 344 areas throughout the country. The success of this program is mainly owing to the district being able to predict precisely the demand of scientific needs in the area and facilitating what they called “The Residents’ Autonomous Centre” which enabled the district residents to access to the program easily by promoting the program consistently in their districts. In addition, the introduction of the idea how to lower the costs while maximizing the efficiency by using the practical materials as their scientific experiments have played a crucial role for the success of this program.



PCST NO.415

## ARTS-SCIENCE COLLABORATIONS: AN IDENTITY PERSPECTIVE

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Arts-science collaborations are productive endeavors for the development of major new inter-disciplinary projects and activities that benefit not only those involved but wider society. However, as the barriers between the arts and sciences blur, new challenges are emerging for science communication.

Interaction between the arts, humanities and science has often been seen as fairly simple and one-directional, one sector using the tools of the other for their own benefit. For example, advances in science and computer technology provide creative artists with new tools and inspiration. Tools from the social sciences are applied to help overcome the social, moral and economic challenges resultant from scientific and technological advances in areas such as genetics, nanotechnology and environmental management.

This dynamic is changing with scientists, artists and others working together on projects as valuable as understanding of how the brain perceives and responds to external signals, dealing with interactions between 'patients' and healthcare professionals, and creating more viable rural communities. These collaborations also provide new approaches to the public engagement with science and technology.

However, these cross-sectoral collaborations often require a reshaping of identity for those involved in order for them to communicate effectively. Using approaches taken from social psychology, this paper will look at the constraints and opportunities for cross-sectoral communication occurring within Australia and overseas and provide some recommendations based around the management of identity for those involved in cross-sectoral communication.



## FC5 - Informed Citizen

PCST NO.279

(FC5-01)

### THE OPPORTUNITY OF SCIENTIFIC ARGUMENTATION IN THE CLASSROOM: CLAIM-EVIDENCE APPROACH

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Scientific inquiry is one of the ways that students understand how scientific knowledge is constructed. However, scientific inquiry in the classroom has a problem as a cookbook system without the opportunity of communication among students and teachers, so that they cannot understand the nature of scientific inquiry and scientific knowledge. The communication during scientific inquiry is defined as the opportunity of developing argumentation, where students differentiate evidence from data, support their hypothesis with evidences, and refute others. The purpose of this study was to analyze one science teacher's understandings and his explicit teaching strategies for the opportunity of student argumentation in the classroom. One middle school science teacher and 54 students participated in this study. Data were collected through three times of semi-structured interviews, 60 hours of classroom observations, and two times of students' lab reports for eight weeks. Students' discourse was also analyzed by employing three different argument analyzing tools to develop Scientific Argumentation Table (SAT). SAT made it possible to make decision how often students had the opportunity of argumentation and how its quality was as responses to teaching strategies. The results indicated that teacher defined scientific inquiry as the combination of students' hands-on activity and the abilities of reasoning skills. Claim-Evidence Approach, the main teaching strategy for scientific argumentation, provided students with more opportunities to develop their own claims based on their readings, design the investigation for evidences, and differentiate evidences from data to support their claims and refute others. The teacher's role of scaffolding was critical to shift students' less extensive to more extensive argumentation through his prompts and questions. The teacher's involvement, his explicit teaching strategy, and students' scientific knowledge influenced students' abilities of developing argumentation and its quality.

PCST NO.320

(FC5-02)

### SCIENCE COMMUNICATION VS. SCIENCE JOURNALISM - HOW DO THE NEWS MEDIA BEST CONTRIBUTE TO SCIENTIFIC LITERACY

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The last five years has seen a significant increase in the amount of resources put into science communication in Europe. The current focus on science and innovation as a pivotal part of the Lisbon Strategy/Barcelona Goals in the EU has strengthened this development. In Denmark this has been enhanced even further by a government policy stressing better science communication as a prerequisite for better science funding. In other words: if scientist wants better public funding, they have to help convince the public that the money will be well spent. This is seen in the new university law that stresses the obligation of scientists to communicate their work to a broad audience. Recently a study of 1200 Danish researchers showed that they regard the news media as the best way of communicating their work to a broad audience. The study reflects a strong sentiment in the Danish research community, that news media should share the strategic goals of scientists and the government to encourage people and especially young people to take a keener interest in science. However the point made in this paper is, that the news media cannot do that. Their role is to question these priorities, not to be a part of a publicity campaign for science.

This will lead to a general discussion on the importance of the news media doing proper science journalism instead of science communication. In an analogy to the political debate, science communication can be equaled to political spin doctoring. Science journalism takes the role of proper political journalism. And just as critical political journalism is better to raise political literacy than spin doctoring, critical science journalism the best way to raise scientific literacy. Using examples from Politiken the paper goes on to try and define what distinguishes science journalism from science communication.



PCST NO.322

(FC5-03)

**MEDIA AND SCIENTIFIC CITIZENSHIP:  
EXPLORING MEDIA EFFECTS ON FEELINGS OF EFFICACY FOR SCIENCE-RELATED  
ISSUES**

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Consensus seems to exist among science scholars and policy makers on the necessity to involve the public in science and technology decision making processes. In science policy-making circles, it is taken for granted that specific participation mechanisms (such as consensus conferences) have to be put in place to allow citizens to express their views on science and technology related issues. The impact of the media on public involvement and public opinion on these issues is generally considered minor, although no empirical data supports these claims. Since media has been shown to have an impact on political participation in general, it seems however worthwhile to investigate what role the media might play in promoting, or limiting, public involvement in science affairs.

Using agricultural biotechnology as a case study, this paper examines the impact of media use on feelings of efficacy in the context of science-related issues. Efficacy is usually defined as “the feeling that one is capable of influencing the decision-making process” (Goel, 1980, p.127). Based on the responses to a mailed survey to a representative sample of 1,500 residents of New York State, we examine the extent to which the media makes people feel confident in participating in science and technology decision-making, when the effects of education, gender, and age, are controlled for. We examine the potential mediating effects of knowledge, institutional trust and attitudes toward science. Initial findings of a regression path analysis suggest that newspapers and television play a crucial role in promoting feelings of efficacy for science affairs. Attention to news related to agricultural biotechnology in the newspaper increases feelings of efficacy for scientific decision, directly, but also indirectly by impacting knowledge about scientific issues. Contrary to common assumptions, attitudes toward science and trust in institutions providing scientific information are not related to feelings of efficacy.

PCST NO.340

(FC5-04)

**EFFECTS OF MASS MEDIA IN SCIENCE COMMUNICATION: IN CASE OF SOCIAL  
CONTROVERSIES OVER BIOTECHNOLOGY**

Sung Kyum Cho  
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This paper attempts to find out what effects the communication media have on the social perception on science and technology. In Korea, mass media are the major information channel for science communication. The surveys have shown that the general citizens get the information on science and technology through the broadcasting and newspaper. Therefore, it is assumed that media are playing important role in forming the public opinion. However, this hypothesis has not been tested with empirical data yet. One can argue that media contents reflect the public opinion. Moreover, many researches on media effects in other fields have shown that the effects of the mass media are limited. These researches have placed much emphases on the receivers.

This paper tries to analyze how much effects the mass media have on the public opinion toward various biotechnological issues. For this purpose, we are to analyze ten data sets of social survey data, which were gathered from 2001 about the biotechnological issues. We also consult the content analysis studies on media coverage on these issues. In addition to these data, we are planning to have depth interview with some science reporters. These data would show the scope and width of the communication media effects.

Mass media is important in science communication. Therefore we have to know more about the nature and scope of the media power. Especially it is needed for the understanding of social controversies and predicting of the future course. By analyzing empirical data on media effects, this study would contribute to the practice and theory building of science communication by showing the

PCST NO.356

(FC5-05)

**TELEVISION: WHY IS THE OLD MEDIUM STILL IMPORTANT FOR SCIENCE  
COMMUNICATION?**

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It seems that in science communication more and more attention is focused on new and interactive media as the favorite means to inform the public about scientific knowledge and exchange scientific information. According to some scholars the old mass medium television plays only a minor role in science communication. But time use data, studies on information processing through television, and data on trust in television as a source of information suggest that the old medium should still be regarded as the number one medium in science communication, although there are some limitations for its use. The present study provides a review of the pros and cons of the use of television and the internet in science communication, and concludes that the old medium television should still be regarded as the number one medium in this context.



PCST NO.358

(FC5-06)

## ESCITY: THE EUROPEAN SCIENCE AND THE CITY NETWORK

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We are living through the transition from the industrial society to a new one characterised by the swift incorporation of scientific advances into daily life and by our ability to turn information into knowledge. In this process, not only economic but also, particularly, deep social changes take place. In this context, the promotion of scientific culture is a key matter. It is not just a matter of understanding that there is only one culture (which includes artistic, humanistic and scientific cultures) for attempting to explore the world we live in. Scientific culture also represents an opportunity for increasing citizens' competence in a new and emerging knowledge society.

Some local administrations (as the nearest administration to citizenship) have begun to incorporate the scientific culture as part of their cultural activities. ESCITY, the European *Science & The City network* wants to share experiences and build networks of cooperation with cities throughout the world, because scientific culture is also a universal process, as set out in the cultural document, Agenda 21, promoted by the cities of Porto Alegre and Barcelona.

Some of the challenges of ESCITY are:

1. Encouraging a more active population with greater decision-making capacity in the face of new scientific, medical and technological challenges
2. Consolidating the public image of research and innovation as activities which generate wealth and, therefore, as key elements of development
3. Improving the chances of accessing new opportunities, thus strengthening social cohesion and reducing the educational and digital divides
4. Encouraging knowledge and the dissemination of local scientific values coming out of the university environment, small and medium-sized enterprises, social fabric, etc.
5. Redirecting the current crisis in scientific vocations among young people, guaranteeing the future competitiveness of the city in terms of research and development
6. Correcting the gender imbalance in the area of science and technology by encouraging greater participation and visibility of women

PCST NO.424

(FC5-07)

## A TWO SIDED COMMUNICATION APPROACH FOR SCIENCE AND TECHNOLOGY POLICY RESEARCH: THE CASE BIOTECHNOLOGY FOOD IN THE NETHERLANDS

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In order to avoid costly and emotional clashes between stakeholders in innovative fields of technology (nuclear energy, cloning, GMO crops) many scholars blame the knowledge divide between scientists, politicians and society and therefore advocated a cautious (network) approach to synchronize knowledge levels among all stakeholders. The proposed solutions are described under various headings like "interactive science communication", "Interactive policy" and "New Modes of Governance". However, hardly any examples of good practices are presented yet. This paper describes an actual case to involve citizens in policy making on the issue of biotech food in The Netherlands in which a bottom up methodology was applied. The approach is unique in the sense that it sandwiches classical tools for policy analysis (analysis of policy documents, interviews of experts, relational problem analysis) with participative tools (citizens' panels, focus groups, Socratic dialogues, stakeholder workshops) resulting in a so called "constructed societal agenda". This societal agenda reflects *the interrelated* complexity of the different positions taken by stakeholders and at the same time it is a frame of reference to enable communication between stakeholders with opposed views as they can recognize their own position in relation to others. Common grounds are used in the final steps to shift various dead ended one-way discourses by stakeholders with a specific interest (scientists, entrepreneurs, politicians) towards constructive dialogues to proceed with technological innovations in a mutual acceptable way. Citizens' views and experiences are equally matched with expert views and experiences. The constructed societal agenda offers in addition a framework for successive monitoring and evaluation studies. Due to this transparent frame of mutual understanding, the two-sided approach in PCST will commit the parties for the future and thus empowering the public (and other stakeholders) to an open and trustful communication.



PCST NO.428

(FC5-08)

## MAKING PLAYFUL LEARNING VISIBLE: EMPOWERING PARENTS AS RESEARCHERS

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Institute of Education

Play lies at the heart of learning, a finding confirmed by countless studies, and much of early childhood learning looks like - and is embedded - in play and play-like activities. Play can often be disruptive, and if directed by the child herself, is often pursued according to rules that seem random or confusing to outside observers. Learning often involves experimentation, exploration and repetition - which if it involves inverting a bowl of porridge on the floor repeatedly may be difficult for a parent to distinguish from pure caprice or wilfulness. At the same time, serving children's learning is the central preoccupation of millions of caregivers - parents, relatives and teachers - but unfortunately caretakers often are not aware of the many ways in which a child's seemingly wilful or random activity often masks deep and active learning. In particular, caretakers from low-income backgrounds often lack the means to distinguish between behaviour that calls for discipline and that which calls for support. Education is seen as the key to 'getting ahead'. So if it doesn't 'look like' traditional learning - studying for tests or doing multiplication tables - children are rewarded not with a pat on the back but a slap on the head. If behaviour is not recognised as learning - or worse, is penalised rather than being encouraged - parents miss out on a fundamental chance to enrich their own lives and those of their children. By creating a framework for observation in the form of a simplified but robust methodology, this project provides parents and other caregivers with the tools necessary to transform their observations into usable data - data that can be compared, analysed, and used by educational researchers worldwide. This paper describes a series of projects undertaken to empower parents to become researchers of their children's learning, and documents the challenges and transformations that resulted from the project.

# Poster Session

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## Poster Session I

PCST NO.68

(WA7-01)

### FRAMING OF SCIENCE NEWS: A STUDY ON THE PATTERNS OF NEWS COVERAGE OF BIOTECHNOLOGICAL ISSUES

Sang Hee Kweon

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This study examines the patterns of news coverage of biotechnological issues by theoretically approaching from multidimensional aspects. The purpose of this study is to put forward a desirable model of news patterns in dealing with biotechnological matters. The results show that new modes of news coverage emerged especially in regards to editorial sections, themes, and complexities. Firstly regarding editorial sections, biotechnological news were increasingly placed in social and international sections, eroding its predominance in science and technology sections. Secondly, in terms of themes, newspapers started to shed light on the aspect of the birth of new life, compared with their earlier focuses on medical treatment of disease. Finally, complexities of news were characterized by explanations of biotechnological development when research performance reached its peak.

PCST NO.99

(WA7-02)

### RESEARCH ON SCIENCE COMMUNICATION - THEORY AND PRACTICE THE SWEDISH CASE

Thomas Tydén

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Interest in research dissemination and utilization and in collaboration between universities and society at large has increased significantly in recent years. Many attempts have been made, and are still being made, to increase the range of contact between the universities and the rest of society. Nevertheless we have to acknowledge that comparatively little is known about this process. Is priority being given to the right things? Is there a mutual exchange of experience and problems? What effects are being achieved in the short and the long term? Are they worth the price? What form does the practice of knowledge, the learning process, take for different professions - and what are the motivating forces behind their search for knowledge? At present there are no firmly established theories on the communication of information between research and practice, and there is an express need to develop satisfactory forms and methods.

Research on science communication and knowledge utilization is a growing field in Sweden.

Research on the subject of the spreading of research information can be seen as a field of research on the way in which science and practice meet. It is a meeting that can vary in character depending on the field of knowledge in question, which groups of practitioners are involved, different cultural and social frames of reference and so on. Describing and trying to explain this complex encounter is a difficult task, which is presumably facilitated by researchers from within different disciplines approaching the question on the basis of their own set of theoretical and methodological instruments. In this paper we describe the state of the art on research on Science Communication in Sweden

PCST NO.133

(WA7-03)

### SCIENCE, MEDIA AND THE PUBLIC SPHERE: A MEDIA SOCIOLOGICAL PERSPECTIVE.

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The fact that the expansion of science and technology occurs in a strongly mediatised society ensures that science becomes more and more subjected to processes of mediatisation. Hence the need for a media sociological approach to the relationship between science and the media. The aim of this paper is to clarify that media sociological approach and to demonstrate in how far this approach is different from, but at the same time also related to, the science communication approach. In media studies much attention goes to the relation between the media and the transformation of the public sphere. The majority of this research has mainly focused on the political dimension (media and citizenship) and the cultural dimension (media globalization). Since the last quarter of the 20<sup>th</sup> century, also science and technology has penetrated the discussion agenda of the public sphere (e.g. increasing media attention to the debate on genetically modified food or biotechnology in general). In this paper we will argue in favour of a more dynamic approach to the relation between media, the public sphere and science. The broadening of the political domain from “emancipatory politics” to “life politics” (A. Giddens), the “detraditionalization” of the public sphere, and the media related concepts from the risk society approach (U. Beck) will be integrated with insights from social psychology (social representation theory, S. Moscovici) and science and technology studies. From a media sociological perspective, science communication is considered not only as a diffusion process of specialised knowledge to a lay audience, but in the first place as a communication process, in which the status of science itself is constructed and legitimised. In this process, the media play a very important role.



PCST NO.153

(WA7-04)

### YOUNG INVESTIGATOR AWARD- NO JARGON SCIENCE EXCELLENCE

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The Children, Youth and Women's Health Service, in collaboration with the Faculty of Health Sciences at the University of Adelaide, holds an annual Young Investigator Award. This highly successful award, now in its seventh year, rewards excellence in South Australia's young researchers in both science and their ability to communicate and 'sell' that science in lay language. The event is believed unique in involving the media in the final judging of the young scientist's ability to communicate to a general audience. Through this experience young scientists are exposed to a world beyond the laboratory and must communicate to an audience with little knowledge about their area of expertise. There are up to 20 applicants annually and they are judged, over a period of five months, firstly by a panel of senior researchers on the quality of their science. The process culminates at the Award finals when three finalists have to convince the media judges (from TV, press and radio) of the importance of their research in front of a general audience. The skills learned through this process hold the young scientists in good stead for all their careers. The Award finals are targeted towards staff and students of associated organizations, the general public, corporates, donors to research and the media. Since the Award's inception in 2000, the audience has almost doubled and increasingly higher profile venues are being used for the Award final. In 2005, the South Australian Minister for Science and Information Economy attended the finals, giving the opening address and presenting prizes. All finalists receive a prize with the two runners-up each receiving \$A500 and the winner receiving \$A1000 untied plus \$A1500 to attend and present at a relevant conference during the following year. Considerable media publicity for research results from the Award.

PCST NO.164

(WA7-05)

### IT INFLUENCES OF MASS MEDIA IN THE CONCEPT OF BIOTECHNOLOGY SHOWED BY THE TEACHERS OF THE CITY OF MELILLA (SPAIN)

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The present society characterizes by its globalization and the emergent necessity of a Society of the Knowledge and the Information. This fact, desired or no, has important educative repercussions. Thus, the speed that technology developments take place implies that most of the present teaching staff that make educational workings in any country, has not been able to receive any kind training on the scientific development and technological product of innovation in the last decades. The biotechnology is a example.

In the present work the ideas and concepts expressed by a significant number of teachers of all the educative stages are analyzed on the biotechnology in the City of Melilla (Spain). Since the Mass Media appear as the main source of information, we analyze and discuss the differences and similarities between the contents offered on biotechnology written by the Spanish Mass Media (newspapers and specialized magazines) and the teachers ideas about what biotechnology is establishing comparisons between the information contributed by these means and the misconceptions showed by the teachers.

Some scientific versions of the scientific literacy concept have been based on the degree of scientific knowledge of the public. According to our investigations, we have been able to verify the important influence that Mass Media have in the scientific literacy since the knowledge showed by our teachers is similar to the knowledge that the public in general has in comparison to scientific issues of recent advance.



PCST NO.226

(WA7-06)

THE FUTURE VIEW OF THE SCIENCE EDUCATION IN JAPAN  
- WORKSHOP FOCUSED ON SCIENCE COMMUNICATION FOR THE ASSOCIATION OF  
PROMOTING THE SCIENCE EDUCATION FOR THE 21<sup>st</sup> CENTURY (APSE21)

Kaoru Kimura, Yuko Uchio, Yoshikazu Ogawa, Hidehiko Agata, Hiromi Mikami  
The Association of Promoting the Science Education for the 21<sup>st</sup> Century

The announcement of World Conference on Science in 1999 has highlighted 'science in society and science for society'. Thus we have to respond to the challenge for new science education for 21<sup>st</sup> century society. After the announcement was taken, we have initiated to work on The Association of Promoting the Science Education for the 21<sup>st</sup> Century (APSE21) in 2003.

We think taking root of science as a culture lead to the improvement of science literacy in the society. To permeate science as a culture to everyday lives, the process is crucial. Science Communication is essential as the process of permeating of science to the communities. Therefore, we have made the network of Administration, Research Institutions, Media, Museums, Schools and General Public and so on, and set up these communities to join the Workshop of APSE21 to promote Science Communication between different communities.

We have held workshops for Communication in 2003, Science Communication in 2004 and Public Engagement in 2005 to discuss about Science Education of the 21<sup>st</sup> century that has focused on science communication and communication policy. These problems of communication on science topics, how the science museum works as a place of science communication, what is the most important information we should send, and what is a barrier we have while we make communication, were cleared by the dialogs between talented people of the various communities in this workshop. Furthermore, we have to discuss what kind of system we should provide in the interactive science and technology society that the specialty of talented people of science communicator and skill up are taken seriously.

In this presentation, the outcomes of Workshop of APSE21 will be introduced and the future view of the science education for 21<sup>st</sup> century society will be discussed.

PCST NO.232

(WA7-07)

A UNIQUE PLATFORM FOR COMMUNICATION OF SCIENCE CULTURE - THE  
MUSEUM

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Beijing Museum of Natural History

**Abstract:** Nowadays, with the development of science and technology, the ways by which science culture are communicated are becoming more diverse than before and thus those for the public to acquire science culture information are also increasing. Under such circumstances, is a museum still able to function as before, i.e. as a platform for communication of science culture, and how? Here, we take Beijing Museum of Natural History as an example, and attempt to discuss how a museum can take its own advantages and still functions as a useful platform for science culture communication. We believe that a museum has its own advantages which can not be fully substituted by other ways such as newspapers, TV or internet. For instance, the museum has its own fixed exhibition space and many real scientific materials such as specimen. Within museum, the audience can also participate in many activities on the spot. Therefore, a museum is thought to still play its unique role in science communication if it can continue to improve its working ways and increase contents to meet the need for future development. This may be the reason that the audience to visit museum is steadily increasing even that the ways of science communicate have become more diverse.

**Key words:** science culture communication, museum



PCST NO.261

(WA7-08)

### DESIGNING SCIENCE COMMUNICATION PROCESSES: BRIDGING THE GAP BETWEEN THEORY AND PRACTICE BY A COMMUNICATION SPECTRUM.

Maarten C.A. van der Sanden and Caroline Wehrmann

(Maarten van der Sanden, MSc, is a science information officer, lecturer and researcher in Science Communication, Caroline Wehrmann, MA, is a lecturer and researcher in Science Communication, both are connected to the Delft University of Technology, Faculty of Applied Physics, section Science Education and Communication, The Netherlands, corresponding address: m.c.a.vandersanden@tudelft.nl, tel.: +31 15 278 5454)

Looking at developments in science communication at this moment one sees new theories and many descriptions of best practices. However, the connection between theory and practice is poorly understood. Professionals in the field of science communication are therefore often not connected to the theoretical developments in science communication and vice versa. This hinders the development of science communication theory and leads to a less effective science communication practice.

Our paper and presentation therefore will be on the development of the connection between science communication theory and science communication practice. It is about building a bridge between the science communication researcher and the science communication professional. As one develops this bridge between theory and practice a *science communication process* is *designed* and *optimised*.

Designing and optimisation of science communication is a process in which social, cultural and technical aspects are connected in such a way that the best possible communication effects can be achieved. Using existing design theories for science communication processes is - as far as we know - new to the field of science communication in theory and practice.

One of the design instruments we have developed in order to achieve an effective and meaningful interaction between developments in science and a target group is the *communication spectrum*. Such an instrument is not yet available within the realm of science communication. This instrument gives an integrated overview of choices that are made to shape the communication process. In our presentation we will show the first results of the spectrum being applied by science communication professionals.

The communication spectrum is only an example of designing and optimisation of science communication processes. Therefore in the paper and presentation we will - next to the communication spectrum - present our research portfolio on designing and optimisation of science communication processes which is connected to the Master of Science Education and Communication at the Delft University of Technology.

PCST NO.283

(WA7-09)

### THE TYPES OF PHYSICAL ENVIRONMENTS FOR FOSTERING CREATIVITY AT NATURAL HISTORY MUSEUMS

Ji-Eun Choi, Chan-Jong Kim  
Seoul National University

This study purposed to explore the types of physical environments perceived to stimulate creativity.

Recent conceptualizations of creativity have suggested that physical environment could play an important role in facilitating the development of creative processes and products (Amabile, 1988), but little empirical studies has been conducted to the ways in which the physical environments affect individuals' perceptions and experiences of creativity. Some exceptions to this trend are several studies in the area of work environments (i.e., Alencar & Bmno-Farir, 1997; McCoy & Evans, 2002; Stokols, Clitheroe, & Zmuidzinas, 2002).

The target setting were two informal education institutions in America, Smithsonian National Museum of Natural History and American Museum of Natural History. Museums which give variable activities of experience beyond physical limits of schools, take 'objects' to the core of education differently from schools which usually deliver content by 'discourses and letters', and attempt to make exhibition more attractive by providing more active roles to the visitors.

Research procedures were 1) physical environmental characteristics of gallery and exhibit photographs were categorized, 2) content analysis of the 62 photographs by 3 independent raters scaled each setting according to the categories developed, and 3) potential creativity of photographs was rated by 129 middle school students, which was defined as degree of they would feel to stimulate individual creativity. Cluster analysis identified the most and least creative types of galleries and exhibits separately.

The study suggests that a creativity research should concentrate on how much a community is able to foster a creative genius, instead of exclusively focusing on an individual. According to this perspective, this study could contribute to define characteristics of physical environments of natural history museum which can foster students' creativity, especially in science and technology.



PCST NO.335

(WA7-10)

### INTRODUCTION TO THE 4 D DIGITAL UNIVERSE PROJECT

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Our group have been developing 4 Dimensional Digital Universe Theater (4D2U) in Astronomical observatory of Japan. The aim of the theater is providing intuitive understanding by using stereoscopic movies based on up-to-date astronomical researches. The theater is open to not only researchers but also public audience.

PCST NO.346

(WA7-11)

### “ THE INFORMED CITIZEN ” - HOW TO GET THE PUBLIC INTERESTED AND INVOLVED - A NEW MECHANISM.

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People get interested and pay attention to an issue only when they consider it as essential to what they feel is important in their lives or for society. Thus, to get the public interested in science and scientific issues as well as researchers interested in interaction with society, there is a need for mutual understanding of the attitudes and driving forces of both groups. Dialogue face to face is a fundamental necessity to achieve mutual openness and trust. Science's understanding of the public is just as important as the public's understanding of science.

Vetenskap&Allmanhet, VA was established in 2002 in order to stimulate interaction between researchers and people in all segments of society. In order to ensure a multitude of perspectives VA endeavours to involve many different actors. VA is a non-profit, non-governmental association of organisations, public authorities, academies and others from across Swedish society

We use three main approaches:

- organise experimental meetings in new and unconventional arenas for researcher - public dialogues on matters of interest to the public.
- conduct surveys and studies on how the public views research, how researchers view dialogue and what influential groups of society (e.g. teachers, journalists, politicians) think about science.
- disseminate experiences of various and diverse activities in order to inspire others, create and catalyse more dialogues and events and to influence decision-makers to take appropriate measures.

The object of the VA is to

- promote contacts and the flow of ideas between the public and researchers
- increase public knowledge of research methods and findings
- improve researchers' sensitivity and understanding of the public's questions and concerns
- build networks for encounters, interactions and exchanges of experience

We would like to share a number of surprising, interesting and successful results and experiences with the participants of the PCST2006.

PCST NO.357

(WA7-12)

### A NEW FRAMEWORK FOR RESEARCH ON INTERACTIVE COMMUNICATION

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Interactivity is a frequently used term in communication research. However, at this time there are multiple definitions that are similar but not quite consistent. This article postulates that this is due to a discrepancy in contemporary conceptualizations. There is a divergence within the theory of interactive communication as an abstract idea (or ideology) and interactive communication in practice. To illustrate this, the article discusses previous research on this topic and focuses primarily on four effect studies on interactive communication, in the disciplines of science communication, education and psychology, published in high impact scientific journals. A new framework is described that explicates the problem of divergence within contemporary conceptualizations. This framework is three-fold and gives attention to the ideological aspects of interactivity (interactive communication as an ideal), the divergence between these ideals and contemporary operationalizations of the concept, as well as the actual effectiveness of interactive communication. Recognizing the difference in conceptualization and operationalization before, during, and after actual communication processes within this framework, allows for a reconstruction of the concept of interactivity. This would permit better distinctions between ideal and actual interactivity and the evaluation of its effects on communication.



PCST NO.186

(WAT-14)

## PROPOSALS FOR INTERACTIVE COMMUNICATION BASED ON THE HISTORICAL ANALYSIS OF JAPANESE GENOME SCIENCE COMMUNITY

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Science communication activities have been intensified in Japan, and scientists began to realize the significance of communicating their research with the society. In particular, the field of genome science (GS) requires tactful communication skills to deal with its ethical, legal and social issues and to achieve interdisciplinary collaboration between biologists and researchers in other disciplines. To clarify required skills for better science communication, we investigated the 15-year history of Japanese GS community.

Our survey revealed its major shift of attitude from education to dialogue. A typical example is the 'Genome Square' event held in 2002 - 2004, which included lectures, panel discussions and exhibition by GS laboratories. In three years, approximately 1300 genome scientists have participated in this outreach event. To render dialogue between scientists and guests more interactive, the way of presentation needs improvement. Researchers should not 'teach' but 'show' their research to think over the problem together. It would also be effective to present multiple topics, including controversial ones, using small handouts instead of a large poster.

The findings from the historical analysis also included the hardship of biologists to collaborate with researchers from other disciplines, such as computer science or bioethics. Through interviews with genome scientists, we found that this difficulty is attributable to cultural difference between research fields in addition to the gap of basic knowledge and terminology. Each discipline has different interests, purposes, and value standards. Knowledge about such gaps, especially recognizing one's own biased viewpoint, will reduce friction between different communities. In conclusion, we propose visualization of research cultures to promote interdisciplinary cooperation and to help non-researchers to overview the spectrum of research activities.

PCST NO.237

(WA7-15)

## OPINIONS OF LIFE SCIENTISTS ON SCIENCE COMMUNICATION IN JAPAN

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Scientific information from scientists has become an increasingly important part of our society, enhancing citizens' understanding of science and technology relating to their daily lives. In other words, scientists are expected to know how to convey their researches effectively to members of their society. For both scientists and our society, the need to understand the impact of the science on society becomes extensively stronger in these days. Here, we have a problem that we do not have enough knowledge about the actual activities, or concerns of scientists themselves. The question is that, for the scientists mainly in natural science, what is their duty to the general public? How do they actually communicate with the general public? Are there any factors hindering their activity in science communication?

To study these issues, we interviewed more than 40 Japanese life scientists and examined their opinions. To what extent should scientists convey their scientific information to public, or how much are they concerned about citizens' participation in public decision making processes? It is clear that most Japanese life scientists want more global discussions or judgments in/from the society, considering the social value and influence of their research. At the same time, many of them point out that lack of effective communication methods makes them reluctant to engage in communication activities with the public. It also appears that the relationship between scientists and science communicators, especially science journalists affects greatly on the quality of the scientific information. Comparing the views of scientists with those of science journalists or other people working on science communication, we will discuss possible ways of achieving effective communication in practice. Without any systematic support, it is rather difficult for scientists to improve their ability of scientific communication.



PCST NO.242

(WA7-16)

## A NEW MODEL FOR EFFECTIVE COMMUNICATION OF SCIENCE: AUDIO-VISUAL PRESENTATION OF THE LATEST LIFE SCIENCE TOPICS AT PLANETARIUMS

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In this presentation, we will report an ongoing practical research of science communication. To promote the public understanding of research (PUR), we sought a place that could make presentation of science attractive and effective to the public. There are so many planetariums in Japan and mostly they are set up as an annex to science museums. Now we must have a chance to make the most of remarkable our circumstance. Interestingly, recent Japanese planetarium community tends to use domes not only for the star projection but also for the place of presentation of science topics other than astronomy. Then we aim to bring the latest science topics, especially life science into planetarium programs. Although its program needs to work in cooperation with astronomy well, we do not always need to introduce astronomical topics mainly. We can challenge to use the all sky for life science presentation. We plan to design our programs as follows;

- produce pictures and sound effectively in artistic ways
  - show the latest science research frankly
- try to introduce scientist themselves
  - children to adult are entertained with it

Now the last sentence above mentioned is one of the important points that many science communication researchers always discuss. What if we can introduce a new way of audio-visual presentation, that is, using a planetarium. We have started to make programs with curators in science museums, astronomical and life science researchers.

And finally, we hope our project also promote effective collaborations between university researchers and science museums.

PCST NO.266

(WA7-17)

## PATTERNS AND LINKAGES OF SCIENTIFIC CONTRIBUTION AND COMMUNICATION TO KNOWLEDGE DISCOVERY AND DATA MINING

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### Introduction

The objective of this study is by means of global research citation to analyze channels and characters of scientific contribution and communication of knowledge discovery and data mining (KD&DM). Data for the analysis were collected from the *ISI Web of Science - Science Citation Index Expanded (SCI-EXPANDED)*, *Social Sciences Citation Index (SSCI)* and *Arts & Humanities Citation Index (A&HCI)* databases.

### Findings

KD&DM did not initially attract citing authors' attention until the late nineties of the twentieth century. The yearly cited work productivity increasingly grew between 1995 and 1999 and the tendency has been remaining overwhelmingly.

It is found that 458 (i.e., 25% of the total scholarly output) "pure" references, which never refer to any one of these collected KD&DM literatures, lead to 3758 citing articles. Among the top 50 cited articles, E. Zivot & D.W.K. Andrews's paper was given the highest citation score—254, followed by the C. Chatfield's, 108 times cited. A record of the most frequent citation for a particular literature was set by L. Oxley and D. Greasley who each used Zivot & Andrews's work as a reference 15 and 14 times. Specially, the highest self-citation rate—13 out of 24—belongs to a contribution of H.C. Chen & T. Ng. The great majority of the "top 50" at least two times, with the maximum of 34, appear in reference lists of 153 bibliographic records. R. Agrawal et al.'s contribution plays a significant role in co-citation and (in) directly associates with eleven of the "top 50". The most frequent co-cited pair is the publications of O. Fiehn et al. and U. Roessner et al.

As the channel of scientific contribution and communication, 245 serials in all covered the 458 purely cited articles above-mentioned. The most cited journals are *IEEE Transactions on Knowledge and Data Engineering* and *Data Mining and Knowledge Discovery*. The source of the 3758 citing documents was 1078 journals. Again, *IEEE Transactions on Knowledge and Data Engineering* and *Data Mining and Knowledge Discovery* are the most citing journals.

### Conclusions

First of all, KD&DM research productivity is a considerable figure in quantity, and academic collaborations become a popularly acceptable model in scientific communication. However, only a few contributions with great reference value have been arousing the interest of academia, subsequently impacting a huge number of citing articles. The reason might be the highly specialized research findings. As such, the majority of frequently cited works are rarely co-cited. Concurrently, in view of lacking of the previous experience of peers for reference, many authors have no alternative but self-cite repeatedly. Furthermore, channels of scientific communication are decentralized distribution so that the core of journals cannot be ascertained. This situation influences to a certain extent the visibility of publication. The result of analysis indicates the positive correlation between impact factor of journal and citation count of article.



PCST NO.294

(WA7-18)

## OUTREACH ACTIVITIES FOR SCHOOL EDUCATION BY SCIENCE MUSEUM

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### INTRODUCTION

Teachers and schools face difficulties in science education, particularly in developing teaching materials to catch students' interests. School trips to research institutes and science museums are effective activities, however, enough occasions may not be provided due to financial and time constraints.

Many research institutes and science museums have been offering on-site lectures at schools in Japan. These lecturers give good chances to introduce researchers and their works to students, but they are often too difficult to understand or mere science shows with less educational perspective.

### OBJECTIVES

National Museum of Emerging Science and Innovation has been promoting for the public understanding of science and technology through the unique activities by science communicators called the interpreters. This study aims to develop a new type of on-site lectures by our interpreters presenting up-to-date science topics to students. This is also expected to build a bridge between researchers and schools, as well as to be training opportunities for the interpreters to improve their research and communication skills.

### RESULTS AND DISCUSSIONS

Our on-site lecture is prepared by collaboration between the interpreters, junior high school teachers and researchers as below;

1. The interpreters study and investigate on the latest science topics with the cooperation by researchers,
  2. Teachers design the schooling procedure with advices from the interpreters, and
  3. The interpreters implement the on-site lecture at school.
- The effectiveness of this on-site lecture is also examined by following practices;
1. Questionnaire to teachers and students on changes of their interests to science before and after the lecture including long-term observations, and
  2. Interviews to the interpreters, teachers and researchers on impact and problems of such activities for science education.

PCST NO.591

(WA7-19)

## DEVELOPMENT OF SCIENCE AND CULTURE THROUGH DINOSAUR RESEARCH IN KOREA

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Some dinosaur eggshells in Hadong County, South Gyeongsang Province in 1972 were the first find of vertebrate fossils of any kind in South Korea. Since then, abundant dinosaur footprints and dinosaur eggs have been found in Cretaceous sediments with a few bones. Along with these discoveries, a blockbuster "Jurassic Park" in 1993 hit the public about dinosaurs in Korea. This results in the increase of dinosaur experts and the development of science as well. To fulfill the intellectual curiosity of the public, hundreds of books have been published and TV documentaries have been produced and broadcasted at key stations. Scholars have introduced new theories and discoveries on dinosaurs to the public by lectures and contributions to newspapers. These informations have been shared among netizens through dinosaur websites. Consequently, the public interests are expanding to Paleontology and Geology, and eventually Popularization of Science.

Dinosaur fossils are treated as national properties and protected by law in Korea. National monuments related to dinosaur fossils are 80% of all fossil national monuments. It is noticeable that two dinosaur museums were already built at dinosaur national monuments even though we do not have the National Museum of Natural History yet. These dinosaur museums made the government realize the importance of natural history museums and in fact, several projects are going on including a new National Science Museum. New dinosaur museums and natural history museums need artists who devote themselves to sculptures and paintings of ancient animals so that a new field of art was opened up very recently. Goseong County, South Gyeongsang Province is now famous for the dinosaur festival, and in which "Dinosaur World Expo" will be held this year. Therefore, the dinosaur is an excellent example to show how great one field of science has effect on the public development of science knowledge and enhancement of cultural level.



PCST NO.685

(WA7-20)

### KIGAM'S EXPERIENCE TOWARDS THE PUBLIC: “GUIDEBOOK OF GEOLOGICAL TOUR IN JEJU ISLAND”

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Korea Institute of Geoscience & Mineral Resources (KIGAM; www.kigam.re.kr) is a unique organization for the geologic and natural resource research in Korea. KIGAM has been making continuous efforts for the distribution of research outputs to provide the proper understanding of natural phenomena to the public. “Guidebook of Geological Tour in Jeju Island” was published as one of these efforts in 2003 by the Groundwater & Geothermal Resources Division. The general public as well as geologic experts are still interested in the contents of this book, and students love to read it for their homework and personal interest. This book is very successful for KIGAM as a public service organization to satisfy scientific curiosities of Korean people.

Every Korean knows that Jeju Island is a dormant volcano with many parasitic volcanoes. However, they don't recognize true features and how to evolve. Volcanic eruptions in somewhere and sometime from Marado Island to the summit of Baekrockdam have made attractive sceneries in the whole island. This book provides information on characteristic features and mysterious roles of volcanoes to enjoy a joyful tour of the island.

'Pahoehoe lava' has flowed rapidly and left gentle slopes in east- and west-long directions, and as the result of cooling event of 'aa lava' tough topography has been made in Jeju and Seogwiipo cities. Lava tubes, most attractive touring spots, have formed in 'Pahoehoe lava' area, and Yongduam, a dragon head-shaped rock, was made by 'aa lava'. This book is really helpful not only to the field volcanologists as a basic field guide but also to the teachers as an education material. In addition to the tourism, the Jeju Island is a very nice spot for holding many local/international conferences, workshops and symposiums all year around.

Basically, this book is our first step for the wide distribution of the science to the public, and we have a plan to publish another “geologic guidebook of Dokdo Island” near soon.

PCST NO.107

(WA7-21)

### SCIENTIFIC CULTURE COMMUNICATION OF THE NATIONAL SCIENTIFIC RESEARCH INSTITUTIONS IN CHINA

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**Abstract:** National scientific research institutions are a very important force to communicate S&T knowledge in China, this paper analyzes systematically the reasons of scientific culture communication in the national scientific research institutions by using case study. It relates to the communication models such as popular science publications, popular science base and S&T communication activities. Finally, it summarizes the characteristics of various kinds of communication models. Therefore, it has the enlightening significance for us to do the work of S&T communication.

PCST NO.132

### A LANGUAGE'S LEARNING AND COMMUNICATION CAN INFLUENCE MAN'S LIFE AND IMPROVE LIFE QUALITY

Mei Li

The Star Foreign Language College of Kunming  
Shi Zhihong  
Kunming Wuhua Science and Technology Association

STAR LANGUAGE COLLEGE believes that a thorough command of language including a command by scientific technological language is important for participation in public communication and science technology by its students. Because of this belief English communication camps have been established as part of the curriculum for students. The confusion that can arise from misunderstandings between cultures and languages was recognized by the management and staff of the college, so a special planned curriculum for English communication camps was documented and evaluated. Foreign experts and counselors were engaged, and a controlled environment set up to simulate an English speaking situation. During a ten-day camp students are able to attempt effective communication with people of different cultures, customs and attitudes. They have the opportunity to make themselves understood in another language and to adapt to social life by mixing with others and discussing practice, custom and usage of another language and social system. As a result, students can begin to see themselves as successful readers, participants and communicators in the public arena. Post-camp evaluation revealed that students could use skills they have learned at the camp. The evidence suggested that these skills could be transferred, not only to their studies and personal lives but made communication with friends, school-mates and parents much more effective. Importantly, the evidence indicated that students realized that knowledge, understanding and communication in another language and culture could enrich their own lives and was a positive influence in planning for their future. Effective exposures to other languages and cultures can provide alternatives and positive influences in the students' lives and that of their families.



PCST NO.145

WEBPACIENTES, THE PATIENTS ASSOCIATIONS PLATFORM IN HEALTH & RIGHTS  
PRESENTED AT THE 9<sup>TH</sup> INTERNATIONAL CONFERENCE ON PUBLIC  
COMMUNICATION OF SCIENCE AND TECHNOLOGY

Jovell Fernández, Albert; Navarro Rubio, Ma Dolores; Fernández Maldonado, Laura; Gabriele Muñoz, Giovanna;  
Moreno Maurel, Joan; Pineda I Traid, Enric; Blancafort Alias, Sergi;  
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Several initiatives coming from civil society and under different forms have been organized in Europe to promote patient's empowerment and involvement in health care. These initiatives includes patients' organizations, research projects, and public funded patients' programs. There is not a common link to all these initiatives in order to meet the common end of reaching their potential benefits to all type of patients and organizations representing them. Thus, there is a need to develop a global action that acts as an umbrella for all these initiatives and makes them available to the public in a more organized and efficient way. Taken into account the experience of similar initiatives, such as the Observatory for Woman and Health ([www.obsym.org](http://www.obsym.org)), the Spanish Forum for Patients, has created Webpatients project in 2003 as a global initiative aimed to identify, promote, and disseminate current patient's activities across Europe.

The mission of the project is to empower patients and patient's organizations to get a better quality of life through patient involvement in health care and to empower patients and patient's organizations to get a sense of ownership on health and health care. It is structured in five major areas:

- 1) Information: Website: [www.webpatients.org](http://www.webpatients.org) and e-Patients: A monthly free access electronic journal dealing with patients' issues, activities, and research
- 2) Research: promotion of research to meet patient's needs at individual and collective levels. This research should be cross-national and interdisciplinary and done in coordination with specific institutions as Harvard University.
- 3) Education: the Patients University includes basic education online packages dealing with these topics: searching Internet for medical information, analyzing medical literature, Basic management concepts for patient's organizations and Self-care in specific diseases.
- 4) Analysis: The Patient Intelligence Unit has the aim of collecting, monitoring, and analysing information and data on patient's trends, research, and policies in Europe.
- 5) Communication: the first stage try to get support for the overall project from patients organizations and from institutions. In a second stage, it try to develop and implement the structure for facilitating more in depth communications activities such as Association-to-Association communication and Patient-to-Patient communication.

PCST NO.143

SHARING (SCIENTIFIC) INFORMATION TO THE PUBLIC THROUGH NEWSPAPERS: IS  
IT NECESSARY (FOR SCIENTIST)?

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In developed countries, science and technology writing section in the newspapers is very easy to be found. Many scientists have used this practical method as a way to show their research achievement or it could be the shortcut way to be famous caused by newspaper news. However, this condition is different in developing countries where science and technology are not the main target in their development program. This paper will discuss the situation of current (scientific) science and technology information. Indonesia has been chosen as the object of the research. Some students and scientists that study and work in Indonesia and some other countries, such as: Korea, Taiwan, and Thailand have been asked their opinion via data questionnaire. Some supported information was also included to strengthening the conclusion of this research



PCST NO.178

## ESCIENTIAL I.F. PROJECT: TRUNING LABORATORIES/EXHIBITIONS PRESENTED AT THE GENOVA SCIENCE FESTIVAL INTO ITINERANT INITIATIVES, FAVOURING THE ACCESS TO EDUCATIONAL RESOURCES IN LESS FAVOURED COUNTRIES.

Silvia Merlino, Marco Bianuccii and Roberto Fieschi

INFM-CNR and Department of Physics of Parma University

(Partners of the project: Museo de la Ciencia de Barcelona from Spain; Tecniczi Museum of Lubjana and Hisa eksperimentov from Slovenia; Techniquet and Aberdeen University from UK; CNRS and INLN of Nice from France; PASS of Bruxell from Belgium; Technisches Museum Wien from Austria; Natural History Museum of the Pisa University, INFM-CNR and AFS from Italy, Národní technické museum from Czech Republic)

ESCIENTIAL project, conceived to enhance the European value of the Genova Science Festival (held each autumn in Genova, Italy), proved itself effective in favouring cooperation in the field of Science communication between EU States. During the first phase of this project, in 2004, important results were obtained:

Presentation in Genova, during the Festival period, contributions from European centres/museums/institutions active in science diffusion.

Comparison of theories and techniques of science communication during a Workshop addressed to professionals (animators, staff of museums/science centres, communicators).

The project had a great success, due to the fact that several high quality exhibitions have been accessible to public at the same time. On the other way, if it has been a great oppommit for Italy, it was less helpful for the other involved countries. For this reason, in ESCIENTIAL Itinerant Events, (granted by EU for 2006) a new strategy is foreseen, aimed at turning the events presented in Genova into itinerant exhibitions to be brought around Europe: the Festival can be seen as a showcase to present and test exhibits/laboratories/conferences: the most successful of them will become itinerant and will be brought to other EU Science Centres. Thus we will encourage:

- the cultural exchange among the partners involved and the share of resources;
- the mobility of professional personal as animators, staff of museums/science centres and communicators out of their countries and the improvement of their skills;
- the scientific education in less favoured countries, with special attention to the new entries in EU.

Finally, we stress the importance of the role of scientific animators: we think it would be helpful the creation of European/International training centres to properly exploit this professionals; and we guess our project could open the road for a future cooperation in this direction between States, and not only in Europe.

PCST NO.241

## SCIENTIFIC TRUTH AND COMMUNICATION AS POLITICAL CULTURE: FROM A PERSPECTIVE OF COMMUNICATION STUDIES

Sung-Wook Jung

Freelance writer

In the history of modern science, it has always been a critical issue when to accept a scientific proposition as a truth. For a classic example, the famous 17<sup>th</sup> century debate as to the question of whether the void really exists was buoyed partly by the power of rhetoric to persuade the involved intellectual audiences. Obviously, the scientific polemic would be eventually resolved when the first crucial experiment to show that the void indeed exists was repeatedly duplicated by other scientists working in different laboratories. Nonetheless, it takes numerous kinds of communication strategy for a polemical scientific truth claim to be held serious enough to further consider high-priced multiple duplications of a crucial experiment. Making a scientific truth claim is rarely done in a political vacuum where truth and only truth, if it were, counts and matters. Whenever an ambitious scientist who has aspired to leading a scientific community to throw itself into solving a set of problems newly defined by himself or herself succeeds in doing so, he or she must have been quite a politician in the first place. Moreover, when modern science developed into big science projects of nation states that compete for national pride and wealth as well as military power, the political talent that had traditionally provided a scientist with an edge in persuading his or her own colleagues extended way over a small scientific community of experts to ordinary citizens who were to pay tax for sumptuous science projects without knowing what they were going to pay for exactly. What we have witnessed in the current affairs of stem-cell research in Korea may be viewed as another historical example to illustrate what political roles communication strategy has played in the history of modern science.



Poster session

PCST NO.100

(TB7-01)

THE “ TWO CULTURES ” AND THE REAL WORLD

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The “two cultures” refer to the scientific culture and the literary culture. The gap between these two cultures was pointed out by C.P. Snow in the 1950s. The former derives from the study of material systems from the natural sciences, while the latter comes from the understanding of humans. However, humans are *Homo sapiens*—a (biological) material system, and are thus a part of natural sciences since the latter is the study of *all* material systems. Consequently, science and the humanities are unified at the fundamental level. The apparent “gap” comes from the different levels of scientific development, the deficiency in the school curricula, and the unfortunate misconception reinforced by current science communications. The apparent “gap” comes from the deficiency in the school curricula, and the unfortunate misconception reinforced by current science communications.

To help close this “gap,” a general-education course—The Real World—was introduced and taught by the author at SJSU. A maximum of 15 in-coming freshmen, with diverse background, were admitted. In the beginning, every student bought and read a newspaper, picked out the topics that interested her or him, which could be about international conflicts, movies or television programs, sports, or anything. After class discussion, three topics were chosen and students joined one of three groups. Each group tried to find out the current status and the frontier in the scientific study of the chosen topic—through books, the Web and interviewing of experts. Each group would give regular progress report in class and, at the end of semester, handed in a written report after orally presenting it. Simultaneously, the instructor gave lectures on complex systems—on fractals, chaos, power-law phenomena, and active walks. These topics can link up science and the humanities. By pointing out the common themes and unifying principles, the merging of humanities with science could be achieved.

PCST NO.105

(TB7-02)

NURTURING THE SCIENTIFIC LEADERS OF TOMORROW: ENGAGING THE YOUTH OF TODAY.

Jean Hsu<sup>1,2</sup>, Henry Ko<sup>1,2</sup>, Terri Lin<sup>1,3</sup>, Lydia Ng<sup>1,3</sup>, Nicole Yu<sup>1,3</sup>, Gorjana Kisa<sup>1,2</sup>, Krit Hariharan<sup>1,2</sup>, Johann Lennfer<sup>1,4</sup>

Paulo Lai<sup>1,4</sup>, Nagaraj Gopisetty Venkata<sup>1,5</sup>, Fiona Smith<sup>6</sup>, Hamish Hawthorn<sup>7</sup>, Vikki Hine<sup>7</sup>, John Whitelock<sup>2,7</sup>.

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Innovation in science and technology plays an important role in a nation’s economic and socio-economic growth. To ensure a strong and growing global scientific citizenship, it is crucial to nurture the scientific leaders of tomorrow. This goal can be achieved by the combined efforts of professionals and students in the disciplines of science and engineering, who can actively engage the public and youth to spark interest and awareness in science and technology. This aspect is important for influencing and encouraging the younger generations, who are the future leaders of scientific advancement and knowledge.

Here we present strategies and initiatives from the Australian Biotechnology Students Association (ABSA), Australia’s sole student organisation that promotes on a national platform, an active network between practicing scientists, industry, and academics with the youth and public within Australia.

Various initiatives have been implemented, such as informal industry discussions and information nights called “Homebrew” and “Careers Nights” which focus on careers and hypothetical scenarios in the industry. At these events, practicing scientists, industry representatives, students and young professionals share insights about the industry.

Two other initiatives promoting excellence in science and technology towards the opposite ends of youth spectrum have been implemented. The annual *National Student Excellence Awards* is aimed at university students doing research projects and providing them with an opportunity to present their research to the public, academia, and industry. On the other end, the annual *Biofutures* event is a week-long camp which aims to provide secondary school students with an opportunity to interact, with and learn about the cutting-edge advances in bioscience and biomedical engineering research.

These events not only encourage the nation’s youth to study science and technology in higher education, but also aim to encourage the nation’s youth to contemplate and consider the benefits that science bestows on our society.



PCST NO.277

(TB7-03)

## FINDING A NEEDLE IN A HAYSTACK: FACILITATING WEB-BASED SEARCHES FOR EDUCATIONAL RESOURCES

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In principle, databases available on the Worldwide Web make astonishingly rich resources available to anyone with a computer. In practice, however, the deluge of available data has proven overwhelming for expert and non-expert users alike. Recent innovations at Apple, Google, and elsewhere demonstrate a widespread desire for new search tools that can help users filter appropriate information out of the information clutter. In virtually every endeavor, from science to commerce to national defense, efforts are underway to help people rapidly and easily locate things they can actually use.

We have recently completed and tested a prototype web-based design for the US National Aeronautics and Space Administration (NASA) that takes an important step toward this goal. In this presentation, I will describe the Science Education Framework (SEF), a new web-based browser and search tool architecture. We developed the SEF to help teachers quickly locate and use educational resources from the large number of space science related materials produced by and for NASA. It also provides access to resources that can help scientists with public communication and help curriculum developers identify areas needing development. While the SEF provides a means to search conventionally with several different filters, the three key innovative pieces are: 1) the use of a browser area that is always visible to help the user remain oriented to the topics, 2) a set of “stories” that provide a context for each topic selected in the browser area, and 3) a set of four questions based on unifying concepts and processes that organize the resources found for the selected topic. I will also discuss the opportunities and challenges in applying this design to other databases and subjects.

PCST NO.297

(TB7-04)

## INTERACTIVE EVENTS RELATED TO THE LATEST RESEARCH ACHIEVEMENTS: CLOSING THE GAP BETWEEN SCIENCE ADVANCEMENTS AND THE PUBLIC

Fuji Nagami

National Museum of Emerging Science and Innovation (Miraikan)

Nowadays, more scientific research articles are produced in various fields of studies than ever before. These emerging sciences have the potential to directly change people's everyday lives, and the latest research achievements are highlighted through mass media such as television and newspapers. Mass media tends to treat scientific results from the view point of the impact of application, not from those of a scientific perspective or from the attractiveness of the study itself. Public images of the emerging sciences have been shaped by these of mass media reports. Traditional science museums have no role in this process as they have been focused on the education of established science knowledge and cannot treat the new research results. We, Miraikan, have developed the program, “Live Talk: Science Edge”, related to the latest research achievements, featuring the most recent research articles published. We select a “Hot Paper” from scientific journals and invite the first author as a guest of the event. First authors of research articles are normally doctoral students or post doctoral fellows and they can tell related realistic processes of the study, like experimental procedures. The results of the program show that the general public sometimes cannot understand the research results themselves, but are interested in the research process. Here we report on the effectiveness of direct communication between researchers and the general public using the “hot paper” as a basis for the cultivation of interests in science itself.

PCST NO.332

(TB7-05)

## ART ABOUT SCIENCE: AN INNOVATIVE USE OF ART AND TECHNOLOGY FOR SCIENCE EDUCATION

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We describe a project in which we use art as a medium to teach science and technology to the general public. In July 2005, the Franklin Institute, the premier science museum in the U.S. city of Philadelphia, opened a new exhibition hall cleverly named *Sir Isaac's Loft* (referring to Sir Isaac Newton), featuring hands-on demonstrations of physics created in collaboration with artists. To inaugurate the space, the Institute commissioned artists to participate in a *Sci/Art Jam*. The event was a remarkably successful and innovative example of education on technology through the arts. This paper describes this particular example of science outreach through the arts, and places our example in the wider context, urging its more general use. We cite examples in university and K-12 education, and in informal science settings such as museums.

**Keywords:** Technology, Art, Science, Education, Connections, Converging, Public



PCST NO.652

(TB7-06)

### WOMEN'S NETWORK FOR SCIENCE & ENGINEERING IN GWANGJU-JEONNAM

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<sup>2</sup>Dongshin University, Korea  
<sup>3</sup>Chosun University, Korea

In June of 2004, the women scientists in Gwangju and Jeonnam area organized the Women's Network for Science & Engineering in Gwangju-Jeonnam, Co.(It is abbreviated as Network hereafter). Most of the members are female professors and the name of our organization reflects our goal, to form a regional support network for women in science and engineering. We collaborated on the Dream Tree Project to jointly give an opportunity to teenagers experience of the research laboratory and the college life in advance. We also extended our network to the Chinese Korean Yanbian women scientists and engineers.

PCST NO.674

(TB7-07)

### SCIENCE EDUCATION FOCUSED ON EXPERIENCE THROUGH YSC (YOUNG SCIENCE CLUB)

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This research is a case-oriented study based on the operation of SCINOVATOR (Science Extra-curriculum in Posung High School) which was supported by the YSC (Young Science Club) project of the Science Culture Foundation during 2005 school year. Students experienced diverse science activities through programs including various lectures related to science, programs to induce students' interest in science, diffusing science culture to adults and youngsters by operating science activities in rural area for urban student to experience rural community and conserve environment, and programs including Korea-Japan visiting activity to experience famous science related sites and facilities. This research pursued not cramming education but self-experience oriented education, not in lectures but in the field of society, not only for knowledge but for thinking and ultimately tried to suggest a model of science education based on participation and self-experience.

**Keywords:** Science education, YSC

PCST NO.677

(TB7-08)

### INQUIRY PROJECT TO DEPARTMENTS OF SCIENCE AND ENGINEERING OF UNIVERSITIES FOR ELEMENTARY, MIDDLE AND HIGH SCHOOL STUDENTS IN DAEGU METROPOLITAN CITY

Sungim Park 1), Won Jung Lee<sup>2</sup>), Mae Ja Park<sup>3</sup>)  
The Association of Daege-Gyeongbuk Women in Science and Engineering,

To develop our next generation's grounding in science, it is important to start science education at their early ages. However, because of unbearable pressure put on students by entrance examinations and overly high competition on test scores, our public education of science is known to be almost useless for scientific attainments. Looking squarely on present situation, The Association of Daege-Gyeongbuk Women in Science and Engineering will teach nature's laws and provide definite understanding of mother nature to the future leaders of Korea. Moreover, we try to develop talented children in science to speed up the growth of Korea's high-tech industry. Our inquiry project to departments of science and engineering in universities for elementary, middle and high schools students can be one answer.

The laboratories of Daegu's fertile human resource, the professors of science and engineering, was opened to young students. Students has been given opportunities to access what they couldn't at their own school. During the inquiries, professors gave easy lectures that fits young students' level and aroused children's scientific curiosity. And at the same time, they provided the students a chance to accumulate basic scientific knowledge for scientific thoughts. As a result, many students showed interest in high technology and hope to have this kind of opportunity more often. Many elementary, middle and high school teachers were positive about classes that students participate with using high-tech devices in laboratories. With professors' sacrificial posture, we strongly believe that this kind of inquiry projects can give positive influence on our new generation's choice of paths in life.



PCST NO.683

(TB7-09)

### DIFFUSION OF SCIENCE THROUGH COMMUNITY SCIENCE CLASS IN DAEGU AND GYEONGBUK IN KOREA

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The Community Science Class in the Daegu-Gyeongbuk area was inaugurated in October, 2004, by the Association of Daegu-Gyeongbuk Women in Science and Engineering, with the support of the Korea Science Foundation. At present, it is conducting 19 dong(subdistrict) level classes in Daegu City, 2 classes in Gyeongbuk Province, and 6 orphanage classes. A class accommodates 10- 25 children, from the third to the sixth grade. Classes are held once a week at dong offices, and once a month at orphanages; well qualified instructors teach math, physics, chemistry, and biology. It also conducts four special programs a year--such as environmental exploration, visit to science museum, and participation in science festivals in town. A class is run by a team of three instructors including a head instructor. They regularly meet for discussion and participate in at least four workshops a year to review the contents of their teaching materials, and different programs were run in each term. In 2005, the average rate of class attendance was above 90%, and the rate of students' satisfaction was also high. The increase in parents' interest resulted in the inauguration of the "Science Mom" program. Overall, our program contributed to the diffusion of science. But we have yet to solve these problems: the standardization of teaching material, a better linkage with science teaching in elementary schools, increase in time of student participation, and measures to ensure instructors status.

PCST NO.97

(TB7-10)

### COMPARISON OF HEPATITIS B REPORTING FROM CHINA AND AMERICA

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Tsinghua University

Health communication encompasses the study and use of communication strategies to inform and influence individual and community decisions that enhance health. Mass media have great power to affect the public agenda and are quite necessary elements of efforts to improve personal and public health.

However, in the highly commercialized media environment, press likes nothing but a man-bites-dog story, which by definition is "news." What takes place everyday is not good news, reversely, what happened infrequently or even never existed is good news, which can catch eyeball and can stimulate the newspaper circulation or improve, television/radio audience rating. The public health events are too common to arrest the eye of the journalists and editors.

Actually, in China, about 120 million people are Hepatitis B virus carriers, and about 30 million people have been infected by Hepatitis B virus. However, such a great many people are ignored by mass media. Compared with the great amount of reporting on SARS subject, the amount of reporting on Hepatitis B is so little.

Hepatitis B as a disease with its carriers could exert a long-term and extensive impact on the society. And also because of its long-term and extensive impact, the disease doesn't have any element to make a man-bites-dog story.

The paper has built a Hepatitis B reporting database, the articles were selected from mainstream newspapers in China and America, from 2000 to 2004. Through analyzing articles by using key words, scientific words, news sources, content, story frame, editions they belong to, we want to reach the conclusion that how media comprehend the disease, what kind of strategies the press use to communicate the important information of public health.



PCST NO. 118

(TB7-11)

## DEVELOPING PUBLIC AWARENESS OF SCIENCE IN INDONESIA

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Public Awareness of Science (PAS) is a less pronounced issue in Indonesia, compared to other things which caused a direct impact to public, such as poverty issues, political stability, or security issues. Meanwhile, the society transformation e.g. from traditional culture, where has a tendency to interpret the natural phenomena in superstitious way (based on a mysticism) rather than in a rational way (based on science), is just in early stage compare to that in the developed countries. In such condition, it is an important issue to enhance the public awareness of science in an innovative way to support or back up the national plan in leveling up the education level and at the same time contribute in stimulating the people to catch up with the science and technology manner society.

We pay special attention to a science communication for the kids, in other word exposing a “public awareness of science” in the early age, since the kids are leaders in the futures. Starting from year 2001, we set up a center for fun science learning, with focused in children and family. We developed science pre-school and kindergarten, workshop, outreach program for school, birthday party, and special event. We combined science activities with outdoor adventures and using popular kids themes; such as wizard, spider, beyblade; to increase children enjoyment.

In collaboration with the Ministry of National Education, we set up Indonesian Science Festival since year 2003, consisted of fun interactive science exhibition (participated by schools), science show and parody, fun science project competition for students, innovative science teaching competition for teachers, science camp and tour, and teachers enhancement workshop. Ever since it is started, more than 500 students and teachers across the country participated in the competition, and more than 5000 visitors come to the festival.

*Keywords: public awareness of science, science communication, kids*

PCST NO.173

(TB7-12)

## COMMUNICATING SCIENCE AND TECHNOLOGY IN ROMANIAN SCHOOLS - THE “ HANDS-ON SCIENCE ” PROJECT

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We are coordinating at national level the European Union funded Comenius project “Hands-on Science” , a project aiming both to improve science teaching in schools, and to rise young people’s interest in science and technology subjects. The paper will reveal the various methods we have used to achieve these targets, both from the organizational point of view and means of expression. In several cities of Romania science clubs were organized in schools, where teachers and students from neighborhood schools present every two months reports on various scientific subjects, new set-ups and virtual experiments they developed. Every six months the “Hands-on Science” network is coordinating a science fair at national level, where small reseamh projects run by students are presented as an exhibition like contest. In 2005, the project coordinated in Romania a student contest celebrating the World Year of Physics with over 250 entries. At local level, small contests were run (i.e. to develop some experiments or a contest of posters on chemistry). Groups of teachers, members of the project team, are traveling across the country with demo sessions, targeting less developed regions and minority groups. Apart from the classical educational practice (real and virtual experiments, scientific presentation, etc.) we used less orthodox means to introduce science and technology to schools students such as: theater, poetry, live music, all on science related subjects. The success of the project was proved one more time when we participated with a stand to the “Communicating European Reseamh” Conference organized last November in Brussels by the European Commission. On the same occasion we run two demo sessions in two high schools in Brussels on science related subjects similar to those we are offering in Romania. The paper will provide a large assortment of photo and video records illustrating the above mentioned activities.



PCST NO.176

(TB7-13)

### “ SCIENCE MEDIA FOCUS ” WITH A TOUCH OF THAI CULTURE

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Generally, science and technology (S&T) are considered knowledge from the West. This brings alienation of S&T knowledge from daily life of lay people who are rather familiar with the products of S&T than knowledge itself. Moreover this alienation also sets apart S&T and the Thai culture. The project “Science Media Focus” was initiated to be a part of the activities in the National Science Week 2005. It aimed at raising public awareness in variety of media as means of communicating science to young people who were not much interested in S&T or attracted to traditional culture. It was a double-purpose effort to bring S&T and Thai culture into one stance. Thai fine arts were used in the design and decoration of the total exhibition space to create Thai ambience in presenting science media, for example, books, magazines, learning kits, television programs, animations, ICT and internet, and other activities. Thai performing arts such as traditional dance, mask drama, and Thai opera were offered to attract and to communicate S&T message to the visitors. “Science Media Focus” was a unique presentation among other exhibitions and activities in the event of the National Science Week that had Western flavor. It had a fraction of space within the total National Science Week exhibition area. Despite a small space, the success brought into light how S&T and Thai culture could come closer in a meaningful way and were welcome by modern audience.

PCST NO.193

(TB7-14)

### A DEVELOPMENT PROCESS TO PROMOTE EDUCATIONAL ACTIVITIES UNDER COLLABORATIVE RELATIONSHIP IN A LOCAL COMMUNITY: A CASE STUDY OF NISHINOMIYA IN JAPAN

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In Japan, it is suggested that collaboration with several different organizations in a local community such as schools, local government, museums and educational facilities should be developed (Council for Science and Technology Special Committee on Science and Technology Basic Plan, 2005). Therefore, these organizations are expected to produce learning programs to encourage awareness towards science and environment for the citizens through their daily life. In fact, some museums have attempted to provide activities and events to attract scientific interest for people. Especially, the Learning and Ecological Activities Foundation for Children (LEAF); a Non-Governmental Organization in Nishinomiya city of Hyogo prefecture in Japan, has carried out to promote environmental education for the inhabitants since it was established by the local governmental body in 1998 (LEAF, 2004). The LEAF assumed an environmental education project called “Earth Watching Club (EWC)” from Nishinomiya city in 1998. Then the EWC became a base model of “Kodomo (Kids) Eco Project”, which is now carried out by the Ministry of the Environment (LEAF, 2004). This means that the LEAF managed a progressive scheme to encourage awareness of environmental aspect for people. Currently, the LEAF is promoting community-based environmental learning activities at schools and in local communities, in liaison with various civic groups, corporations and government agencies. In this regard, it can be mentioned that the LEAF has developed contrivance to promote environmental education and to improve collaborative relations among different organizations in a local community. Namba&Nogami (2001) identified the leading figure, who established the LEAF, and examined why the person thought to start the LEAF. However, the details of undertakings and actual situation of collaboration in the LEAF have not been revealed to date. This paper will explore the development process to promote educational activities of the LEAF under collaborative relationship in a local community.



PCST NO.233

(TB7-15)

## A NEW COMMUNICATION MODEL FOR POLULARIZATION OF SCIENCE TODAY: CONCERNING THE SCIENTIST ROLE CHANGES

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It is true that in the history of science, scientists always played not only an important but central role in the popularization of science. However, nowadays popularization of science has been embodying its new rules and characteristics. Different with the old notion, this paper shows that the diversity and specialization trend of subjects of popularization of science is unavoidable especially due to the mass media development in this scientific and democratic society, and so the traditional role of scientist in the popularization activity of science would also be changed accordingly.

Based on the general communication model of mass media (traditional model: information sender → information → communication channel → information receiver), this paper provides a new communication model of scientist role in modern popularization of science which as following(new model):

scientific information producer→information①→scientific information sender→information② →communication channel→information receiver

then discloses why and how scientific community has to face this reality and adapt to the new trend of the popularization of science.

In the end, the author discusses some new conclusions according to the new model:

- (1) Literary works of popularization of science, such as stories, articles and books, should be admitted as jobs of new creations.
- (2) There should be an independent evaluation system for popular science works, which should not be belittled again under the standards of academic findings of scientific research.
- (3) Scientists will not be the main subject of popularization of science today, and science mass media workers who as the scientific information sender will be the direct and professional subject of popularization of science.
- (4) It should not be a part of each scientist's professional responsibility to promote the popularization of science today.

Key words: popularization of science; scientist; communication model

PCST NO.314

(TB7-16)

## SCIENTISTS AND TECHNOLOGISTS OF NORTH KOREA RUSHED INTO THE PUBLIC: THE ROLES OF SCIENTISTS AND TECHNOLOGISTS TO IMPROVE THE PUBLIC AWARENESS OF SCIENCE AND TECHNOLOGY

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In the end of 1950s, the economic growth in North Korea rose to an unexpected rate of 44%. The more vigorous the production activities became, the more important the role of science and technology became. So, the government of North Korea emphasized the improvement of science and the technological support activities to the production sites, such as factories, mines and farms.

Unfortunately, there were few scientists and technologists at the production sites, and to make matters worse, the scientists and technologists who were dispatched from Soviet Union to support the production activities, withdrew at the end of 1957. At that time, the members of 'the Academy of Sciences of Democratic People's Republic of Korea,' who were top-class scientists and technologists, rushed into the public. The policy was named as 'On-site Research Program'. As the On-site Research Program launched, the roles of the members of the Academy were changed. After the Program, they took the responsibility for not only the scientific research activities in the laboratories, but also the on-site activities.

The important role of scientists and technologists, who were sent to the production sites, was to give technological support. They had to solve the urgent technological problems at the production sites. As the technological obstacles were removed, the speed of economic growth became higher.

Another role of them was to teach workers, and to help establish the 'Kongjang(plant) University.' The Kongjang Universities were powerful institutes to improve the scientific and technological ability of workers without leaving their production sites.

The third role of scientist and technologists was to improve the public awareness of science with joining 'the Dissemination Project of Scientific and Technological Knowledge'. They have designed the Dissemination Project and given the public lectures for science and technology by themselves.



PCST NO.680

(TB7-17)

### A RECONSIDERING OF COMMUNICATION LOOKING THROUGH THE INTERACTION BETWEEN SCIENCE AND ART

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This study explains the importance of communication in relationship between science and some other knowledge, especially on the interaction between science and art. In this paper, I propose a new direction and meaning of communication to understand how various fields of knowledge will be affected with each other. In other to unfold details, I criticize general opinions of public with artistic objectivity in points of sameness between science and art. Besides creative principle and imagination of human have a significant role in interdisciplinary interaction, and it is found that scientific discovery and investigation of scientist are not particularly different from inspiration of artist. In conclusion I define a new meaning of communication to develop the system accompanying function of communication modified from getting knowledge to organizing knowledge.

**Keywords:** science and art, interaction, communication, organizing knowledge

PCST NO.194

(TB7-18)

### A TRAINING PROGRAM FOR SCIENCE COMMUNICATORS IN COLLABORATION WITH UNIVERSITIES AND MUSEUMS

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This presentation considers the role of science museums in the advanced science and technology society. After introducing the training program for science communicators at the National Science Museum, Tokyo, the impact of the program will be discussed.

Science Communication is seen as a crucial measure to promote public awareness of science in everyday lives. According to Stocklmayer et al. (2003), science communication is "as the process by which the culture and knowledge of science is absorbed into the culture of wider community". The process depends on the contexts of communication environments.

At museum contexts, complexity and diversity in learning have been recognized. Focused the complexity of museum learning the reasons of difficulty in capturing learning outcomes were discussed (Ogawa, 2003). Firstly, the outcomes of learning have cognitive, affective, and psychomotor aspects. It is difficult for researchers to capture these outcomes in the simple methods Secondly, the factors of learning are complex, because it depends on some contexts (ex. Falk & Dierking, 1996). Thirdly, as learning is a cumulative process (Rennie, 2001), it is difficult to measure pure outcomes occurred from visit experience.

The results of these researches indicate that learning in museum is complex and depends on the contexts of visitors, exhibits and so on. Thus, good communicators will be expected to understand these contexts and coordinate the communication environment as well as to have communication skills and expertise. Ogawa (2005) discussed the expected qualities of science communicators, as a function of liaisons between audiences and science. They are expected to have the qualities of communication, coordination and expertise.

Based on the features of these communication environments in museum contexts and the qualities of science communicators, a training program for science communicators were developed at the National Science Museum, Tokyo, in collaboration with Universities.

PCST NO.321

(TB7-19)

### SOME CHARACTERISTICS OF PUBLIC COMMUNICATION OF SCIENCE AND TECHNOLOGY IN CHINA

Lin Yin

China Research Institute for Science Popularization

China is a big country with mass population. In the time of "information explosion", how to solve the problem of communication of various knowledge and information in China is an urgent task. However, before policy makers make any decision, it is important for them and the public to know about the situations of public communication of science and technology in China. This paper analyses several characteristics in this area mainly from two perspectives. 1) Changes are taking place in means of public communication of science and technology in China. Traditional media are replacing by modern ones. 2) There are obviously big differences among diverse social groups in the process of science communication. For example, male and female, people from western, eastern and central areas, people from urban and rural areas, etc.



PCST NO.761

(TB7-20)

## THE HISTORY AND THE PRESENT STATUS OF KOREAN AMATEUR ASTRONOMICAL GROUPS

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Korean amateur astronomy has grown for about 35 years. In early 1970's, the activities of Korean amateur astronomers formed a systematic group, KAAS (The Korean Amateur Astronomical Society).

The early amateur astronomy was mainly focused on the activities for astrophotographs, and today the amateur astronomy is tending to cover a wide scope according to the advancement of observation instruments and the supply of professional ones like CCD cameras. Now the activities ranges from the detection of new objects like asteroids to the conduct of joint researches with professional astronomers.

KAAS, a corporation aggregate as a representing group of Korean amateur astronomy, holds star festivals for the common citizens and simultaneously provides astronomical leaders' programs to foster the astronomical leaders who can teach the public and the students. After all, the activities of KAAS contributes to organize 'the Science Supporters' who support the science to nourish the society. Now KAAS is trying to extend its role in the society and KASI is helping KAAS to play more independent role by promoting systematically. However, KAAS is expected to achieve their goals in their own way after all.

In this presentation, we are going to introduce the history and the present status of Korean amateur astronomy.

PCST NO.81

## COMMUNITY CLUB OF SCIENTIFIC TOPICS FOR THE YOUNG

Liqiao Li  
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With the reform and opening up, China has gain great achievements, especially in economy. However, as the development of the society, tremendous changes have taken place, on the material as well as the mental. The government began to pay much attention on the construction of harmonious society and straggle for building the learning society. In pursuit of the above objectives, community education was proposed and put into practice in Xuhui District. Popular science education is one of the important parts of community education. To meet the demand of citizen in different level, bilateral and interactive propagation of science through governmental involvement were conducted. Community clubs of science topics for the young were one of the demonstrative

projects of local government. Different topic clubs were built according to the scientific resource in community, as a platform for science and technology education to the young. To push science popularization as a social initiative, as well as to construct a science and cultural atmosphere, this initiative was carried out with the intention to raise the awareness in science, to allow more aspiring volunteers to join in the work and to allow the community a convenient way to enjoy scientific activities. A mechanism of teenager participation in club management and operation was established under community organizing. In accordance with conditions of community popular science activities for the young, we investigated club activities of the young participators on popular science from four aspects: organization and participation, activity manner, activity time and management. Data was collected based on questionnaires and processed with SPSS. Analysis according to the data was conducted and proposals for valid improvement were postulated.

PCST NO.138

## COMMUNICATING SCIENCE TO SECONDARY SCHOOL STUDENTS WITH THE CREATIVE AND PERFORMING ARTS

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It has been shown that as school students progress though secondary education there is a reduction in the popularity of the sciences and in particular physics. In recent years the three UK science-oriented Research Councils (EPSRC, PPARC, BBSRC), the major biomedical funding charity, The Wellcome Trust and NESTA (National Endowment for Science, Technology and the Arts) have all been making substantial funds available for science communication projects in order to engage students and communicate science in schools in an effort to amend this decline in attitude. This includes projects that involve creative and experimental collaborations between science and the arts.

The paper will describe a baseline study that aimed to establish school children's preferences for teaching activities that are traditionally used to teach physics along with more creative approaches. It will report the findings of how helpful students feel different activities are in aiding their understanding of physics, along with the linkage between these aspects. The paper will also explore the applications of this research into understanding the factors that affect the success of science communication projects. In addition the paper focuses upon a summary of the evaluation results from a project that involved the collaboration of both scientists and artists. The impact on students of a science theatre project "Science Journeys" that aimed to entertain, inform and enthuse young people about the science and technology of Particle Physics and Astronomy will be discussed. The effect of two aspects of the project on changing students' attitudes towards science will be highlighted (i) interactive performance workshops where student participants developed their own drama pieces along with (ii) a science based play delivered to students as audience members.



PCST NO.130

## PCST IN THE WORLD AND 1N ASIA

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- In Rural Asia, Science communication problems are similar everywhere.
- Health, Nutrition, Earthquake, Tsunami, Land and water resources, Bio-diversity etc. communicated through Museums, Science Centers, S&T Institutions, media extensively.
- But there are number of areas are almost untouched, mostly women related.
- In India Rural women are busy through out the day after domestic livestock.
- Her tasks includes milking, fodder collection, Assisting the male members of the family, Agriculture activities, collection of fire wood and procuring water.
- These duties are in addition to responsibilities of raising children taking care of elderly, cleaning and cooking.
- These tasks do not carry any economic value and are not taken into consideration while planning developmental programmes.
- Recently some drudgery - reduction measures have been attempt at micro level.
- Still there is need to developed scientific tools and equipments which would reduce drudgery and ease the burden of women.
- Need for appropriate intervention and transfer of technology through training and creating Science and Technology awareness amongst self-help groups, Training Agencies, Departments, NGOs and Stakeholders.
- **My study:** Collecting Existing Information on appropriate technologies developed for drudgery reduction for women.
- **Objectives:** To introduce concept of the drudgery to rural women groups.
- Encourage them to use possible reduction method of drudgery of daily life.
- To improve quality life within community structure within a community structure.
- To initiate innovativeness in women's thinking.
- To introduce group leaders drudgery reduction resources.
- To find ways of making such devices available to end users.
- This kind of studies of Innovative, economical and practical Science and Technology gadgets can help Asian as well as other developing countries to plan their developmental programmes.
- I would like to give examples of gadgets develop by people themselves, Science communicators, Designers etc.
- Example: Simple Ball-bearing pulley can help women better in fetching water from the well. This kind of technology can be adopted and replicated in any developing country.
- India has lot to share and lot to learn.

PCST NO.361

## SCIENCE COMMUNICATION: KEY TO BRIDGE URBAN RURAL DIVIDE IN INDIAN SUBCONTINENT

Tariq Badar

Indian Science Writers' Association

In today's global scenario, flow of S&T related information among Urban & Rural communities is much needed to abridge the gap among them. Especially in Indian & Asian context, there is a wide gap among these communities, which in turn relates to social, educational, information & other imbalances. Different S&T Communication strategies are to be attempted to suit both of them in such a manner that there is a two-way flow of information and a dialogue is thus established among them. These are going to be the stepping stones of achieving Scientific Culture for Global Citizenship.

Attempt is made in this paper to demonstrate a model for Asian, especially Indian sub-continent countries to adapt to such S&T Communication strategies which may eventually lead the Urban & Rural populations into a Global Society having scientific outlook and duly preserving there cultural diversities & heritage.

The study will reveal that taking along the masses is the best strategy for any radical change and preparing its ground is a challenge for policy makers & planners. The same is true for S&T Communication strategies targeted for public in archiving a common platform for Urban & Rural populations thereby to bring Traditions & Science together in friendlier manner.



PCST NO.369

## COMMUNICATION TO SOLVE REMOTE AREAS' PROBLEMS IN BANGLADESH THROUGH EMPOWERMENT OF WOMEN WITH INFORMATION TECHNOLOGY

Lutfur Rahman

Association for Advancement of Information Technology (AAIT) - NGO registered with NGO Bureau, Govt. of Bangladesh

The scenario of communication is changing very rapidly and information technology is becoming all pervasive development tools. Its impact from day to day life has become undeniable in almost all sectors. But the impact of communication technology in health care systems lags behind in Bangladesh. Here one observation in medical science is that early diagnosis can prevent many casualties in remote areas. Medical doctors have now the capability to use the Internet to route around the power structure and historic barriers to advance their goals and careers by networking together. But women of Bangladesh do not have equal opportunities of access to knowledge due to the fact that they do not have access to the new technologies at the same level as in European, America or elsewhere.

This paper describes a project, initiated in 1996, to strengthen the capacity of Association for Advancement of Information Technology (AAIT) in cooperation of the Commonwealth Science Council (CSC) and the Tanzania Commission for Science and Technology (COSTECH) based in a Commonwealth country in Africa. The main objective of the project was to train the senior woman scientists, technologists, researchers and medical doctors with new technology (ICT), and to utilize their gained knowledge in respective areas to enhance their activities. A survey conducted by AAIT identified their training needs. Training modules and materials were then designed in the context of Bangladesh. The regional programs were specially arranged for medical professionals who work in the rural clinics, hospitals and healthcare centre. Trained professionals are now utilizing their IT knowledge in the remote river islands using mobile vans or water vehicles (launch) equipped with necessary medical tools.

PCST NO.455

## A STUDY ON SCIENCE COMMUNICATION

Jung-Tae Kim

Association of Biotechnology Genetics

The modern society is described in many ways and one of them is an age of scientific and technological civilization. It is also said that there is no area not affected by science. In this sense, it is only natural to explain about and teach science to the public, and the level of scientific education can have a huge impact on the determining of the future competitiveness of a country. Despite countless technological achievements made by science in numerous areas, the level of public understanding of science is considered to be still lacking.

This thesis is aimed at providing a comprehensive understanding and contents of scientific communication that explains about science, a relatively unfamiliar area to the public, from a social science perspective. It approaches to the terms of science and communication in the etymological aspect and depicts the social function and understanding of scientific communication. Furthermore, this thesis intends to deliver the basic meaning and function of scientific communication, one area of social science to nurture and increase the public's understanding of science which constitutes a part of social culture.

PCST NO.114

## NATURAL AND UNNATURAL EVENTS: EFFECTIVE TOOLS TO ENHANCE SCIENTIFIC TEMPERAMENT

Chandra Mohan Nautiyal

BSIP,

During the past decade or so, there have been several natural/unnatural events, some being global, that served as effective tools to enhance knowledge of science and also promoted the scientific temperament. This paper describes the approach and impact in changing the orthodox attitude to the scientific in face of superstitious and unscientific environment. Being privileged to have been directly involved with several of these events as a scientist as well as science communicator, using TV, radio, print and direct interaction media, I had an opportunity to evaluate their efficacy. The TSE of 1995; the Venus transit of June 8th, 2004; the unfortunate earthquake in western India, later Tsunami of December, 2004 and hurricane of 2005 not only offered the opportunity to educate people about the causes of the events but also strengthen their scientific approach to enjoy wonders of nature or to minimize damage wherever possible as appropriate, whether by prevention or remedial measures. Even though eclipse and transit of Venus were believed to be 'inauspicious' by the laypersons, sustained efforts and coordination between scientists and the media led to inhibition- shedding and unprecedented response to these events even in the remote places. However, the scientific approach was found to be useful even in the case of the unnatural event of rumour of face- scratcher ('muhnochwa?' in local parlance) in 2002 that had led to a fear-psychosis in certain area of northern Indian state of Uttar Pradesh. A systematic, scientific and interactive approach was adopted but the report here is unorthodox in several ways. It's neither an experiment carried out with result reported, nor is it a field observation such as of a geologist who can describe things comparing with some standard. The pleasant observations of attitude- change are reported in both categories as a result of scientific approach.



## Poster Session

PCST NO.116

(FB7-01)

### GLOBAL WARMING BETWEEN SCIENCE AND FICTION

Tiziana Lanza  
INGV-Rome

Author of popular bestsellers, some of them also successful movies, Michael Crichton with his last book *State of Fear* contributes to heat the debate over Global Warming, a long standing debate recently exasperated by the USA's refusal of ratifying Kyoto protocol. Crichton's last techno-thriller is an interesting literary experiment, because the author inserted in the text graphs coming from excellent research centres. The book contains footnotes where quotes from scientific articles are used to validate the story. The bibliography is a long list of references to scientists' works. An analysis of how science has been used in this context will lead to more general considerations. The scientific community is claiming at large that Global Climate Change will lead to more frequent extreme events. Can the fiction help citizens to get aware of the role played by science in this context, getting them also involved in the problem solving? Rather than considering the fiction as conceived merely for entertaining, we suggest to consider it as an intriguing tool to promote a debate between people and the scientific community. In the past when human beings were facing a violent planet, without the help of science, myths and tales have saved lives. In the same way, we should welcome stories as a way to involve people in scientific issues of vital importance for the contemporary world.

PCST NO.139

(FB7-02)

### SCIENTIFIC CULTURE - A CHALLENGE FOR DEVELOPMENT

Prof. Shamima K. Choudhury  
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Dhaka University

Science is an adventure of the whole human race. Creative, cumulative and ever evolving scientific knowledge and its application through innovation have resulted in products, processes and services benefiting the mankind. Science has given knowledge, the tools as well as methodologies for speeding up development creating new resources using new technology: Industrialists have made good use of scientific discoveries for social benefit as well as for making money. The communication between scientists, entrepreneurs, policy makers, public and civil society is sometimes covered by mistrust, anxiety and confusion. That science should be a public knowledge; communicable, unambiguous and objective seem to be ignored. A gap has arisen between scientific pursuit and the public understanding of science through unnecessary complications. A broad understanding of the methods of science and a general knowledge of some of the scientific endeavors by the nonscientists has been given a number of terms like scientific literacy, public understanding of science and so called science culture. The idea is to narrow the gap between the producer of scientific knowledge and its users.

There is unequal spread of education in the developed and developing countries. The developed world has abolished illiteracy and incorporated science in basic education. On the other hand, lack of proper science based education have has great social consequences for the developing countries in terms of poverty, productivity and other problems. The gap between the developed and developing countries in terms of scientific efforts, institutions, policy and planning need to be narrowed for a better world with mutual respect, understanding and peaceful coexistence.



PCST NO.273

(FB7-03)

### THE GAP BETWEEN SEXWORKERS' NEEDS AND INFORMATION PROVIDED BY MEDICAL SPECIALISTS ON HIV/STD PREVENTION IN JAPAN

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Prevention of HIV/AIDS is an issue of global concern which requires the active cooperation of communities, medical specialists, and governments. Japanese Ministry of Health, Labour and Welfare issued the National Guidelines for HIV/AIDS Prevention and Care in 1999, and designated "specific measure populations" which are vulnerable to the AIDS epidemic and require special measures. Though sexworkers are included in these populations, there are few STD/HIV program specialized to sexworkers because of difficulty to approach for sexworker themselves.

In this study, we develop a protocol to provide more practical information for sexworkers by medical specialists as a part of STD/HIV prevention program. For the first step of this purpose, we reveal the qualitative gap between the needs of sexworkers and information provided by medical workers (mainly gynecologists).

We analyzed the results of workshops concerning to STD/HIV facilitated by sexworkers as peer-group sessions. They expressed actual anxieties and problems which occurred during their works. We compared these problems with the information by medical specialists whether these information match up to the sexworkers' needs. The result suggests that even though specialists were supportive to the sexworker, their information tend not to be useful in the real situation and could not meet the needs of sexworkers, because it is very difficult to presume suitable measures or methods which are available on the real situation.

Though the involvement of the target populations is considered to be essential to the development of effective STD/HIV prevention programs, it is difficult to bridge the difference between sexworkers and medical specialists directly. To solve this difficulty and ensure effective communication between specialists and sexworkers, we propose to set up two roles between them according to our results; one is trained sexworker as representative of sexworkers, and another is interpreter who has medical knowledge and works close to trained sexworkers.

PCST NO.299

(FB7-04)

### PRESENT SITUATION AND THE FUTURE: ANALYSIS OF CHINA'S SCIENCE NEWSPAPERS

Guangjiang Pei

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*Popular Science News*, which focuses uniquely on popularization of science and technology, is to be merged with *Science and Technology Daily* next year. One of the three national science newspapers in China will cease to exist in the wave of newspaper reform.

Previously, there are many science newspapers in China. However, China now is introducing reform by pushing all newspapers into market competition. Newspapers covering science and technology, which previously depended on its owner for money, are weak in competition and not successful in earning money.

This paper, taking *Popular Science News* for example, will analyze the present situation of China's science newspapers, especially the cause of living difficulty, for example, the concept of managing, reporting guideline, quality of science journalists and editors. Media ecology and media economy theories are used to help the analysis. Meanwhile, this paper will put forward a question: what is the future of science newspapers which are useful in science communication between scientists and the public, but weak in the market? On the future of science newspaper, the aim of this paper is to give suggestions and to bring the development of science newspapers into public attention.



PCST NO.649

(FB7-05)

COMPARATIVE ANALYSIS OF SCIENCE KNOWLEDGE AND ATTITUDES BETWEEN  
KOREANS AND AMERICANS  
— FROM THE SCIENCE CULTURE POINT OF VIEW —

Jonghyeun Yun

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This research aimed to analyze the reason of Koreans' relatively lower interest in new scientific discovery and the use of new invention and technology relative to Koreans' higher knowledge on science than that of Americans, to forecast the influence, and to propose solutions for this problem. A scientific technology level of a country is the most sure and accurate indicator that tells the future of the country while weighing the national power. Scientific technology will develop in geometric progression beyond our expectation, and it is ever more emphasized to establish a right point of view toward scientific technology. The worldwide environment pollution, genetic foods, copy of life, nano issue, etc are not only scientific problems but also social problems. Under this situation, it is imperative to have a right understanding on scientific culture. If we call a complex body consisted of shared view toward scientific technology, faith, attitude, and life style of social members, as scientific culture, there will be created right scientific culture in overall society when we try to understand, think highly of such scientific technology and to participate in the creation of scientific technology. In this regard, as a result of forecasting the future through this study, Korea will remain passive in sharing interest or understanding while having a vague hope toward science and technology for the time being. It is thought undesirable given the strong influence of modern scientific technology on all areas of our lives. As shown from the survey results, there appeared serious problems such as low interest and understanding in science, negative attitude toward scientists, and insufficient scientific contents, and this study is meaningful in that it proposed solutions for each problem.

Keywords: science culture, analysis, knowledge, attitudes

PCST NO.650

(FB7-06)

IMPORTANCE OF SCIENTIFIC COMMUNICATION AND THE ROLE OF THE PRESS,  
(SCIENTIFIC BROADCASTING IN CENTER)

Seong-Hwan Lim

Korea Science Foundation

This thesis is to study the importance of the scientific communication in these modern days and the role of the press. Out of which, it is to search on the broadcasting media, which is one of the most effective medium of communication. Especially, the intention of this study is to search on the soundness of the Korean scientific broadcasting system and the establishment of an idealistic modern. The modern science and the popularization of technology became an important influence on the objective of the nation, where the process of the characteristics of the 21st century's society is changing. Thus, in order to have the mass of population to become aware of and to understand and to propagate and to popularize the scientific information, through the mass communication media, the role of the communication is very important. Therefore, the role of the press is to alienate from the traditional passive way to positive and active public information method of providing scientific information.

Through this very kind of scientific communication, one of the most effective way in achieving the mass popularization of science is the utilization of the television media. As one of the means for this infrastructure, it is most paramount to establish a special channel that will only handle the programs related with scientific technology area. The reason for this method is that the existing mass communication system including the press and the broadcasting system has limitations because of the completion for the number of audience and other factors. Then, why is it important to have the scientific communication for this purpose? What will be the most effective communication method? Furthermore, what would be the most effective kind of scientific program? Then, would it be necessary to have the broadcasting system that only specialize in scientific information and the production of such programs? The result of the study on this matter are as follows: The mass media have neither devoted much weight on science related programs nor have shown much interest in handling of science matters. In the case of a supreme broadcasting media, which has much influence on the society, has allocated not more than 3.7% of their programming time on science related program. Not only because of the recognition that science itself is a difficult and is complicated subject to the general public, there are not much contents that are dramatic and of news value on science matters. This is also the result on the part of the scientist, who are the main source of the information, is not positive on the dissemination of the information for the general mass media. Namely, in spite of the fact that much expense and efforts are needed from the standpoint of the press companies on the science programs or articles, it is difficult to draw out the reaction of the readers and the audience, which is an area that there are not much people that would readily wish to be involved.

In conclusion, to cope with this sorts of problems, this thesis is aimed to present the necessities of establishing the broadcasting system, specializing in scientific information, with specific ways and methods, especially, with the utilization of the satellite broadcasting system, as the new and wide ranging media. The start of the broadcasting system on science matters is to head toward the publishing type broadcasting system, that can be operated with minimum number of manpower, enabling planning and editing, while maintaining its principle on outside reassembling. Starting with this small number of manpower and through the programs which are already being produced by the existing broadcasting system or through the arrangement of foreign programs, and by maximizing the editing merit, an entirely new impression can be achieved, enabling it to become the center of scientific culture both in name and reality. Viewing from this point, it could become a catalyst enabling the existing broadcasting system to have more interest in the science programs to allow the change in the broadcasting genre, that could bring about the testing to view how close the true character of life and broadcasting could be brought near together.



PCST NO.89

(FB7-07)

TV SCIENCE PROGRAMS IN TRANSITIONAL PERIOD IN CHINA  
A CASE STUDY: “ SCIENTIFIC CHINESE ” OF CCTV AT THE CROSSROADS

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Even since the end of last century, scientism has become part of state ideology in China. As a strong and dogmatic ideology prevailing in all the walks of life, scientism takes science to be the only privileged knowledge about the world, and views scientific method as the exclusive way to make progress in all kinds of human enterprises. As a result, traditional Chinese TV science program neglected the interaction and interlocution between viewers and scientists. Greatly indebted to the new idea deeply influenced by anti-scientism that the public should be not only the information receiver but also the participants of scientific issues, Chinese TV science program has changed the form of talk-show by scientists on stage with a host as a partner, to a new one as interactive activities with scientist and the public both on the stage from the beginning of 1990s. The new form of TV science program can attract the viewers' attention and stimulate the viewers' interest so as to keep the rate of TV program viewing above the “dangerous” position (last 1-3). Nevertheless, the attempted reform has provoked a hot debate between scientism-oriented and anti-scientism-oriented Chinese scientists and intellectuals in China. The presentation shows how the change in the form of Chinese TV science program happened with the help of its ideological transformation from “science is always right and people should understand” to “science should be communicated as it is and people have rights to join the discussion”.

PCST NO.93

(FB7-08)

CHINTHAMANI RAGOONATHACHARY AND SECULARISATION OF TIME DURING THE  
LATE NINETEENTH CENTURY MADRAS PRESIDENCY

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*Abstract:* Chinthamani Ragoonathachary was a ‘native’ astronomer who joined the Madras observatory as a menial labourer and rose to occupy the high position of first assistant to the Astronomer. Hailing from a family of almanac (*panjang*) makers, he was a keen and erudite observer. He is credited in the discovery of the minor planet ‘Asia’ and with variable star observations. He was on the official team in the 1869 total solar eclipse expedition as well as Transit of Venus observation in 1874 and was the first Indian to be elected to the Royal Astronomical Society. Keen to popularise science he communicated basic principles of astronomy in the regional languages such as *Tamil*, *Malayalam*, *Kanada Hindustani* and *Telugu*. Ragoonathachary was disturbed at the apparent deviation of the traditional almanac (based upon the orthodox tradition- called *Vackya Panjangam*). The phenomenon computed by the traditional almanac and the actual occurrence of events differed in reality. In view of this, he and his friends attempted to devise a new almanac- *Drkkaniitha panjangam*- or almanac that agree with the observation. However he had to face the criticism of the *Jyothish*- astrologers, who argued against such improvements and criticized him for his scientific zeal.

While the change to ‘modern’ calendar system was achieved with administrative fiat, the contours of social acceptance are the focus of this paper. Time, it may be said, is a fundamental factor of the human condition. At the personal level, as well analyzed by Heidegger, temporality is not extrinsic but rather constitutive of our being-in-the-world, and temporality is equally a parameter of social organization and social interaction. Sorokin and Merton have well argued that while physically based time-reckoning inexorably marches on in relatively homogeneous units, on the other hand social time unfolds with varying rhythms. Thus, we experience time both as physical passage and as a social procession. Often one is not aware of time as a fundamental structure relating the human being and the human group to the environment unless there is a rupture in temporality. One such rupture in Tamil society was switchover from traditional time reckoning to modern time reckoning as deemed by the colonial administration that demanded a radical shift in the quantitative and qualitative temporalization of social activities. Time is a vessel for both the sacred and the profane, social conventions and equivalents, thus, replacing the static time and theological time of the tradition, the modern time came as a temporal representation armed with an arrow pointed towards the future: it is the time of perspective, of future planning, but also of synchronizations, and brutal changes. This study is situated at the crossover point between history of science popularisation and sociology of science popularization, and attempts to reconstruct the contours of the modernization of social time during the colonial era and identify the agents and agency of the same.

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PCST NO.157

(FB7-09)

## THE MEDICAL/SCIENTIFIC IMAGINATION OF PSYCHIATRIC PATIENTS IN THEIR ACCOUNTS OF MENTAL ILLNESS

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Since many studies have shown that perception and scientific knowledge that animate medical expertise do not always coincide with those of sick people, doctor-patient communication is nowadays at the centre of renewed interest. Very often these different ways of seeing the illness come into conflict during the negotiation process about the cure. This aspect is of particular relevance in the psychiatric field: the definition itself of norm, of wellbeing and therefore of recovery is difficult to establish and to communicate. Communication between experts and the person asking for help is often mediated by other figures (for instance the relatives). Finally, often the doctor doesn't make an effort to understand how to communicate the illness or how to negotiate the treatment with the sick person.

For this reason, there is a relative lack of literature concerning:

- the knowledge and representation of mental illness elaborated by people affected by mental problems;
- what psychiatrists say to their patients,
- how patients are able to rename their malaise *translating* medical terminology in a non scientific language.

This case study (qualitative research through the method of narrative interview) deals with these issues considering the stories of people who have suffered a long history of psychic disturbance, including in some cases, a period spent in old psychiatric hospitals. We have underlined twenty-five interviews with people connected to the mental health department of Trieste (Italy), the first city in the world where the psychiatric hospital was closed down and replaced by community mental health services operating 24 hours a day. The content analysis of these interviews has allowed us to understand the images, the psychiatric competences and ways through which sick people communicate. We have evidenced the difference and analogies between the representation of illness of doctors and those of the patient.

PCST NO.263

(FB7-10)

## THE DEBATE ABOUT “ REVERENCE FOR NATURE ” IN 2005 AND IT S MEANINGS FOR PUBLIC UNDERSTANDING OF SCIENCE IN CHINA

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To enhance the public's environmental consciousness, is an very important part of the works of public understanding of science. In China, for recent years, there are some visible progress have been made on that side. In the year 2005, there is a influential debate about “reverence for nature” which has caught numerous public's attention in Chinese Society. However, in this debate, we also can find some problems worth to study in perspective of public understanding of science. The meanings of this debate for public have been analyzed in the paper.

PCST NO.679

(FB7-11)

## THE THEORY ON THE STRUCTURE OF TAO AND THE WAY OF LEARNING

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The present civilization want oriental culture to explain its own structure by scientific language to overcome the limitation of this century. Although scientification of oriental medicine is wrong expression by general public accustomed to western education system, it is inevitable for the present oriental medicine to explain itself more clearly with new age language. Korean medicine is different from western medicine in terms of curing and illness. The illness which warns a bad state, In Korean medicine it is like a signal that can lead to a healthful life. The concept that we ought to begin is to understand Korean Medicine with learning right living represented in Tao.

From oriental science, philosophy, religion we tried to deduced Korean methodology of Korean scienco. Based on this fact this study will examine several theories, logical structures, and present the way of learning Korean science.



PCST NO.151

(FB7-12)

A SUCCESSFUL CANADIAN INITIATIVE LINKING WATER SCIENCE TO POLICY, &  
RELATED WORK ON PRACTICAL LINKAGE MECHANISMS, FOCUSING ON THE  
NEEDS OF POLICY ANALYSTS AND DECISION-MAKERS

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**Summary**

Our paper briefly describes a successful series of “Linking *Water Science to Policy Workshops*” that provided a mechanism by which recent water science could be delivered to Canadian practitioners, and practitioners could identify their research needs, especially to federal scientists and research managers. We then report on work stemming from the workshops, and currently under way, to further explore practical mechanisms for sustaining dialogue and delivery of science information to policy makers and decision makers with particular emphasis on the role of the Policy Analyst.

**Keywords:** Science, Policy, Linkages, Decision Making, Peer-Assist, Survey, Policy Analyst

PCST NO.234

(FB7-13)

HOW TO DESIGN SCIENCE COMMUNICATION VIA WWW?: INTERACTION BETWEEN  
VIRTUAL AND REAL COMMUNITIES.

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Internet/WWW is one of the powerful tools to encourage communication between scientists and public. We report in this paper the framework of newly developing web site of the National Museum of Emerging Science and Innovation, Japan (*Miraikan*), focusing especially on the method and design for activating communication among real and virtual communities. *Miraikan* is national science museum which is located in Tokyo, Japan, established in 2001, of which director is astronaut Dr. Mamoru Mohri. Main purpose is attractive exhibition of the products of advanced science and technology for public people, especially youngsters. *Miraikan*, along to this aim, is developing cooperative activity with secondary and high schools. Number of visitors was ca.630 thousands per year (in 2004).

In 2005 *Miraikan* has launched the project of creating the new web site, a kind of “portal” in which we edit and send various information of science and technology. Operation will start on July 2006. The “Café & Pub” is planned to be set up within this site for facilitate communication among scientists and public. The details are still open, but outline should be as following: 1) a scientist or technology specialist will give a short thesis displaying his/her opinion for rather important topic, 2) public people freely debate each other about the topic and specialists opinion through blog or BBS, 3) then the specialist and lay persons will exchange their thoughts. We hope that this cyber Café will function as a node between real and digital worlds by connecting with real Café Scientifique and/or exhibitions in the *Miraikan*. This will also contribute to increase the number of visitors to *Miraikan* and to create newer community including people who seldom come to *Miraikan*, because of, say, living in distant place. We report some tips and devices for fascinate the communication between real and cyber communities.



PCST NO.626

(FB7-14)

## WHAT AND HOW TO PAY 1N SEOUL CITY BUS? - FROM ANNEYANG TO T-MONEY

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In this paper, I want to show the change happened in the city bus in Korea from 1960s to the present. Mainly I will focus on the way how passengers pay the fare. Besides I will look at the status of the driver and the responsibility of the passenger, I will contend that the changes happened in Seoul city bus reflect technical and social backgrounds of the days.

From 1961 young girls could be conductors in the bus by the government order. They were called *anneyang*, meaning a female guide. At that time each bus had only one door and *anneyang* were standing beside it to get the fare. They also informed the driver when to start and stop by shouting '*Oh lie*' or '*Sdop*' and pushed passengers into the bus when it is almost full. The driver was the director of the bus and exempted from all the extra duties. Passengers faced *anneyang* to pay the fare and get the change. Like kitchen maid, factory girl, *anneyang* were young girls from the country and badly paid. They were monitored and searched for the possible cut. There were some records on *anneyang*'s strike on the unjust search and too low wage.

Paper tickets and tokens appeared in 1966 and 1977, and finally came the fare box in 1980. Bus was passing by the taxi, subway, and 'my car'. *Anneyang* were not any more suspected for the cut, but 'citizen self bus' did not allow room for them. New type of bus with automated two doors appeared and get off bell, bus stop guidance recording system started to be embedded. Drivers got the new job of operator. They answered questions of the passengers, notified the bus stop information, opened and closed two doors. Passengers were encouraged to prepare token or exact coin, and push the get off bell to let the driver know. Bus stop stand were spreading to sell tickets, tokens, and drinks. 'Self' meant self preparation of token. But passengers were not ready to the rapid change. At first bus companies let the driver to take care of the change, but soon they adopted auto change releaser to prevent possible cut. Still the driver can control the bus once the bus leaves.

Bus card based on Radio Frequency Identification Card technology appeared in 1996 was another try to remove coin out of the bus. Passengers now own their own card to charge before they get on the bus. Bus stop stand prepared charger and some credit card companies provided pay-later services. This RF ID card was soon adopted in subway system. CCTV was introduced to record the fare box and the driver's life in 1997. This plan was delayed by harsh opposition from the labor unions. But the companies adopted allowance to ease the anger and drivers were persuaded. The allowance disappeared with the coming of IMF crisis, but the CCTV remained. Now the cut was quite lessened by the arrival of the bus card and CCTV. Passengers were slowly adapting themselves to the new system and the privacy of the passengers was threatened by the CCTV.

In July 2004, the mayor of Seoul declared the advent of the new Bus Management System. It reclassified all the buses into the 4 types, main, sub, round, and metro. It raised the basic fare, but reduced extra charge when transfer to another bus or subway. It made the bus companies under the control the city. Seoul Smart Card Company, which is in charge of all the system including reader charger, and relay become the center. Seoul city are distributing the fare based on the record and covering the loss. New RF ID card *T-money* appeared and are to be used in other shops to pay small amount of money. GPS made known the position of each bus. The driver is now fully under the control of the bus companies. The passengers are also able to know the expected time to wait. But there are also new difficulties. Kyunggi province bus cannot be merged with Seoul bus and the commuters are complaining about it. Passengers need to prove their status actively. They need to tell the driver how many are to get on and put the card on the reader when they get off to transfer. If they fail, the extra money will be charged. The risk of the company to lose extra charge on the long distance is minimized by preventing passenger with not enough money getting on the bus. Coins have been gone, but not entirely. Some passengers from other areas are still paying by coin with extra 100 won.

To sum up, *anneyang* were gone and the drivers are operating the new system with the help from the passenger with *T-money*. The drivers are not controlling the bus fully, but are under the control of the BMS with GPS and CCTV. Passengers are getting a discount, but also getting new responsibility to prove their status.

PCST NO.306

(FB7-15)

## AN ANALYSIS OF SECONDARY SCHOOL TEACHERS' PROFESSIONALISM FOR TEACHING ENVIRONMENTAL SUBJECTS

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The purpose of this research was to find out the problem areas to improve the quality of environmental subjects in secondary schools. A questionnaire survey and observation of class were conducted. A 5-point Likert scale self-evaluation questionnaire on their professionalism in environmental education was developed based on Hungerford et al.(1994)'s five evaluation areas. The questionnaire was responded by 249 junior high school teachers and 182 high school teachers from 34 schools in the City of Seoul and Kyunggi Province, Korea. The class observations consisted of actual classroom observations, videotaping, and interviews of two junior high school teachers. The survey analysis revealed that teachers evaluated their professionalism on environmental subjects to be about in the middle of the scale. However, the class observations revealed that there was a big gap between their self- evaluation of professionalism and their actual classroom application. The two interviewed teachers also admitted that although they knew the importance of environmental education, they were not confident in applying it in the classroom. The results of this research can serve as a basic reference in improving environment-related subject education.



PCST NO.312

(FB7-16)

### SELF-DIRECTED LEARNING THROUGH MOBILE LEARNING IN SECONDARY SCIENCE EDUCATION

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In this research, we try to improve secondary school students' self-directed learning skills, one of the 21<sup>st</sup> century skills, in their science education. For this, we used Tablet PCs(TPC) and PDAs as student's personal learning tools, specially TPC is for middle school student and PDA is for high school student. This research was related to government's initiatives for education innovation, "u- learning model school project in Korea " and we gathered the data from 2 schools(1 middle school and 1 high school) of total 9 u- learning model school.

This kind of learning environment, 1 student to 1 computer, helps student to get ownership of learning and then improve student's self-directed learning. At the first stage of this research, Mobile learning environment for using TPC and PDA at school was settled and professional development program for teachers was conducted. Next teachers analysed curriculum, identified good unit to apply mobile learning into their practice, and developed mobile learning usage models and unit plans. Moreover, some contents which could run on PDAs were developed. Students could use EBS VOD contents, Internet, MBL tools, some contents made by teachers, and programs & tools for their learning. This research was conducted from May to December in 2005. From this research, we find some potential of mobile learning to improve students' self-directed learning skills and motivation.

Keywords: mobile learning, 1 to 1 learning, technology, science education, self-directed learning.

PCST NO.300

(FB7-17)

### A COMPARISON STUDY ON ILLUSTRATIONS OF ELEMENTARY SCIENCE TEXTBOOKS IN KOREA AND USA

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The purpose of this study was to compare the illustrations used in elementary science textbooks of Korea and BSCS in USA, and analyze the types, role, and characteristics of the illustrations. We discussed the desirable direction for using the illustrations in the future science textbooks. For the analysis, we used 8 elementary science textbooks of the 7th curriculum of science education in Korea from 3rd through 6th grade, and 16 volumes (stage 2 to stage 5) used in BSCS in USA. We examined the illustrations' 5 types, including photograph, picture, graphic, cartoon, chart, and their 4 roles such as, motivation, introducing the lesson activity, providing the materials, and presenting the learning result. The results were as follows: First, textbooks in Korea had more illustrations, but Korean textbooks seemed to contain too much information in each illustration. Second, in Korean textbooks, there were less graphics and charts used compared to BSCS. Third, Korean textbooks have more photograph type of illustration than BSCS. Finally, there were many illustrations to describe students working together with the disabled children. Considering the findings in this study, we propose for desirable orientation for illustrations in our elementary science textbooks. First, types of illustration need to be more diverse. Second, the roles of illustration need to act as an effective motivator in a way of stimulating children's thoughts. Finally, when we construct the illustrations, it needs to pay attention to the alienated social class, attempting to consider all of the students.

Key words: science textbooks, illustrations, elementary science, Korea, BSCS

PCST NO.713

(FB7-18)

### INTERPLAY OF GESTURE AND SPEECH IN SCIENCE EXPLORATION

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The communications among people include both gesture (non-verbal component) and speech (verbal component). The gesture one person use can convey more important meaning than his/her speech. For example, a man can say to his girl friend "I love you" while he is looking another woman: then, he might want to say "I don't love you any more." Thus, we should focus both on the gesture and on the speech to unveil the communication process. In this study, we investigated the gesture and speech observed in a science exploration activity. This study presents fine-grained analyses of videotaped fragment of interactions among participants (middle and elementary students) in a science festival held by 'Teachers for Exciting Science' in Korea. Three cases of interplay between gesture and speech were found as follows. First, the gesture assisted the speech in the explanation. For example, the gesture shows an example of what the speech says. Second, the gesture has an essential role over the speech. For example, the speaker says 'the right angle' while he shows the specific angle with his arms. Third, the gesture is contradictory to the speech. We also found that with gesture (and speech) we can gain insight into student's knowledge (experience). This study suggests that more focus should be laid on the role of gesture in science education research.



PCST NO.542

(FB7-19)

The Scientific Culture Propagation for the Public:  
A Case Study on KIGAM Geological Museum and its Mineral Exhibition

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Minerals play very important roles in the exhibition contents of natural history museums. Minerals, the fundamental constituent materials of the Earth crust, are known to be more than 3,000 species. They are the main concerns of natural history museums in that they are aesthetically and academically important. 'Human and Minerals' is the main exhibition concept in the Geological Museum of Korea Institute of Geoscience and Mineral Resources(KIGAM). Minerals are exhibited in groups according to the crystal chemical classification so that the visitors can understand them systematically. They are also displayed for the visitors to understand their definition, characteristics and applications to human life. In addition to the systematic mineral exhibition, there are other facilities such as experience corners, mineral observation corners, etc. to help people understand minerals. The KIGAM Geological Museum's mineral section offers a criterion for mineral exhibition of natural history museums in Korea. KIGAM Geological Museum is now connecting people with geological sciences and assumes a main role in communicating with scientific museums in other countries. Thus, it is the key center for scientific culture propagation especially in geological fields for the public in Korea.

Key Words: Geological Museum, mineral exhibition, natural history museum, scientific culture propagation

PCST NO.675

(FB7-20)

SCIENCE MUSEUMS FOR ADULTS: TO MAKE PCST MORE SERIOUS

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Science museums are unique compared to any others such as art and history museums in that they are considered places mainly for children. However, although the visit to museums is often thought as leisure activity, science/natural history museums are also expected to have a serious responsibility to enhance the public communication of science and technology and promote environmental awareness. This paper argues that science/natural history museums have not made a substantial contribution on PCST because they are hardly taken serious in the society. Science/natural history museums have had an inner-tension due to the historical reason among museums, science and technology and nature. That is, in the West, modernity, while sacrificing nature, gave birth to both science and technology and public museums. Science/natural history museums as institutions for children have not had to deal with this dilemmatic reality. As an example, the analysis on *Biodiversity Hall* in the American Museum of Natural History demonstrates that museums fail to present science and technology in context related to environmental issues. This paper also proposes that science-related museums should function as social spaces for those who can actually make a decision in real world. To do so, science/natural history museums need to appeal mature audiences in two ways: they have to challenge modern ideologies such as globalization through deconstructive exhibits and create multifold stories based upon locality through reconstructive exhibits. The more serious science museums are, the more relevant PCST is to the society.

PCST NO.678

(FB7-21)

DEVELOPMENT OF INSTRUCTION-LEARNING MATERIALS  
FOR THE FIELD EXPERIENCE ACTIVITY AT ELECTRICITY MUSEUM

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We developed the instruction-learning materials for the field experience activity at KEPCO(Korea electric power corporation) Electricity Museum and had various funny activities for the students to be familiar with the concept of electricity.

This activity consists of 3-steps: preview learning about the field experience activity, field trip activity, and review learning, with linking the electricity parts in science curriculum. It was shown that the attended students played a leading part in activity in contrast with the other existing, common field trips.

It is well believed that the science knowledge by hands-on experience is maintained for a long time, because it is given by inquiring skill through direct seeing, observation and experiencing process from the field experience activity.

For the effective activity, it is necessary for students not to get unconditional observations, but to have guides on "what is that?" and "how to observation it?"

While accomplishing the research it is found that students did not think about exhibits with visual pleasures but try to think and observe them related with the concepts of science. Also they asked many questions about the exhibit. Since the interactions among students and those between student and teacher are increased during and after field trip, it is considered that teaching process was happened not by one way but two ways.

Our research suggests that we should offer them the opportunity about experiment, book, or worksheet related learning after museum visit, and the opportunity to get a learning impetus immediately, to realize the effective field experience activity. In conclusion, we propose that exhibition is not given with just a visual pleasure, but it should keep pace with expert's lecture or experiment.



PCST NO.342

(FB7-22)

### SCIENCE ON TV: ASSESSING EFFECTS OF DIFFERENT MEDIATION PROCESSES

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The communication of scientific subjects is more than the process of “supplying” citizens with information; therefore, this communication raises several issues that exceed the mere transmission of knowledge, such as the perception of science in the current world, the role played by the scientist in the society, the consequences of the scientific and technological development and opinion-making procedures towards science, among others. The understanding of mediation processes, implicit in this form of communication, is, therefore, essential for the study of public understanding of science.

The present paper contains an analysis of 179 science programs recorded in the months of November 2004 and February 2005 on Portuguese cable TV.

The development and application of an analytical grid, that illustrate different mediation processes of science communication on TV as well as the relation between those categories and the effectiveness and communicative quality of the science programs is presented.

PCST NO.670

(FB7-23)

### ANALYSIS OF STUDENTS' UNDERSTANDING OF DIGESTIVE ORGANS THROUGH STUDENTS CENTERED CLASSES

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The aim of this research is to confirm patterns of understanding of science highschool students, and how such understandings changed through a program in which students had to draw digestive organs. This lessons were designed students-centered and bidirectional communication between students or students and teacher. In the 1st lesson of 'drawing digestive organs', the students were asked to write and draw all the digestive organs they knew on a piece of paper to see how much they knew. In the 2nd lesson, the students were put into groups and asked to do the same job they had done separately in the 1st lesson on a larger piece of paper. In the 3rd lesson, the students corrected their mistakes using the given biology books, and in the 4th lesson, each group presented their work. The initial test showed that students differed a lot-some could remember most of the correct facts about the organs' structure and function, while others couldn't recall anything about such things. Even after the students centered and bidirectional communication program ended, there were some students still having the misconceptions of digestive organs unchanged.

**Index terms:** digestive organ, misconception, bidirectional communication, students centered program

PCST NO.221

### SCIENTIFIC CULTURE IN IBEROAMERICA - THE EXPERIENCE OF LIMA (PERU) SEMINAR: SCIENTIFIC CULTURE, SOCIAL PARTICIPATION AND DEVELOPMENT

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II World War promoted a new approach in science and technology. Since then science no more is something that happens and should be decided without the public participation. The cold war is in the past but should that science still be treated as a state secret or something that happens and is decided by having the public maintained at distance? The OEI (Organization of Iberoamerican States) just recently introduced in Iberoamerica studies in STS (Science, Technology and Society). In industrialized countries this is in discussion for about 30 years. In spite of this, is just in 2000 Lisbon Summit that European Union decided that the EU must grow to become the most dynamic and competitive knowledge society in the world. For this the PCST (Public Communication of Science and Technology) has an important implication. Scientific Culture as an object of study is something relatively new even in industrialized world. For this when the OEI promotes a seminar to discuss the scientific culture in Iberoamerica this is not something of small triviality. From November 14 to 18, 2005, thirty invited people from Iberoamerica, in particular from the South Cone and Andean Countries after a distance study by internet (from 1 to 30 of October) participated in a Seminar promoted by the OEI to discuss the Scientific Culture, Social Participation and Development in Iberoamerica. This presentaiion intends to share with the 9<sup>th</sup> PCST World Congress participants the results of the discussions of the Seminar about Scientific Culture in Iberoamerica such as a non-conclusive definition of scientific culture and its reasons, inconsistency of public politics in Science and Technology as a consequence of democratic political fragility in these nations.



PCST NO.282

## ADOLESCENT SCIENCE MUSEUM'S INFLUENCE ON BIONOMY EDUCATION

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21<sup>st</sup> century is an era of bionomy. Bionomy will lead the development of subjects as well as relative subjects. It's necessary for the society development to strengthen the widespread education of bionomy. In China, Adolescent Science Museum is an important part of national basic education. It's an institute of science spread for adolescents. It performs an important function. Bionomy education could strengthen science quality of adolescents. It lays the foundation of educating capable persons in bionomy developing.

Adolescent Science Museum services for schools, students, teachers as well as parents. It effectively integrate resoures of itself with resources of colleges, science research institute, factories, museums, natural reserves, scientists. It carries out different activities to different aged adolescents. The activities carried out in lectures, symposia, examining, etc. It spreads bionomy knowledge. It cultivates adolescents in examining, experiments, gathering, productions, growing, feeding, supervising, researching, etc.

It selected creative bionomy fans by competitions, exhibitions, subjects, subject studing groups, etc. Adolescent Science Museum has been becoming ideal platform for adolescent growing.

PCST NO.324

## THE OBSTACLES IN THE SCIENCE EDUCATION FOR THE YOUTH IN CHINA

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This paper shows many difficulties in science education for youth in China. The author thinks that these difficulties deal with the problems of formal education in China to some extent such as education oriented to examination. And this is the reason why there are too much initiatives aimed to reform the education in China. So, formal education is the one of the obstacles of science education for youth in China.

Second, the general public understanding of science affects the science education for education in China. For example, the different perceptions for the public understanding of science bring different ways of science education. As we know, the modem public understanding is different from the traditional public understanding. It is essential for the educators to rethink the future science education for youth in China.

PCST NO.681

## EFFECTS OF COLLABORATIVE LEARNING ON COMMUNICATION APPREHENSION, CLASS SATISFACTION AND ACADEMIC ACHIEVEMENT IN INTRODUCTORY ASTRONOMY COURSES FOR NON-SCIENCE MAJORS

Myung-Hyun Rhee,

Yonsei University

For the last few years, we have performed various Collaborative Learning (CL) sessions in the classes of Introductory Astronomy course for non-science majors at Yonsei University, Seoul, Korea. We present some results from these experiments mainly focusing on the effects of Collaborative Learning (CL) on university students' Communication Apprehension (CA), Class Satisfaction and Academic Achievement. The main results we found are as followings: (1) The amount of CA reduction is proportional to the number of CL sessions; The amount of CA reduction of the 9 CL students was much higher than that of the 0 CL (control group), 2 CL and 5 CL students. (2) The amount of CA reduction was greater with the higher CA students. (3) CA reduction effect was intact after a half year later. (4) Academic Achievement of the 9 CL students was higher than that of the 2 CL, 5 CL and control group students. (5) Students' Class Satisfaction also showed more or less the same results with Academic Achievement.



PCST NO.160

## COMMUNICATING THE WEATHER IN THE FACE OF SHIFTING CLIMATE AND LAND TENURE ENVIRONMENTS IN ZIMBABWE

Joel Chabata

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The traditional subsistent farmer in Southern Africa and indeed in Zimbabwe has minimally been dependent on weather information for planning and executing his farming activities. Recent land tenure reforms, coupled with the increasingly apparent effects of climate change, have posed a great challenge to the indigenous Zimbabwean who has been brought up in a small scale farming setup with very little regard to weather and climate information. Disseminating weather and other scientific information to the new and largely inexperienced large scale farmer is of paramount importance, if food security and the mitigation of adverse effects of extreme weather and climate occurrences are to be realized. National and international institutions and organizations operating in Zimbabwe are playing a pivotal role in communicating weather advisories, drought early warnings, crop yield estimates and providing other agrometeorological information. The Zimbabwe Meteorological Services, SADC Drought Monitoring Centre and the National Early Warning Unit are at the forefront in this endeavor.

This paper discusses the weather and climate information dissemination activities of these key institutions and organizations, and the various methods they are using, the inherent challenges they encounter in dealing with a previously less scientific farming community and the inroads they have made in recent years. Qualitative and quantitative assessments of the spatial and temporal trends in the embracing of and use of agrometeorological and other related information are given. Government response to weather information, seen in relevant policy formulations, is also examined.

# Joint Session

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## WB6 - Interfaces between Sciences and the Korea Society (Organized by The Korean History of Science Society)

PCST NO.475

(WB6-01)

### APPROACHING FOR KOREAN HISTORY OF SCIENCE AT ELEMENTARY EDUCATION IN KOREA

Myon U Lee

Chuncheon National University of Education

Korea has one national school curriculum to apply into and control all Korean schools from elementary to high school level in terms of education systems and its content. The 7th National Curriculum now in use was first announced publicly in 1997 and has been used since 2000. All kinds of textbooks in Korean elementary schools have been developed by the Ministry of Education according to the 7th National School Curriculum guideline.

This study: 1) analyzes the contents of Korean science history in the elementary school textbooks of both social studies and science under the 7th National School Curriculum; 2) discusses the possibility to teach Korean science history at elementary school level based on the clinical interview results with elementary school teachers; and 3) provides some teaching examples to teach Korean science history as an elementary school subject.

PCST NO.587

(WB6-02)

### EINSTEIN AND THEORY OF RELATIVITY IN KOREA DURING THE 1920 S

Zae-young Ghim

Faculty of Liberal Education, Seoul National University

In this paper I will discuss the public understanding of Albert Einstein and the theory of relativity in Korea during the period of Japanese Colonization, particularly in the 1920's. He and his theory were popular subjects both in journalism and in public lectures.

One of the first reports on Einstein by Korean journalism in 1921 was about his visit to the U.S.A. for campaigning of the establishment of Hebrew University in Jerusalem. After another report on Einstein's visit to Japan in 1922, Einstein became a celebrity in Korea. Einstein was frequently reported in Korean journalism, 58 times by *The Dong-a Daily* and 37 by *The Chosen Ilbo* before 1955. A series of public lectures on the theory of relativity followed. Choe Yunsik, a Korean mathematical physics student at Tokyo Imperial University, gave public lectures on the theory of relativity. Those lectures were a part of the movement for *Reconstruction (Gaejo)* during the 1920's and were related to *Establishing Movement for Civil University* against the education policy of Japanese Colonization Government. Chosŏn Education Association invited Einstein to Korea for promoting the education movement, but he never came. Hwang Jin-nam who met Einstein in Berlin in 1922 introduced Einstein and his theory in detail. He studied at University of California, Universität zu Berlin, and Université de Paris and was a member of the diplomatic committee for Korean Provisionary Government located in Shanghai. He wrote several articles on Einstein and the theory of relativity in order to encourage people's *will of independence* and not to be left behind other countries.

In sum, Einstein and his theory of relativity were well known in Korean and were related to Korea's culture movement and independence movement against the Japanese occupation.

PCST NO.635

(WB6-03)

### INNOVATING FARMING WITHOUT THE FARMERS:THE GOVERNMENT'S INITIATIVE IN THE " GREEN REVOLUTION " IN SOUTH KOREA, 1964 - 1980

Tae-Ho Kim

Seoul National University

South Korea achieved its self-sufficiency in rice in the mid-1970s. This has been usually regarded as a success of the global "Green Revolution," based on the adoption of new seed, named "Tong-il (reunification)." Government leaders in the 1960s eagerly tried to increase yield of rice, to feed the growing population of urban laborers. From 1964, Korean government sent agronomists to the IRRI (International Rice Research Institute) in Philippines, to cooperate with American experts. In the late 1960s, they developed a new variety "Tong-il," a hybrid of Indica and Japonica varieties.

Tong-il rice was not welcomed either by rural farmers or by urban consumers. The new seed, hastily introduced to fields, revealed itself as vulnerable to unpredicted plague, and required farmer's extensive care with new techniques. Moreover, the taste of Indica-originated rice was unsatisfactory to Koreans, who had long been accustomed to glutinous Japonica rice. As the farmers were reluctant to plant Tong-il, government used carrot and stick. The Agrarian Development Office mobilized its entire manpower, to appease farmers by incentives, or to enforce them by violent "guidance." As a result, Tong-il and its derivatives became dominant by the late 1970s, and South Korea's rice yield was increased by 30% in ten years. However, with the unexpected death of president Park and the end of his 19-years-long reign, Tong-il rice quickly disappeared from fields in the early 1980s.

I will argue that the fall of Tong-il rice was inevitable, because it was introduced not by the farmers' choice, but by the government's high-hand. The policy makers valued statistical figures most, and the farmers were treated merely as objects for instruction, or passive agents for fulfilling nationwide goals. In the midst of farming innovation, there was no room for the farmers' active engagement as informed citizens.



PCST NO.690

(WB6-04)

## GENEALOGY OF THE KOREAN NATIONALISM IN SCIENCE AND TECHNOLOGY

Jin Hee Park

Kookmin University College of Social Science Research Center of Social Science)

The Hwang's Affair shows that lay people in Korea understand modern science and technology as a symbol of the Korean nationalism. They argued that the scientific and technical know-how must be protected and promoted, even if the scientific results were manifested. The public understanding of science and technology in Korea differs from that of developed countries, in which modern science was established as a result of struggles with religious institutes. In Korea many intellectuals gave attention to the development of modern science and technology, in order to construct a modern Korean society after the colonial period. This resulted in the instrumental understanding of science and technology. Under the military regime the instrumentalism was enforced with the nationalism.

This article aims to configure the genealogy of the Korean nationalism in science and technology through the analysis of editorial pages. The selection of editorial pages covered the period from 1876 to 1990s and was originated from the national presses. The meaning of terms and the rhetoric with which science and technology was interpreted will be analyzed. This may show us the genealogy of the nationalism.

PCST NO.891

(WB6-05)

## SCIENCE IN PUBLIC: THEORETICAL TRENDS AND THE KOREAN CASE

Sung soo Song

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This paper examines theoretical trends and policy issues concerning science and public. The dominant perspective about it was changed from "popularization of science" to "public understanding of science(PUS)". PUS pays attention to active roles of public in the understanding of science based on the contextual model. And recently various concepts are attempted to complement PUS such as "heterogeneous PUS", "public understanding of research", and "public participation in science". PUS related activities in Korea can be analyzed using the concept of "science culture system". The characteristics of science culture system in Korea can be summarized as follows: Its purpose is confined to support existing national innovation system; Its actors have been unevenly and separately developed; Its material and institutional infrastructure is not sufficiently prepared; Its organizing mechanism is strongly influenced by government's execution power.

PCST NO.913

(WB6-06)

## VALUE-NEUTRALITY AND OBJECTIVITY OF SCIENCE DURING THE COLONIAL CHOSUN PERIOD

Sungook Hong

Seoul National University

My paper discusses how Korean scientists during the Japanese colonization period looked at various aspects of the Korean society under Japanese colonization. In particular, my paper will pay special attention to their ideas on the relationship between science, technology, and society. Many of the members of the Society for the Diffusion of Scientific Knowledge (SDSK), as well as the students of Keijo University, considered science to be value-neutral, or to be independent of social and political circumstances. Members of the SDSK, therefore, supported the policy of industrialization by the Japanese government-general, largely because they thought that industrialization could foster the development of science and technology. Since Korean students at Keijo University viewed that science and technology were universal and international, they thought that they could, and should, cooperate with Japanese scientists and engineers. I will show that their idea that scientific knowledge and activity are neutral and independent of society constituted an influential image of science even after the colonization period.



PCST NO.922

(WB6-07)

### SCIENTIFIC RESEARCH AS VALUE -LADEN ACTIVITY: THE CASE OF NT STEM- CELL RESEARCH IN KOREA

Sang-Wook Yi

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Scientists tend to describe scientific knowledge as value-neutral. They usually love the homily of 'two-edged knife'. A knife can be used either to kill people (by a robber for instance) or to save people (by a doctor for instance). Just like a knife, scientific knowledge can be used either for good causes or for bad causes, depending on who are using it. Similarly, ideal scientific research is usually envisaged to be value-free. In order to produce untainted, value-neutral knowledge, researchers should execute their research in a 'pure' setting without any particular value-laden agendas. Good scientific works must (and can) be distinguished from bad ones by judging their faithfulness to this ideal of value-free research.

The recent scientific fraud case of Dr Hwang's stem-cell research team raises a number of controversial issues related to this ideal. Scientists tend to focus on 'immoral' conduct of data fabrication, suggesting Dr Hwang's 'impure' connections with politicians. They also love to emphasize the defects of government-driven science policy, and ask for more freedom in utilizing public fund for their 'pure' research. Although these claims have some points, the paper argues that Dr Hwang's case also vividly shows how the intricacies of scientific research are highly value-laden in various ways; epistemologically, socially and institutionally. It also claims that neglecting the value-laden nature of scientific research will hinder tackling the problem of scientific fraud.

PCST NO.1091

(WB6-08)

### SOCIAL CONSTRUCTION OF “ AVOIDANCE OF S&T ” AND THE KOREAN SCIENTIFIC COMMUNITY

Eun Kyoung Lee

CHONBUK National University

This paper analyzes the socially constructing process of “avoidance of S&T” throughout 2002 in Korea, and argues that the Korean S&T community is not homogeneous and consists of many subgroups with different interest. The discourse of “avoidance of S&T” was begun with the first notice of the rapid decrease in applications of Korean SAT for S&T majors in the middle of 2001. The decrease was interpreted as a warning sign of the avoidance of S&T among teenagers and developed into the avalanche of discussions on the causes of such rapid decrease around the end of the year.

Through 2002, the “avoidance of S&T” was developed into a general policy agenda covering most of problems in S&T, not a teenagers' issue any more. Many scientists and engineers claimed that their own difficulties and problems be the main causes of it. In the name of measures to overcome the avoidance, they requested the government to solve their problems and to accept their demands. With the analysis of those claims, we can understand how a policy agenda is shaped and what the Korean S&T community is like.



TA2 - Science Education as Communication  
(Organized by Korea Association for Research in Science  
Education (KARSE))

PCST NO.102

(TA2-01)

EXPLORING POSSIBILITY OF DEVELOPING INDIFFERENT GROUP-DRIVEN SCIENCE  
COMMUNICATION ACTIVITIES AND ITS IMPLICATION TO SCHOOL SCIENCE  
TEACHING

Masakata Ogawa  
Kobe University, Japan

While the concept *communication* generally presupposes mutual exchange of *information* between relevant actors, the concept, *science communication* implies a certain unique asymmetry in terms of *information* respective actors possess. Actors from science community, and also in some cases, those from facilitators or communicators' group, are believed to be 'superior' to those from *lay public* in terms of scientific knowledge. This is the very main reason why most prevailing science communication activities are usually initiated or triggered by the pro-science group. Few activities are developed from general public. If activities of *science communication* must aim at real *communication*, much more efforts should be made to encourage 'counter-development' of science communication activities initiated and driven by consumers of scientific and technological knowledge or *lay public*. When these counter-activities be developed, publicized and popularized in addition to the now-already-prevailing activities from pro-science group, 'science communication' might achieve a real *communication* between relevant actors. In this paper, the author challenges and explores possibility to develop *indifferent public* driven science communication activities. And in addition, he argues that the resultant ideas directly mirror possibility of revision of current practices in science teaching in school settings.

PCST NO.236

(TA2-02)

EDUCATIONALLY MEANINGFUL COMMUNICATION IN NATURAL HISTORY  
MUSEUMS

Chan-Jong Kim  
Seoul National University, Korea

The exhibits in natural history museums are expected to communicate to visitors educationally meaningful way. Two major natural history museums in U.S., Smithsonian Natural History Museum and American Natural History Museum, were explored in terms of content-wise connections between school science and museum exhibits. Among several science disciplines, earth science is one of the most interactive subjects with natural history museum. Earth science curriculum based on Third International Mathematics and Science Study and National Science Curriculum Standards (1996). Exhibition characteristics related to better communication in science were also investigated: types of activities, exhibit media, exhibit technology, and exhibit presentation methods. Natural history museums as an informal educational institute were sought for its relevance and potential through this study.

PCST NO.278

(TA2-03)

HUMANIZING SCIENCE WITH CONTEXT: SOME CONTEXT-RICH APPROACHES TO  
TEACHING PHYSICS

Jinwoong Song  
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The school science is often criticized as being too remote from learners' interest and needs. Although science is mainly taught based on textbooks inside classrooms, the learning of science can not be confined to the boundaries of curriculum and school. Firstly, this paper reviews briefly and characterizes the historical development of science education with a series analogies, and then suggests a new analogy so-called 'Hearts-On' science education which emphasizes the humanistic aspects and the context dimension of science education. Secondly, it critically examines how much traditional school science, particularly physics, teaching is limited in terms of the context of learning (i.e. textbook, laboratory, classroom, local, and global) as well as in terms of the context of contents (i.e. physical, personal, social, and global). Thirdly, some recent attempts initiated by the author and colleagues are explained as the examples of the Hearts-On science education. Especially, a series of community-based science programs led by SNU and the development of the books of 'Contextual Physics' (i.e. Body Physics, Wearing Physics, Dining Table Physics, and Sports Physics) are outlined with their processes and outcomes. It is hoped that these attempts help us reconsider what would be the goals of science education and how we could expand the world of science education beyond the boundaries of curriculum and school.



PCST NO.280

(TA2-04)

## THE NATURE OF SCIENCE DRAMA IN SCIENCE EDUCATION

Hye-Gyoung Yoon

Chun-cheon National University of Education

The use of educational theatre has been studied and developed mostly in language education in Korea. With emphasis on scientific literacy and STS movement, its possible use in science education was increased. This paper is a reflection on the meaning of effort incorporating drama in science education by figuring out characteristics of drama.

As introduction, it is shown that there could be many kinds of science drama science educators can use, then as its main feature 'story' and 'live-ness' are pointed out. The 'story' of science drama enables empathetic learning, the 'live-ness' arisen from present action of participants facilitate students' participation and interaction with the story. These characteristics can contribute humanistic approach in science education still have challenges for science educators how incorporate distinctive science knowledge into humanistic educational aims. The practical use of science drama as a teaching tool, a learning process, assessment tool will be proposed with exemplar.

**Keywords:** science drama, story, live-ness, science education

PCST NO.350

(TA2-05)

## EXPLAINING EVOLUTION IN SCHOOLS AND IN NATURAL HISTORY MUSEUMS: WHAT IS THE ROLE OF NATURAL HISTORY MUSEUMS IN SCIENCE EDUCATION ?

Sun-Kyung Lee<sup>1</sup>, Heui-Baik Kim<sup>2</sup>, Jung-Narn Song<sup>2</sup>, Joo-Hye Jung<sup>3</sup>, Chan-Jong Kim<sup>2</sup>,  
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Students have difficulties in learning 'evolution' which is one of fundamental concepts in biology, not only because it has an abstract nature but also it is neither described appropriately in textbooks nor provided with concrete experiences for students. This study explores the way of explaining evolution in and out of schools in Korea and the U.S. through analyzing the contents in biology textbooks and exhibits directly related to evolution in natural history museums of both countries. The results showed the biology textbooks were deficient in inquiry activities to help students' understanding the evolutionary processes or the concepts themselves, and mainly devoted to give lists of simple scientific facts related to evolution. On the other hand, natural history museums such as the Smithsonian natural history museum and the American Museum of Natural History in the U.S. started the quest with questions related to evolutionary concepts or processes. Then, it provided how scientists have solved them and how evidences supported the theories through fossil records, diorama, biological models, photos or pictures, and panels for explaining. However, natural history museums in Korea such as Seodaemoon Natural History Museum and Gyeryongsan Natural History Museum had a limitation to explain evolution. This study suggests how natural history museums in Korea can compensate for school science education based on the analyzed results of explanatory structure of evolution.



## FA6 - Bioethics and Journalism (Organized by Korean National Commission for UNESCO)

PCST NO.879

(FA6-02)

### BIOETHICS AND MEDIA'S RESPONSIBILITY -- A CHINESE PERSPECTIVE

Xiong Lei  
Xinhua News Agency

Media have been enthusiastic in following life sciences, especially as it is claimed that life sciences are to lead to major breakthroughs in the 21<sup>st</sup> century. A popular statement in China since the turn of the century has been that the 21<sup>st</sup> century belongs to life sciences.

A striking contrast to this enthusiasm is media and society's alienation to or even ignorance of the ethical principles life sciences research must observe. On various websites, news stories about new discoveries and achievements in life sciences far outnumber those about bioethics.

There have been talks about bioethics, but up to late 2000, such discussions in China were by and large confined to the academic circles of ethicists themselves.

Along with the inadequate media coverage of bioethics are violations of ethical principles or even human rights in the field of research.

Exploration in life sciences is no longer purely for lofty scientific goals but can be profit driven. As the research involves human bodies and organs, it can no longer be exclusively academic, either. Media must be concerned with ethics in life sciences research and have a big role to play in reminding researchers of bioethics, in seeing to it that their research is decent and on the right track, in alerting the public to their rights and keeping them informed.

In this context, media are obliged to extend knowledge of bioethics to the public and the raise public awareness of bioethics can promote the research in life sciences towards the right direction.

PCST NO.962

(FA6-04)

### BIOETHICAL DEBATES ON EMBRYONIC STEM CELL RESEARCH IN KOREAN NEWSPAPERS

Bang-Ook Jun, Manjae Kim  
Kangnung National University

This paper analyzes chronological changes regarding embryonic stem cell bioethics, by using 1,625 newspaper article contents between January 1, 2000 and February 3, 2006. For this purpose, it first divided the whole period of analysis into eight phases according to major events.

Results show that the media portrayed more positive contents than negative ones over the time period. In terms of issues, it is noticed that egg donation, cloning, and religious concerns were the most frequently mentioned issues. Table 2 also shows that, in spite of some exceptions, issues generally became more specific in later phases than before.

It is also found out that Hwang was the most influential source of information except journalists. Considering journalists represent the group of reporters from various newspapers, it is hard to ignore Hwang's incomparable power over the media.

Although Hwang's scandal provided an opportunity for the Korean people to realize the importance of bioethics, the Korean society lost a series of opportunities to reach an agreement regarding bioethics. Considering these limitations, this paper suggests the cooperation between bioethicists and science reporters to avoid another scandal in the future.

PCST NO.1326

(FA6-05)

### THE STEM CELL CONTROVERSY AND THE ROLE OF SCIENTIFIC JOURNALS AND THE MEDIA IN THE PUBLIC COMMUNICATION OF SCIENCE

Edna Einsiedel  
University of Calgary

The system of knowledge dissemination includes formal scholarly channels as well as public communication channels such as the media. The processes of knowledge production and dissemination are more clearly illuminated under conditions of controversy. This paper examines the complementary roles played by the press (looking at elite papers in Canada and the U.S.) and two scientific journals, *Science* and *Nature*, as they covered the controversy trajectory of South Korean scientists Woo Suk Hwang and his research team, from their publication of seminal research on the derivation of stem cells from cloned embryos to the retraction of these papers based on findings of fraudulent data and ethical breaches. The paper suggests that the communication system in the age of big (and controversial) science is an interdependent network of information exchange, making it difficult for scientific knowledge production to take place as a process separate from and independent of this interdependent dissemination network.



PCST NO.847

## REPORTING ON BIOSCIENCE IN THE GERMAN MASS MEDIA

Hae Ryong Song  
SungKyunKwan University

On 19th May 2005, a South Korean team of stem cell researchers, headed by Prof. Woo Suk Hwang of the Seoul National University, had announced their success on producing embryonic stem cells through cloning body cells of medical patients by publishing an article in Science magazine. This news from Seoul had an impact on the German political system and had resolved its public controversy on the production and on the use of human embryonic stem cells. The Korean scientific success was heavily covered by the German news media and seemed to be the starting signal for a new phase of the German stem cell debate, which could have lead to a revision of the current legal regulation on stem cell research in Germany.

As Professor Hwang's stem cell research data became proven to be academically fabricated, German news media showed its critical stance towards the issue. Compared to its previous favourable attitude towards the success, it started to stress moral and ethical values of biotechnology. Therefore, the viewpoint on how German news media reported the Hwang's fabrication of data arouses our concern greatly. This paper presents an analysis on the transition of the Korean stem cell research, which had once been praised as "Another Sputnik Shock from Korea" .

keyword: stem cell, biotechnology, german news media, ethical values of biotechnology



**FC4 - Science Communication and Women  
(Organized by Korean Federation of Women's Science and  
Technology Associations)**

PCST NO.240

(FC4-01)

**KOREAN WOMEN' EXPERIENCES WITH SCIENCE ACTIVITIES AND THEIR NEEDS  
FOR SCIENCE PROGRAMS**

Moo-Suk Min (Korean Women's Development Institute)  
In-Sook Yang (Korean Women's Development Institute)

This paper reports the results of the survey of 1,104 mothers of elementary and middle-school students and 174 female science teachers and researchers in Korea to assess their level of understanding of science technology in general and their experiences and needs for science programs. It was found that Korean mothers were neither substantively understanding science technology, nor had sufficient opportunities to participate in science programs or activities. Especially, female science teachers and researchers wanted to have more opportunities to participate in the activities related to science culture popularization..

Key words: women, scientific culture, science programs

PCST NO.438

(FC4-02)

**SCIENCE PROGRAM FOR GROUPS OF MOTERS AND THEIR CHILDREN**

Miok Mum Heisook Lee  
Ewha Womans University, Ewha Womans Universtiy

We introduce 'work in turn for one another' (Pumaci in Korean) program for mothers and their children to whom science and mathematics is easily accessible. This program has following characteristics:

- Representatives of each group of 3 to 5 mothers and their children visit University once a month and do interdisciplinary experiment to conduct the experiment for their group once a week.
- Each group post their work of experiment on the wise-mom website and they learn each other great deal. WISE center give them feedback. Mothers can use high technology freely for learning and teaching their children.
- Women understand science and technology better and would guide their children into the related fields better.

We present some statistics of the program including the changes of participants' attitude. Effects of group activities and relationship b/w mom and children will be discussed. We also introduce some comments from the participants.

PCST NO.449

(FC4-03)

**FRIENDLY EDUCATION ON MATHEMATICS AND SCIENCE  
FOR GIRL STUDENTS**

Ju-Young Kim  
Catholic University of Daegu, Korea

In Korea, we have ten WISE centers. WISE is an abbreviated form of Women Into Science and Engineering. These centers are supported from Korea Government. In Daegu/Gyeongbuk WISE center, one among those ten centers, we have various programs for women students. One of those is a program called Mobile Science Laboratory. For this, volunteers visit girl schools and make experiments on science or mathematics with girl students. The contents of these experiments are on mathematics, biology, chemistry, earth science, physics and engineering. Materials for experiments are very closely related to real life.

During vacations, two interesting programs are carried out. Those are 'Science & Mathematics Camp' for middle school girls and "Research Camp" for high school girls. Science & Mathematics Camp is usually held in Universities for three days. On the other hand, Research Camp are made in Catholic University of Daegu for five days. After five days' experiments high school girls write mini-dissertations about the experiment results under the volunteers' guidance.



PCST NO.433

(FC4-04)

### NETWORKS FOR WOMEN IN SCIENCE AND TECHNOLOGY IN KOREA

Ji-Young Kim  
Kyung Hee University

Networks for women in science and technology are facing new challenges, which demand participation of wide spectrum of organizations and individuals at all levels to promote women's role. A number of Women's associations have been established since early 1990 in Korea to meet such challenges, which include The Association of Korean Women Scientist and Engineers, Women Bioscience Forum, Women in Nuclear-Korea, The Women Information Scientist Association of Korea, and Korean Women in Mathematical Sciences and many others. Korean Federation of Women's Associations in Science and Technology (KOFWST: <http://www.kofwst.or.kr>) was founded in October, 2003 to improve women's visibility from Forums, Associations, and Societies for women scientists and engineers in Korea. KOFWST is growing rapidly and is comprised of 16 Women Associations from metropolitan and local areas of Korea having over 13,000 members from the Associations in 2005. Mission, roles and activities of KOFWST will be introduced together with its successful cases. Women Forums, Associations, and Societies belonging to KOFWST and their activities will be presented as well.

PCST NO.436

(FC4-05)

### BUSAN CAMPAIGN FOR PROMOTION OF SCIENTIFIC AWARENESS IN YOUTH

Kyung-Ja Ha  
Pusan National University

In regional institutes needs of a proper mentorship system is hard to answer because of limited research infrastructure and human resources. When mentoring programs started accumulating public recognition, 'mentees' had to be specified and 'mentors' provided. In the city of Busan, a city-run program named BWSE (Busan Women into Scientist & Engineer) was launched in 2002 with a purpose of rousing scientific interest (rather than creativity) in young female students. Two types of mentoring classes were created: One is an open and moving laboratory program and the other one is a continual mentoring program. 'Open' and 'moving' laboratory programs mainly consists of experience visits to contemporary laboratories and field trips to local natural habitats. Continual mentoring programs (also known as 'Kids-Moms class') are curriculum-based and center on the ability to express one's ideas and to probe into the mechanisms behind phenomena. Busan has large of female students due to a cultural tendency, and to meet their need the "Three-Track Career Development Program" was established to aid in improving job interview skills, identifying possible careers, and acquiring leadership and relationship skills. E-mentoring and teletutoring services are planned for launch in 2006. But no matter how well things seem, more resources need to be put into developing mentors and mentoring programs.

PCST NO.434

(FC4-06)

### DISSEMINATION OF SCIENCE CULTURE BY SCIENCE CLASS PROGRAM

Kyung-Suk Cho  
Ewha Womans University

Science culture is a key word in the 21<sup>st</sup> century, a century of scientific and technological revolution. Science culture can be defined as a complex of values, attitudes and way of life regarding science and technology, shared by the members ora society. It refers to an atmosphere where citizens apply science and technology to their thought and behavior, not just understand and value them. It serves as a catalyst to the construction of an advanced, multi-faceted culture, incorporating itself into other fields such as politics, economics and society. It is very important to pay more attention to science culture, which is progressively raising the quality of our lives to a higher level. A Science Class Program is one of Science Korea Programs supported by Korea Science Foundation (KSF). A variety of activities and events has been carried out to facilitate easier but greater understanding of science and technology, making them fun and interesting to the general public. In this presentation, various activities in a Science Class Program will be introduced.



PCST NO.620

(FC4-07)

### FOSTERING THE SCIENCE COMMUNICATION TO THE PUBLIC THROUGH THE NIST - WIST SCIENCE COMMUNICATORS TRAINING PROGRAM

Dr. Ju-Young Min

National Institute for Supporting Women in Science and Technology (NIS-WIST), Korea  
SCTP (Science Communicators Training Program) Scheme by  
Prof. Jhon, Gil Ja, Director General, NIS-WIST  
Prof. Lee, Hei Sook, Director, Main Center of WISE  
Prof. Lee, Kong Ju Bok, Chair of the Planning and Coordination Committee, NIS-WIST  
Ms. Kim, Young Sook, General Manager, NIS-WIST

The National Institute for Supporting Women in Science and Technology (NIS-WIST) of the Republic of Korea has been running the "Science Communicators Training Program (SCTP)" since its launch in February 2005. The SCTP is comprised of courses focused on enabling women with advanced science and engineering education including unemployed, returning and retired with skills such as basic science, perception and psychology pedagogy and performance planning and writing, through which they can convey their scientific knowledge to the public. Over fifty people have completed the courses throughout its two runs in 2005, of which 42.9% are comprised of masters and doctoral degree holders. Currently, 85.7% of graduates are employed, of which 81% have been given the opportunity to create a new position called 'SC (Science Communicator)' in various institutions backed by the recommendation of the NISWIST.

It is our anticipation to discover highly-educated women in the science and technology(S&T) field, enabling them to enter and actively progress in S&T careers as their contributions are also committed for the spread of science popularization and fostering the public understanding on science.

PCST NO.437

(FC4-08)

### BEING A SCIENCE COMMUNICATOR IN THE SCIENCE KOREA PROGRAM

Jong-Sook Won

Korean Federation of Women's Science and Technology Associations

My Personal Experience will be introduced as a science communicator after retrained through WISE Science Mom Academy, which is similar to the team teaching program Madam Curie once employed for her children. I further participated in the science communicator-training program run by NISWIST(National Institute Supporting Women in Science and Technology).

I received Ph. D. degree in food and nutrition and worked as a lecturer once. Through this retraining program my career path changed to science communicator. Now I develop science contents and conduct lab work for K1-K6 students in Science Korea Project.

My experience as a lab instructor and the effect of Science Korea Program will be discussed.

PCST NO.440

(FC4-09)

### WOMEN AND INVENTION: INFUSING MODERN FUNCTIONAL ELEMENTS INTO TRADITIONAL KOREAN DIET

Young-Keun Lee

Korea Women's Inventors Association

The dietary life that is important for health and longevity builds up a unique food culture by regional, climatic, economical, and cultural conditions. Koreans have enjoyed various cereal and vegetable-centered traditional food, especially fermented foods like Kimchi, Doenjang (soy bean paste), and salted fish.

Koreans have regarded food as medicinal herbs, which is represented by the phrase, "Yak-Sik-Dong-Won". Some medicinal herbs have been particularly used as important culinary ingredients.

Although the superiority of Korean traditional food such as fermented food and slow-food are being emphasized to the new generation, their food habits which have already been familiarized to the western fast food are difficult to change. It is said that SARS and mad-cow disease couldn't affect Koreans because of our food habits enjoying traditional fermented food such as Kimchi, Doenjang and Gochujang etc.

I have been interested in Korean traditional food which is good for health and help heal the disease, and felt the time has come to modernize and industrialize it. I have developed an upgraded food by adding new functional ingredients from many kind of wild edible greens, original Korean vegetables and improving their taste and nutrients through various experiments. I have got a patent of them and made pilot products by cooperating with small and medium enterprises. My inventions have been put to practical use and I believe that the food has contributed to people's health and Korean traditional food industry.

I also organized a "Traditional food researching circle" in our college, which is a venture circle. As the advising professor for that circle, I have coached them to develop new Korean traditional food through the discussion about traditional food.

If you need anything, don't only think about it, make what you think through the experiments many times. Invention is not difficult. "Thinking is matter." Bringing up the first idea and finding affirmative methods, and practicing them, those make inventions.



PCST NO.624

(FC4-10)

NICOTINE DEPENDENCE, SMOKING-RELATED ATTITUDE, SUBJECTIVE NORM, AND  
FAMILY SUPPORT ACROSS THE STAGES OF CHANGE FOR SMOKING CESSATION  
AMONG KOREAN RURAL ADULT SMOKERS

Nam Sook Seo  
Dongshin University

**Objective:** The purpose of this study was to identify nicotine dependence, smoking-related attitude, subjective norm, and family support across the stage of change for smoking cessation among adult smokers at G district in Jeonbuk province.

**Methods:** The subjects were 276 current smokers (male = 243, female = 33) classified from district-wide sample survey (1,065 respondents) for health promotion project from Feb 12<sup>th</sup> to March 5<sup>th</sup> 2004. The stage of change for smoking cessation was divided into three: pre-contemplation, contemplation, and preparation. Fagerstrom Test for Nicotine Dependence was consisted of 6-items ( $\alpha = .62$ ), test for smoking-related attitude was 5-point 15-items ( $\alpha = .71$ ), for subjective norm was 7-point 2-items ( $\alpha = .61$ ), and for family support was 5-point 16-items ( $\alpha = .76$ ) summated scales. Data were collected by interview or self-reported, and analyzed with frequency, percentage,  $\chi^2$ -test, ANOVA using SPSS-PC program,

**Results:** According to the stage of change, 114 (41.3%) were in pre-contemplation, 110 (39.9%) in contemplation, and 52 (18.8%) in preparation. Male were more preparatory to stop smoking ( $\chi^2 = 8.99$ ,  $p = .011$ ) and the group of ever-attempted to quit smoking were also more in preparatory ( $\chi^2 = 19.17$ ,  $p = .001$ ); but the support to quit smoking from others were more in pre-contemplation group ( $\chi^2 = 6.67$ ,  $p = .036$ ) than the others. Smoking-related attitude ( $F = 7.43$ ,  $p = .001$ ) and subjective norm ( $F = 27.40$ ,  $p = .001$ ) were affirmative increased, but family support were rather decreased by the stages of change for smoking cessation.

**Conclusion:** Based on these findings, the authors recommend that further study to develop more valid instruments, and community- based smoking cessation program be implemented to preparatory and male groups primarily and develop the way how to provide continuing support to those who are all current smokers regardless their stages.

*Key words: stage of change, nicotine dependence, subjective norm, smoking cessation*

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# WHO is in PCST SCIENTIFIC COMMITTEE



**Prof. Vladimir De Semir**  
**Commissioner for Scientific Culture,**  
**Barcelona City Council/Pompeu Fabra University, SPAIN**

Prof. De Semir is the Commissioner for Scientific Culture in Barcelona City Council. He is also an Associated Professor of Scientific Journalism and Director of the research centre Science Communication Observatory at the Pompeu Fabra University. He is a Member of the European Network of Science Communication Teachers (ENSCOT) and the European Science Communication Network (ESCONET). In 1994, he was granted the Scientific Journalism award by the Consejo Superior de Investigaciones Cientificas.



**Prof. Hak Soo Kim**  
**Co-Chair, Local Organizing Committee of PCST-9/Sogang University, KOREA**

Prof. Kim, the Dean of College of Communication at Sogang University, Occupies several positions in Science society, such as Co-chair of Citizens' Coalition for Scientific Society. He was appointed as a Member of the Korean government's National Science & Technology Council. He has published numerous articles and three books in Korea. Notably, he was awarded Order of Science & Technology Service Merit, Woong-bi Jang, from Korean government in 2001.



**Prof. Pierre-Marie Fayard**  
**Chair Professor, University of Poitiers/**  
**Director, France-Brazilian S&T Documentation Center, BRAZIL**

Prof. Fayard is the Chair Professor from the University of Poitiers (France) and the Director of the France- Brazilian S&T Documentation Center, Sao Paulo. Before, he was a Visiting Professor in Spanish Universities Pompeu Fabra and taught history and strategy of PCST. He was the Co-creator of the Labcis (Investigation laboratory for PCST) in the University of Poitiers, then the director from 1993 to 2004. He was in charge of the first PCST Conference in 1989 and became the first President of the International PCST Network. He is also a Co-creator with Suzanne de Cheveigne of the ISME (information Scientifique, et Medias Europeens) European Network. He gave lectures and published papers in diverse countries.



**Mr. Toss Gascoigne**

**Executive Director, Council for the Humanities, Arts and Social Sciences (CHASS), AUSTRALIA**

Mr. Gascoigne is the Executive Director of the Council for the Humanities, Arts and Social Sciences (CHASS), a non-government organization which represents the interests of Australians working in the humanities, arts and social sciences. Until 2004, he was the Executive Director of the Federation of Australian Scientific and Technological Societies (FASTS). He has since 1993 run training workshops (in conjunction with Jenni Metcalfe) for scientists, to help them improve their skill in dealing with the media and to improve their public speaking.



**Ms. Marina Joubert**

**Director, Southern Science, SOUTH AFRICA**

Ms. Joubert is in the Advisory Council of South Africa's National Science and Technology Festival (SASOL SciFest). After more than 17 years in South Africa's corporate science environment, she has launched the country's first dedicated science communication consultancy. She is interested in training and mentoring science journalists, as well as in helping scientists with communication and media skills. She is engaged in a wide range of science communication initiatives in South Africa, including public engagement programmes in fields where South Africa holds a particular geographical advantage, such as Astronomy and Space Sciences, Palaeontology, Biodiversity and Antarctic Research.



**Prof. Bruce Lewenstein**

**Associate Professor of Science Communication, Cornell University, USA**

Dr. Lewenstein is the Associate Professor of Science Communication at Cornell University. At Cornell, he is on the advisory board of the Science center. He is a member of the executive committee of the CALS Faculty Senate, Co-chair of the "Ethical, Legal, and Social Issues" Committee of the New Life Sciences Initiative and National Coordinator of the "Social and Ethical Issues" component of the National Nanotechnology Infrastructure Network at Cornell. Formerly, he was an Editor of Public Understanding of Science. At heart, he is a historian, but his overall work focuses on both historical and contemporary issues involving the public understanding of science.



**Mr. Rick Borchelt**

**Director of Communications, Genetics & Public Policy Center, Johns Hopkins University, USA**

Mr. Borchelt is a Communications Director for the Pew-funded Genetics and Public Policy Center at Johns Hopkins University. He has had a varied career in science communications and science public policy, including stints as a media relations director for the National Academy of Sciences, a Press Secretary for the U.S. House of Representatives Committee on Science, Space and Technology under the chairmanship of the late Rep. George E. Brown, Jr., a Special Assistant for Public Affairs in the Executive Office of The President during the Clinton Administration, a Director of Communications for the Department of Energy's Office of Science and a Director of Communications and Public Affairs at the Whitehead Institute for Biomedical Research at MIT.



**Prof. Massimiano Bucchi**  
**Professor, Universita' di Trento, ITALY**

Prof. Bucchi is the Associate Professor of Sociology of Science and Sociology of Communication at the University of Trento. He is a Founder and Member of Observa-Science in Society, a non-profit organization and research centre that intends to create a bridge between scientific research, political decisions and public opinion. He has carried out research and given seminars at several universities, such as Sussex University, Universitat Bielefeld, ETH Zurich, University of Wisconsin, University of Edinburgh Science Studies Unit, University of Tokyo and the Museu da Vida Rio de Janeiro. He has taken part in many international evaluation and advisory boards for institutions including the European Commission and the US National Science Foundation. He received Lelli prize for the best dissertation in sociology.

**Ms. Paola Catapano**  
**CERN, SWITZERLAND**

Dr. Catapano worked as a simultaneous conference interpreter and translator specialized in scientific terminology until 1990. That year she started working at CERN as personal assistant to the Director General of the organization, Nobel laureate Carlo Rubbia. She was leader of visits and exhibitions until 2002 in the same institution, and currently she's working in Events and Sponsoring and is a leading member of the Liveform CERN Multi-media Productions Group. As PCST member, she was invited to speak at the UNESCO World Conference on Science in Budapest in June 1999. She has published several scientific articles in Italian magazines and newspapers such as Galileo, Newton and La Stampa.



**Dr. Donghong Cheng**  
**Executive Secretary, China Association for Science & Technology, CHINA**

Dr. Cheng has been the Executive Secretary of China Association for Science and Technology (CAST) since June 2001, a non-governmental organization of Chinese scientists and engineers. Before, Dr. Cheng had been a Director-General of the Department of Science Popularization of CAST from 1999 to 2003 and a Director-General of the Department of Children & Youth Affairs of CAST from 1984 to 1999. Dr. Cheng is now taking the leadership of many national initiatives, such as the Chair of the Internet Science Communication Alliance of the Internet Society of China, and is the national focal point of the Asia-Pacific Network on Gender, Science and Technology of UNESCO. She is also a Member of the Executive Board of All China Women's Federation and a Board Member of the China Association for Science Instructors.



**Dr. Sook-Kyoung Cho**  
**Korea Science Foundation, KOREA**

Dr. Sook-kyoung CHO is the head of the Department of PR & Media (&Int'l Cooperation) at Korea Science Foundation. She is a board member of the Korean History of Science Society and Korea Association for Research in Science Education. She translated several books on history & philosophy of science: *Man Masters Nature*, *Patterns of Discovery*, *Dating Game*, etc. Also she wrote articles on scientific culture & public understanding of science in Korea. After she wrote her Ph. D thesis on 'The Special Loan Collection of Scientific Apparatus, 1876: The Beginning of the Science Museum of London and the Popularization of Physical Science', she has been a part-time lecturer in Seoul National University & Sogang University. Her main interest is informal science education through science museums.



**Dr. Michel Claessens**

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Dr. Claessens, a Deputy Head of the Unit Information and Communication in the Research Directorate-General, has been a free-lance scientific journalist since 1980. He has an extensive professional track record in science information and communication. His main responsibilities concern the organisation of major conferences and the Eurobarometer surveys on science and technology. He is also an Editor-in-chief of the RTD info magazine. He has worked successively at the Free University of Brussels, Department of organic physical. He has published 25 scientific articles and over 200 science popularisation articles on science and technology.

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Dr. De Cheveigne is a Researcher at the CNRS in the Science-Technology-Media and Society Field. She's also a Visiting Professor of the University of Geneva and Expert for the European Commission (Science and Society). She is a Member of Editorial Board of the French journal Hermes-Cognition-Communication-Politique and of the Communications collection of the publisher CNRS Editions. She's also a Member of the Scientific Committee of the Evaluation and Consideration of Natural and Technological Risks Program of the French Ministry of Ecology and Sustainable Development.

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Dr. Fog is the founder of the Colombian Association of Science Journalism, ACPC, and currently writes for El Tiempo and El Espectador newspapers. For several years she worked as a reporter, journalist, editor and anchor-woman for Tele-diario, a news broadcast program in Colombia. From 1994 to 1996, she was the Chief of the Communications Branch at the Colciencias, the Colombian Institute for the Development of Science and Technology. She has worked as a scientific journalist for different media such as UNIVERSOS (a series of 50 scientific TV programs) and the Colombia, ciencia y tecnologia and Innovacion y Ciencia magazine.



**Prof. Winfried Goepfert**

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Prof. Winfried Goepfert used to be a science editor in both radio and television of Sender Freies Berlin (public radio and television station of Berlin). He worked as a science reporter and science producer at major science magazines in German TV channel I. Until 1990 he was the Head of Science Department of Sender Freies Berlin. In 1990, he was appointed as a full time professor of science journalism at the Institut fuer Publizistik-und Kommunikationswissenschaft (Institute of Journalism and Mass Communications) at Freie University Berlin.



**Dr. Luisa Massarani**  
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Dr. Massarani is a coordinator of the Museum of Life's study centre at Fiocruz in Rio de Janeiro and Latin American and Caribbean Regional Coordinator of SciDev. Net. She has worked as a Journalist in the Editorial Staff of Ciencia Hoje (Science Today). Her research areas are public perception towards science and technology (mainly on genetics), the journalistic coverage on science and technology issues, and history of science communication in Brazil. She has published articles on science popularisation in several magazines and newspapers such as Folha de Sao Paulo.



**Ms. Jenni Metcalfe**  
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Ms. Metcalfe is a science and environmental communication consultant and Director of Econnect Communication Pty Ltd. She has qualifications in both Journalism and Science. She is a Foundation Member of Australian Science Communicators and the current National President. She is passionate about listening to people's stories and helping to convey these to different audiences. She has been working as a science communicator for more than 16 years. She has conducted training workshops for scientists in media, presentation and communication skills for 14 years in Australia and internationally in New Zealand, South Africa and Philippines.



**Dr. Manoj Patariya**  
**Director, National Council for Science & Technology Communication, INDIA**

Dr. Patariya is serving as Director (Scientist 'F'), at India's National Council for Science & Technology Communication. Recently, he has been elected as the President of the Indian Science Writers' Association (ISWA). He is very much dedicated to the cause of developing science communication profession. His professional interests included popular science writing, TV and radio anchoring and imparting training to budding science journalists, especially in vernaculars. He has authored a number of books on science communication, science journalism and popular science topics including an international research journal titled "Indian Journal of Science Communication". He was awarded 'International Award for Global Advancement of Science Popularization 2003' by Centre for Global Studies, Texas, USA.



**Prof. Hans Peter Peters**  
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Prof. Peters is the Head of the Research Focus "The Public, Politics and Mass Media" of the Program Group Humans-Environment-Technology at the Research Center Juelich, Germany, and the Adjunct Professor for Science Journalism at the Free University of Berlin, Germany. He is also a Member of the Scientific Advisory Board of the German Committee for Disaster Reduction. The research of Prof. Peters deals with the formation of public opinion on science, technology and the environment under the conditions of a media society. In particular, he focuses on the impact of scientific knowledge on public meaning construction about global environmental change. He lectures at the Institute for Media and Communication Studies of the Free University of Berlin.



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Prof. Schiele is the Head of the Joint Canadian & French International Graduate Programs in Museums Studies at the University of Quebec at Montreal(UQAM), a Researcher at the Interuniversity Research Centre on Science and Technology at UQAM, a Professor of Communications at the Faculty of Communications and a Professor for the Joint Doctoral Program in Communications at UQAM and the University of Montreal and Concordia University. He frequently teaches and lectures in North America, Asia and Europe. He is a member of several national and international committees and is a regular consultant on scientific culture matters to governmental bodies and public organizations including the Auditor General of Canada and the Conseil de la Science et de la Technologie du Quebec.



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Dr. Tinnaluck is the Vice President of the Science Writers and Publishers' Forum (Science Society of Thailand). She also teaches communication and science communication in private and public universities in Thailand. From 1982 to 1996 she worked as the Head of Public Relations for the Science Center for Education of the Ministry of Education, and since then until 2002 as Public Relations Manager for the National Science and Technology Development Agency, the Ministry of Science and Technology. Her specialized area of study is the collaboration of Local Wisdom (Thailand's IKS) and modern science and technology.



**Prof. Brian Trench**

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Mr. Trench has been the Head of the School of Communications in Dublin City University since 2002. He is a Board Member of the Centre for Society Information and Media, and the Leader of the Biosciences and Society Group, both at Dublin City University. Before, he was a full-time journalist specialised in technology journalism for twenty years for magazines, newspapers and radio in many roles. Mr. Trench's research interests lie principally in science communication, Internet Journalism and social uses of Technology. He is active in promoting science communication practice, as a trainer and as an organiser. He was the main organiser of the BA Festival of Science, held in Dublin in 2005.