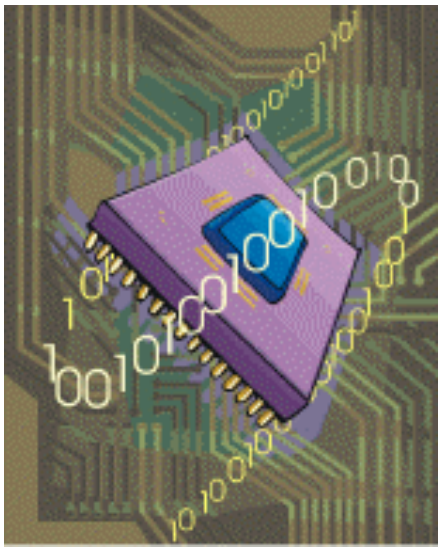

An International Workshop

Creating the Information Commons for e-Science: Toward Institutional Policies and Guidelines for Action

BOOK OF ABSTRACTS

UNESCO Headquarters
Paris, France
1-2 September 2005

Under the Sponsorship of
The Committee on Data for Science and Technology (CODATA)
The International Council for Scientific and Technical Information (ICSTI)
The International Network for the Availability of Scientific Publications (INASP)
The International Council for Science (ICSU)
The United Nations Educational, Scientific and Cultural Organization (UNESCO)
Academy of Sciences for the Developing World (TWAS)
And in collaboration with
The Organisation for Economic Co-operation and Development, OECD

ACKNOWLEDGMENTS

CODATA would like to thank the co-chairs of the Scientific Committee, Paul A. David and Paul F. Uhlir, for their work and dedication in bringing the program together. CODATA would also like to thank Cheryl Levey for providing administrative and web support for the meeting.

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STATEMENT OF PURPOSE

This event is an important element of ongoing efforts to achieve the broader goals of The World Summit on the Information Society (WSIS - www.itu.int/wsis/). In particular, this workshop aims to promote development of institutional policies and guidelines for action in support of the “information commons” for e-science. The work plan comprises four objectives:

- Review opportunities/challenges for realising global collaborative e-science on the emerging "cyber-infrastructure."
- Review government and university mechanisms for managing publicly funded scientific information in the digitally networked research environment; identify problems and develop procedural solutions.
- Identify and analyse institutional, economic, policy, and legal benefits/drawbacks to providing public access to and unrestricted use of publicly funded scientific information.
- Put forward resolutions/recommendations that enable the scientific community to more effectively utilise publicly funded scientific data and information.

At the first WSIS meeting (Geneva, December 2003), 175 countries adopted a **Declaration of Principles** and **Plan of Action** recognising that science has a central role in the development of the information society. Delegates affirmed the principle of promoting “universal access, with equal opportunities for all, to scientific knowledge and the creation and dissemination of scientific and technical information”[1].

Now, in anticipation of the final WSIS meeting (Tunis, November 2005), this workshop focuses on taking practical steps to ensure that both mechanisms and policies related to the production, dissemination, management, and application of scientific data and information support and strengthen the WSIS Principles and Plan of Action.

WORKSHOP PLAN AND RATIONALE

by Paul A. DAVID and Paul F. UHLIR

CODATA[2], along with several other partner organizations[3], has organized an international workshop at the UNESCO Headquarters (1-2 September 2005, Paris, France), the purpose of which is to highlight and analyze the variety of experiments that have already been undertaken to enhance the effectiveness of scientific activity in the current transition phase from the print to digital communications media.

The international scope of digital networks and research collaborations make it both necessary and desirable to seek institutional policies and guidelines for action that will contribute to creating the "information commons" for global e-Science. The workshop aims to promote greater understanding of the variety of successful mechanisms that enhance the availability of public information resources for modern scientific research collaborations. It also seeks to facilitate the development of coordinated principles and guidelines for the rational management of publicly funded data and information in today's rapidly progressing digitally networked research environments.

The Information Commons workshop will build on the body of practical experience and the empirical studies carried out by the participating organizations and other research and information policy institutions. Moreover, collaboration in this initiative by the major international science policy and scientific information policy organizations-CODATA, ICSTI, INASP, ICSU, UNESCO, TWAS, the

[1] Art 3 Paragraph 28, Declaration of Principles
[2] Committee on Data for Science and Technology
[3] ICSTI – International Council for Scientific and Technical Information; INASP – International Network for the Availability of Scientific Publications; ICSU – International Council for Science; UNESCO; TWAS – The Academy of Science for the Developing World ; OECD – Organisation for Economic Co-operation and Development; The National Academies, U.S.

OECD and the U.S. National Academies -- has provided an unprecedented opportunity to work towards the formulation of a common, international set of principles and guidelines for public access to scientific data and information.

From a scientific perspective, access to data and information has never been as important as it is now. Rapid advances in digital technologies and networks over the past two decades have significantly altered and improved the ways that data and information can be produced, disseminated, managed, and used, both in science and in many other spheres of human endeavor. This progress in the emerging e-infrastructure has enabled scientists to perform quantitatively and qualitatively new functions to:

- collect and create unprecedented and ever-increasing amounts and types of raw data about all natural objects and phenomena;
- collapse the space and time in which data and information can be made available;
- facilitate entirely new forms of distributed research collaboration and information production; and
- integrate and transform the data resources into unlimited configurations of information, knowledge, and discovery.

Perhaps most important in this context is that the internet has reduced the cost and time to produce and disseminate additional copies of information in digital form to near zero.

e-Science has been at the forefront of many new paradigms of digitally networked information creation and dissemination activities. Scientific research communities have led efforts to develop open-source software, public-domain data archives and federated data networks, open-access journals, community-based open peer review, collaborative research Web sites, collaboratories for virtual experiments, virtual observatories, and Grid-based computing, among other tools for the conduct of distributed research collaborations. These initiatives have given rise to unprecedented opportunities for accelerating the progress of science and innovation and creating wealth based on the more efficient exploitation of data and information produced through public investments in research. Taken together, they are part of the emerging broader movement in support of both formal and informal peer production and dissemination of information in a globally distributed, volunteer, and open networked environment. Such activities are based on principles that reflect the cooperative ethos that traditionally has imbued much of academic and government (civilian) research agencies; their norms and governance mechanisms may be characterized as those of a "public scientific information commons," rather than of a market system based upon proprietary data and information.

With regard to access regimes for public research data, the situation is mixed, with some countries and disciplines providing more open and comprehensive access than others. At the international level, there have been a number of notable efforts to institute open-access policies, including the 1991 "Bromley Principles" on the full and open exchange of global change research data, the 1996 Bermuda Principles on the Release of Human Genome Sequence Data, the 1997 ICSU-CODATA Principles for Dissemination of Scientific Data, and the 2004 OECD Ministerial Declaration on access to data from publicly funded research, among others. The practical effectiveness of these initiatives in altering access conditions, however, has not been systematically evaluated, and the adherence of governments and publicly funded research institutions to such principles remains far from universal.

Public information regimes for scientific data produced in developing countries have remained among the least open. In addition to the economic and organizational limitations on the capabilities of the government apparatus for gathering and distributing such data, and the political restrictions placed upon disclosure of information regarding social and economic conditions, access to scientific data and information has been inhibited by researchers' and research institutions' suspicions that free and open information exchanges, like free trade, will turn out not to be "fair" trade. The marked asymmetries between rich-country and poor-country partners in the division of intellectual property rights from new discoveries and inventions have certainly contributed to undermine the ethos of scientific cooperation in some fields, notably the life sciences.
Open access to the research literature produced from public funding also is a major issue that has received considerable scrutiny in the past few years worldwide. There are now more than 1600 scholarly journals provided under open access conditions on the Internet, including some notable initiatives such as the Public Library of Science and BioMed Central. Policy principles on open access to

publicly funded journals were issued in both the United States and Europe in 2003 through the "Bethesda Principles" and the "Berlin Declaration." In 2004, many professional society journal publishers produced the "DC Principles," which also recognized the imperative of broad access to the scholarly literature produced from publicly funded research. Commercial journal publishers are now allowing more open access to the articles they publish as well. Most recently, the U.S. House of Representatives and the House of Commons in the United Kingdom proposed legislation that would enhance public access to scientific literature produced from publicly funded research.

Institutional repositories also have been established for pre-prints and e-prints of journal articles (e.g., the Cornell arXiv, originally established for high-energy physics and now expanded to include other areas of physics, mathematics, computer science, and computational biology), for individual research articles and other information resources (e.g., the Social Science Research Network, the MIT D-Space initiative), and for university educational material (e.g., MIT's OpenCourseWare). Public access initiatives in developed countries are frequently being designed with the needs of developing countries expressly considered, while new open-access journals are being established within developing countries themselves.

The adoption of many promising new open-access initiatives (designed from the bottom up), coupled with the recent introduction of some new top-down legislative proposals, makes it a particularly appropriate time for a comprehensive review and stock-taking as what has been learned. However, there is a lack of strategic planning and concerted implementation of policies by the government and academic scientific communities. At the same time, the global trend toward the commoditization of public research outputs—including both the underlying data and information resources—is being reinforced by the creation of new legal rights and protectionist mechanisms that are largely extrinsic to the scientific enterprise, but increasingly adopted by participating researchers and their host institutions.

The benefits and drawbacks of privatization and commercialization of data and information activities in public-sector science, as well as in the application of IP and related restrictions to such activities, need to be more clearly understood and better managed. It undoubtedly is important to identify those respects in which public policies (in developed and developing countries alike) reflect legitimate countervailing interests that place limits on openness and cooperation. These include:

- national security concerns (including grey areas such as "dual use" or "sensitive but unclassified" information);
- the interests of private-sector parties in the legal protections that have been accorded to their intellectual property rights; and
- the practice of allowing publicly funded researchers limited periods of exclusive use of their data prior to the publication of their research findings.

In public policy guidelines and practical implementations alike, progress is likely to be made through searching for workable solutions to "questions of balance" rather than debating "rights" and "wrongs."

The Information Commons workshop will bring together managers from science agencies, university administrators, researchers, data and information managers and publishers, and science and information policy experts to discuss and develop elements of the strategy. The Organizing Committee, together with the collaborating organizations, have identified the workshop objectives, established an agenda for the meeting, and identified expert speakers and invitees. The workshop will examine the issues in the context of research in the OECD countries and in the developing world.

A draft set of principles and guidelines developed in advance of the workshop will be discussed at the workshop, using successful models as exemplars. Three teams of rapporteurs will synthesize the presentations and discussions in the case study sessions; their summaries will be the basis for discussion in the Workshop's concluding plenary session. The CODATA website will publish material from the individual presentations, as well as background documents and a post-event report on the proceedings by the Co-Chairs of the Workshop.

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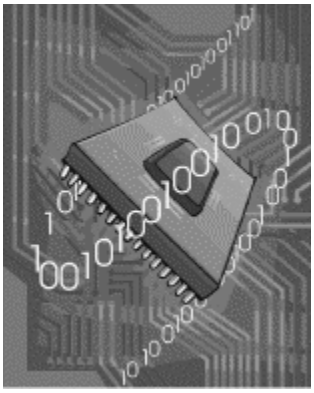
PRESENTATION ABSTRACTS



Keynote Abstracts

The Information Commons

John SULSTON, Ph.D.
2002 Nobel Laureate in Physiology and Medicine

Access to scientific knowledge has always been valuable to people. With the current rapid increase in complexity of human societies, this access becomes ever more important, in two ways. On the one hand it is the basis for research and development, for the advancement of understanding and for the production of material goods. On the other, it is the basis for justice and trust, for without knowledge nobody can judge the worth of progress or the risk of damage. Yet paradoxically, at this very time when the intellectual commons is most needed, we see vigorous attempts at enclosure and the establishment of new barriers to communication. This culture impedes research and innovation, throttles ethical decision making, widens the gap between rich and poor, and contributes to global insecurity.

The human genome project illustrated the importance of making basic information freely available to all, and at the same time exposed the forces of opposition to such free release. Some regard this episode as an extreme example, but actually it's far from unique. It is just one case of our culture of excessive privatization, even in the case of fundamental discoveries that clearly belong to everyone.

At this juncture the role of e-science is critical. Electronic technology provides the means to communicate freely, cheaply and easily. But equally, it can provide powerful locks that prevent communication. The balance is not a matter of technology but of policy. The information commons does not exist by chance, but by wise management that looks to long-term good as well as short-term reward. Above all, the commons is not to be seen as the whim of a minority, but as an essential basis for future prosperity and peace.

Transforming e-Science to Inclusive Science: Open Access Is the Key

Subbiah ARUNACHALAM
Fellow, MS Swaminathan Research Foundation

Inaugurating a micro-credit program in a village in southern India, Prof. Bruce Alberts told the villagers that he had come all the way from Washington DC to support such a program because he would like his grandchildren back home to live happily and in peace when they grew up. The point is this: if there are great disparities in the world, no one can hope to live in peace. If we turn a blind eye to persistent poverty, hunger and malnutrition, we will have to collectively pay a price through mass unrest and even worldwide terrorism.

It must be clear, if ever there were any doubts, that all of us humans live in an interdependent global village. Recent experience has shown that SARS and avian flu take just three or four days to reach North America from East Asia and probably less than that to reach Europe. If people, wherever they are, cannot respond quickly to epidemics and natural disasters, the chances are any of us can be affected.

The best way to address most of these problems is through the application of science, and science performed not just in a few advanced countries but everywhere. Without free and unhindered flow of information, it will be difficult to maximize the efficiency (and the benefits) of science performed. The power of access to information was amply evident during the recent tsunami tragedy: wherever people were exposed to a culture of information access, they were better able to cope with the tsunami.

Researchers in most developing countries are working under very difficult conditions, especially in regard to information access. It is here that the new Internet and Web technologies come in handy. They have

the potential to democratize access to information and facilitate collaboration, be it for scientific research or for rural development.

Both China and South Korea have shown that it is possible for a country to lift itself up from a scientific 'unknown' to a world-class performer within one or two decades. Most developing countries can follow their footsteps, but they need favorable conditions. One key tool is the creation of a worldwide information commons through the establishment of interoperable open-access repositories for research papers and scientific data. Fortunately, these are inexpensive: the software (EPrints, DSpace, etc.) is free and the help, if needed, to set up such repositories is readily available. Such repositories will help e-Science transform science—i.e. to make science an inclusive science activity, rather than continuing in its current state of being the elitist domain of rich nations. These initiatives can also help transform the current 'safari' type of research performed by advanced countries into true collaboration with poor countries, especially in areas such as drug development for combating diseases such as malaria and tuberculosis.

It is not enough if the rich nations offer debt relief. The best way to help the poor nations is to enable them to become self-supporting through strengthening their own scientific capacity. There is no better means to do this than through adopting the information commons approach to sharing scientific data and information.

Plenary Abstracts

Between Science and Government: The OECD and the Building of Scientific Communities

John DRYDEN
Deputy Director for Science, Technology and Industry, OECD (www.oecd.org/sti)

This presentation examines the role of the OECD in assisting policy development to achieve the twin objectives of (a) maximizing the contribution of science to economic and social well-being, while (b) sustaining and developing the science base in the long term.

Since its inception in the 1960s, the OECD helps develop factual knowledge and understanding. It also assists international networks of science policy makers and users from advanced economies in developing coherent approaches to promoting investment in knowledge, ensuring its reward and addressing diverging interests regarding its diffusion.

This presentation provides an overview of recent OECD work, which has examined four aspects of the "Global Research Village":

- the use of new technologies, especially high performance computing and communications, to encourage science and technology co-operation, the development of scientific publishing and public sector information provision in the online environment;
- the development of a shared understanding of complex issues such as access to scientific data, including specific questions related to research exemption to IPR protection;
- the encouragement of arrangements for international science and technology collaboration itself and for sharing needed research infrastructure, principally through the OECD Global Science Forum or the creation of and international network of Biological Resource Centres;
- and, most crucially for the creation of an information commons, there is the question of encouraging the greatest possible access to research data, particular that arising from publicly funded research.

The Emerging Technological Infrastructure of e-Science

Tony HEY
Vice President for Technical Computing
Microsoft Corporation

The Internet was the inspiration of J.C.R.Licklider when he was at the Advanced Research Projects Agency in the 1960s. In those “pre-Moore's Law” days, Licklider imagined a future in which researchers could access and use computers and data from anywhere in the world. He funded an elite group of computer science departments in the USAA—which he called his 'InterGalactic Computing Group'—to explore how to realize his vision.

Today, as everyone knows, the killer applications of the Internet were email in the 1970s and Tim Berners-Lee's World Wide Web in the 1990s. The World Wide Web was developed as a collaboration tool for the particle physics academic community. It is no exaggeration to say that this has not only revolutionized the academic world but also much of commerce and leisure.

In the future, frontier research in many fields will increasingly require the collaboration of globally distributed groups of researchers needing access to distributed computing, data resources and support for remote access to expensive, multi-national specialized facilities such as telescopes and accelerators or specialist data archives. There is also a general belief that an important road to innovation will be provided by multi-disciplinary and collaborative research - from systems biology and bio-informatics to earth systems science and chemo-informatics.

In the context of science and engineering, this is the 'e-Science' agenda. The UK, for example, has embarked on an ambitious, 5-year, £250M research program to create the 'Grid'—a middleware infrastructure to support such collaborative research. Such Grid middleware will be widely deployed on top of the academic research networks to constitute the necessary 'e-infrastructure' - or 'Cyber-infrastructure' - to provide a collaborative research environment for the global academic community. This talk will review the elements of this vision and describe how the scientists and engineers are collaborating with computer scientists and the IT industry to create the new e-Infrastructure. When mature, it is clear that such an infrastructure will support the creation of dynamic 'Virtual Organizations' and collaborative environments for many types of application in both academia and industry.

This new e-infrastructure will clearly be of relevance to more than just the research community and will support both the e-learning and digital library communities as well as many business applications. The need for powerful tools to handle and analyze the imminent deluge of scientific data in such an e-Infrastructure cannot be over-emphasized.

Sharing Information for Development and Security in a Diverse and Divided World

Danny QUAH
Professor of Economics
London School of Economics

Frontier technology—progress in knowledge and information—has now powered economic growth for well over two centuries. Yet even in crude measures of economic income alone, the world remains a highly diverse place. Performance in the world's leading economies contrasts sharply with that everywhere else.

The richest 1% of humanity receives as much income as the poorest 57%. The poor, one-sixth of the world's population, live on less than a dollar a day. Access to clean water, primary education, basic healthcare, and reliable electricity remains a luxury unknown to many in Sub-Saharan Africa and South Asia. Thus, even if the costs are invariant across geographies, the benefits to disseminating information differ widely, depending on the current state of a society.

Viewing knowledge as a uniform, undifferentiated good—something wholly to share or not to share—leads seductively to a single, all-encompassing proposal on its dissemination. This could create as many problems as it resolves.

Institutional Infrastructures for Global Research Networks in the Public Sector

Michael SPENCE
St. Catherine's College, Oxford

There is no doubt that global research networks have the potential greatly to increase our understanding, particularly, though not exclusively, in the natural sciences. But they can do so only if institutional infrastructures are in place that facilitate, rather than hinder, their smooth operation. This presentation will consider the regulation of global research networks, giving an example of the institutional difficulties encountered by one particular e-science project. It will propose a possible mechanism for regulation that might ease some of the institutional difficulties of both constructing and operating a global research project.

The presentation begins with recognition of the variety of regulatory issues that a global research project might raise including:

- the legal relationships among the parties to an e-science project;
- the materials that each party brings to a collaboration, particularly issues concerning the availability of that material for use;
- the allocation of resources, if any, to which a project might give rise; and
- the apportionment of 'responsibility' for the project, both in the sense of credit for its achievements and liability for any harm that it might cause.

Three things must be remembered in designing institutional infrastructures for the regulation of global research networks.

First, it is important to recognize that norms regulating the creation and conduct of an e-science project can have a variety of sources. Thus a particular norm may have the force of law. It may constitute what is sometimes known as 'soft law' (for example institutional policies that do not have legal force but determine institutional behavior). Conversely, it may consist in a convention within the life of given stakeholder community (for example, it may be a convention regarding the attribution of credit for a particular type of research project). Each of these different types of norm can be useful in the development and operation of an appropriate system of regulation.

Second, it is important to remember that participants in global research networks are operating in both different legal jurisdictions and national academic cultures, as well as in different disciplinary cultures. One cannot expect that a solution to a problem of institutional infrastructure useful in biology will also be useful in astrophysics.

Third, it is important to recognize that all these different types of norm are developed and applied in contexts in which different players have very different incentives. This may seem obvious as regards partner institutions, but it is not often enough recognized that different players within the same institution—scientific departments, legal departments, research services departments, technology transfer sections—are usually also operating with different incentives and under different constraints. Thus, for example, simply to take account of the interests of 'the university' in designing institutional infrastructures for global research networks is an insufficiently nuanced approach. The 'university' may seem to have very different interests when it is represented by a participating scientist, from those it has when it is represented by a member of its legal team keen to avoid exposure of the institution to legal risk. For the development of satisfactory solutions to the regulatory issues outlined above, the conflicting interests of the different players must be kept clearly in mind.

This presentation will consider some model institutional infrastructures for regulating the creation and operation of global research networks. It will propose one of these as a possible way forward.

Open-Access Journals and the Latin American Scientific Research Context

Clemente FORERO-PINEDA
Universidad de los Andes

Open access to scientific information provides new access possibilities to researchers from developing countries. Based on in-depth interviews to editors of open-access, arbitrated journals in five Latin American countries, this paper examines the environment of a rapidly growing editorial activity. The idea is to explore:

- how these journals are financed;
- the reasons they had to move into open-access, since many of them were subscription paper journals just five years ago;
- the impact of this change of financial model and of digitalization on access, visibility and the interest of authors in submitting articles;
- the policies of governments in Latin America towards scientific publishing and open access; and
- the practices in the use of information, citing and publishing of the most recognized researchers in different areas of science.

A comparative analysis allows understanding the potential and limitations of open-access journals in Latin America, the role that they may play in giving Latin American scientific production a wider visibility, and their contribution to the worldwide movement towards free access to scientific literature.

An Overview of China Scientific Data Sharing Program

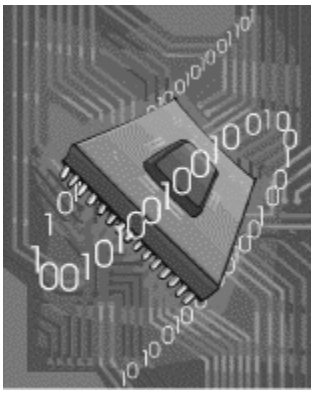
Xian-En ZHANG
Department of Basic Research, Ministry of Science and Technology, China

The China Scientific Data Sharing Program (China-SDSP) is an ambitious endeavor in the beginning of the 21st century and is a part of National Facility Information Infrastructure Program. China-SDSP aims to strike a balance between the demand and supply of scientific data, enhancing the national scientific innovation capability and competitiveness, and maximizing the efficiency of nation's investment in science and technology.

The program takes advantage of information and communication technology as well as experiences gained from international community. It also builds up a data-sharing system composed of supportive laws and regulations as well as standards while also consolidating existing, scattered data resources and establishing a distributed, user-friendly, scientific data submitting and disseminating network.

Technically, China-SDSP has a three-tiered architecture: one gateway leads users into four data centers which are composed of 300 master databases. Besides technical settings, there is a set of laws, policies and standards to interface all relevant aspects of the program. This presentation will give a brief introduction to the five key aspects of the program: general considerations, objectives, architecture, major tasks, and current progress.

CASE STUDY ABSTRACTS



Atmospheric Chemistry & Physics (ACP): An Interactive Open-Access Journal of the European Geosciences Union (EGU) for Improved Scientific Communication and Quality Assurance by Public Peer Review & Interactive Discussion

Ulrich PÖSCHL
Max Planck Institute for Chemistry

The traditional ways of scientific publishing and peer review do not live up to the needs of efficient communication and quality assurance in today's rapidly developing and highly diverse world of science. Thus research and teaching are increasingly inhibited by a lack of scientific information density, accessibility, and reliability.

Substantial improvement can be achieved by open-access publishing with a two-stage publication process that combines public peer review and interactive discussion (interactive open-access journal concept). This approach enables rapid publication and dissemination of new scientific results in discussion papers followed by thorough and transparent peer review, which is open for comments from the global scientific community (permanently archived and fully citable). Ultimately, it leads to final revised papers with maximum quality assurance and information density.

The concept has been successfully realized and applied in the international scientific journal Atmospheric Chemistry and Physics (ACP, www.atmos-chem-phys.org), which is edited by a globally distributed network of scientists, including the Nobel Laureate Paul Crutzen, and published by the innovative scientific service provider Copernicus (www.copernicus.org) on behalf of the European Geosciences Union (EGU, www.copernicus.org/EGU).

The achievements of ACP, including publication and citation statistics, as well as the feedback from colleagues around the world, show that the opportunities and advantages of open access, public peer review, and interactive discussion are very much appreciated by authors, referees, and the scientific community. The ISI Journal Citation Report 2004 confirms that only three years after its launch ACP was already firmly established among the top journals in the fields of environmental and geosciences.

http://www.copernicus.org/EGU/acp/acpd/published_papers.html
http://www.cosis.net/members/journals/df/ranking.php?j_id=1
http://www.copernicus.org/EGU/acp/journal_impact_factor.html

EGU has adopted the interactive open-access journal concept of ACP for all future publication activities. Over the past couple of years, three new sister journals have been launched (Biogeosciences, Climate of the Past, Ocean Science) and one traditional journal has been adapted to the new publishing approach (Hydrology and Earth System Sciences). Further EGU interactive open-access journals are in preparation (Geology, Geodesy, etc.).

http://www.copernicus.org/EGU/publication/mission_statement_for_publications.html
http://www.copernicus.org/EGU/acp/publication_overview.html

Moreover, multiple scientific societies and commercial publishers in related and different fields of science (including biology, engineering, and economics) have expressed interest in adopting the interactive open-access publishing concept.

Overall, the EGU interactive open-access journals demonstrate that:

- Scientific societies can, and do, take a lead in open-access publishing with innovative techniques of manuscript processing and quality assurance;
- Open-access publishing enhances scientific quality assurance through interactive forms of review and discussion open to the entire scientific community;
- High quality, open-access journals can be financed by modest service charges levied from the authors and research funding agencies (sustainability of "author pays" business model for open-access publishing); and
- Two-stage (or multi-stage) publication processes with public peer review and interactive discussion foster scientific discussion. They also enhance the effectiveness and transparency of scientific quality assurance and facilitate rapid publication and dissemination of new scientific results.

Based on the experiences of the EGU interactive open-access journals and other innovative and successful open-access publishing initiatives, the following measures are proposed to pave the way for substantial large-scale improvement of scholarly communication and scientific quality assurance:

- Support open-access publishing by transforming subscription charge funds into open-access service charge funds to create a more dynamic and innovative market for the exchange of scientific information;
- Promote the implementation of two-stage (or multi-stage) publication processes with interactive forms of peer review and public discussion as new standards of scientific publishing and quality assurance; and
- Exploit the full potential of open access and interactive public discussion to develop new and improved tools and (statistical) indicators for the assessment of the impact and quality of scientific publications.

References:

Interactive journal concept for improved scientific publishing and quality assurance, Learned Publishing, 17, 105-113, 2004 (www.atmos-chem-phys.org/ad_page.html)

Interactive peer review enhances journal quality, Research Information, September/October 2004 (www.atmos-chem-phys.org/ad_page.html)

Information Dissemination Challenges Facing the International Livestock Research Institute

Dr. P. KRISTJANSON
Senior Agricultural Economist
Global Project Leader: Poverty, Sustainable Livelihoods & Livestock

The International Livestock Research Institute (ILRI) works at the crossroads of livestock and poverty, bringing high-quality science and capacity building to bear on poverty reduction and sustainable development for poor livestock keepers and their communities. ILRI is a non-profit-making and non-governmental organization with headquarters in Nairobi, Kenya, and a second principal campus in Addis Ababa, Ethiopia, with over 700 staff from over 40 countries. ILRI works in the tropical developing regions of Africa, Asia and Latin America and the Caribbean and has offices in East and West Africa, South and Southeast Asia, China and Central America, and projects in Southern Africa, North Africa and the Middle East.

ILRI's annual expenditures of roughly $30 million are funded by more than 60 private, public and government organizations of the North and South. Some donors support ILRI with core and program funds, whereas other finance individual research projects. In-kind support from national partners such as Kenya, Ethiopia and the Philippines, as well as that from international collaborators, is substantial and vital. This mix of generic, specific and in-kind resources is essential for the partnership research we conduct.

All ILRI work is conducted through extensive and strategic partnerships that facilitate and add value to the contribution of many other players in livestock for development work. ILRI is adopting an innovative systems approach as a powerful tool to enhance the effectiveness of its research in contributing to actual innovations reaching the poor. This approach acknowledges the key roles of diverse and powerful partnerships with a range of stakeholders involved in the research development continuum. Generation, sharing, and widespread dissemination of new information and knowledge—particularly within these broad partnerships—are activities that contribute to our mandate to provide 'international public goods'. They are key to ILRI's success, yet they also provide a huge challenge.

This presentation will discuss ILRI's approach to disseminating and facilitating the dissemination of data and information, and some of the challenges we face in doing so with the institutions and partners we typically deal with. Examples discussed will include recent collaborative poverty-related research undertaken in East Africa and a new initiative to establish a strategic analysis and knowledge support system that will allow institutions throughout Africa to share—for the first time—their statistical, spatial, and analytical tools and information on poverty and sustainable rural development.

Science Commons

John WILBANKS
Executive Director of Science Commons

Science depends upon the ability to observe, learn from, and test the work of others. Without effective access to data, materials and publications, the scientific enterprise becomes impossible. Yet recent studies show a disturbing trend; increasing secrecy, cumbersome materials transfer agreements and complex licensing structures have made more difficult the sharing process on which science relies. A recent article in the Journal of the American Medical Association reports that, "because they were denied access to data, 28% of geneticists reported that they had been unable to confirm published research." And that is published research.

The problem here is not simply the commercialization of science; roadblocks to sharing hurt the development of commercial products, too. Nor is it only a matter of expanded intellectual property rights and curtailed "research exemptions." The problem is more complex than that, and the solution must be as well. Our goal is to solve a specific part of the problem: the creation of a larger "Science Commons" built from private agreements, and technical standardization. It is founded upon the same "some rights reserved" approach adopted by Creative Commons, our parent organization.

We will present a case study on the utility of standard, open licensing in the context of open access to the scientific literature, with specific examples both in open-access journals and institutional repositories. Impact on the developing world will be a specific focus.

For more information, please visit http://science.creativecommons.org/.

Global Biodiversity Information Facility (GBIF)

James L. EDWARDS
Executive Secretary
Global Biodiversity Information Facility

The Global Biodiversity Information Facility (GBIF) (http://www.gbif.org/) is an independent intergovernmental organization with the goal of making primary scientific biodiversity data openly and universally available over the Internet. The idea for GBIF arose in a working group of the Mega-science Forum of the Organisation for Economic Co-operation and Development (OECD). In 1999 OECD science ministers endorsed the proposal to establish GBIF, but insisted that it be developed outside of OECD and be open to participation by any country, economy or relevant international organization.

GBIF came into existence in March 2001. It was established via a simple, non-binding Memorandum of Understanding, with Voting Participants paying a yearly contribution based on Gross Domestic Product. This has proven to be a flexible, efficient mechanism that has allowed GBIF to move into operation much quicker than if it had followed the more traditional, treaty-based approach to founding an intergovernmental body.

GBIF's major product is a prototype data portal (www.gbif.net) which at the end of July 2005 provided access to more than 78 million data records served by more than 130 data providers located in 30 countries. The portal specializes in species and specimen data, but eventually intends to link to a wide range of other kinds of biodiversity information.

Each data provider retains control and intellectual property rights to the information it serves. Some providers restrict access to sensitive data elements, such as the geographic localities of endangered

species, but otherwise the data are not distributed under copyright or database licenses. Any restrictions on data use are stipulated in the metadata for each database. Users of the system agree to cite the source databases in any publications or other re-uses of the data and to abide by any terms and conditions set by the providers.

An independent review of GBIF's first three years of activities, carried out by CODATA and KPMG and completed in February 2005, characterized GBIF as "the right initiative at the right time with the right goals".

INRIA Objectives, Policy and Actions for e-Sciences

Anne-Marie VERCOUSTRE
Senior Scientist
INRIA-Rocquencourt (http://www.inria.fr/)

In April 2005, the French National Institute for Research in Computer Science and Control (INRIA) launched an Open Archive dedicated to its scientific publications. INRIA is committed to the "Open Archive Initiative" since it signed the Berlin Declaration on "free access to knowledge in exact sciences, life sciences, human and social sciences" (25 July 25 2004).

INRIA is convinced that such an open archive will increase its scientific visibility and impact, keep track of INRIA's scientific output, and be of use to the whole scientific community. INRIA's Open Archive is part of the HAL Open Archive, produced by the CCSD (Center for Direct Scientific Communication) (http://www.ccsd.cnrs.fr/) of CNRS, originally for physicists. INRIA is now collaborating with the CCSD for the future evolution of HAL [Hyper Articles Online]. By signing a framework agreement with CNRS, INRIA will build a pool of its scientific production, based on a self-archiving approach from research scientists.

HAL-INRIA is one of the recent outcomes of the DISC (Direction for Scientific Information and Communication), an INRIA department created in 2001, for defining and implementing INRIA policy regarding the access and dissemination of scientific information. DISC objectives include:

- Develop access to and dissemination of scientific information;
- Create a large corpus of Scientific and Institutional content;
- Promote INRIA and its research advances to a wide audience; and
- Facilitate internal communication.

DISC staff counts about 30 people involved in regular tasks (such as running the documentation centers, publishing several newsletters), as well as in innovative projects such as the Open Archive and the exploitation of the Scientific Activity Report.

After introducing INRIA, its context and objectives—especially regarding e-Science—the presentation will detail the benefits and challenges of the INRIA Open Archive.

National Library of Medicine

Elliot SIEGEL, PhD
Associate Director for Health Information Programs Development
NLM/National Institutes of Health

The statutory mission of the National Library of Medicine (NLM) is to collect, organize, disseminate, and preserve the world's biomedical literature. In 1988 the U.S. Congress expanded NLM's role by creating the National Center for Biotechnology Information (NCBI). NCBI is charged with developing databases and software to facilitate access to a broad array of biotechnology information.

Today NLM provides a wide variety of online information resources that range from genetic data (e.g. GenBank) to bibliographic descriptions and full text of the biomedical literature (PubMed/Medline and PubMed Central) and consumer health material (e.g. Medlineplus). More than one million searches are performed daily on NLM databases by researchers, health care practitioners, and the public from around the world.

The U.S. Congress, which is responsible for overseeing NLM's operations and providing funding on an annual basis, has strongly supported NLM's initiatives to leverage the power of the Internet and make it resources free to all users. NLM provides access to copyrighted material either through explicit licensing agreements or on a fair-use basis.

NLM's efforts to implement and openly distribute standards related to bibliographic format, molecular data resources, archiving full text scientific literature, and exchange of health data have contributed significantly to removing barriers to information sharing. Recent NIH policy initiatives to enhance access to the results of NIH-funded research data and associated literature are further facilitating the linking of these resources in ways that advance scientific discovery. Evaluation activities are a strong component of NLM's dissemination programs, including ongoing user feedback.

International Seismological Data in IDC Products and Services

Igor CHERNOBAY
Section Chief, International Data Centre Division
Preparatory Commission for the CBTBO (www.ctbto.org)

This presentation describes the mission and functions of the International Data Centre (IDC) that is being operated by the Provisional Technical Secretariat (PTS) of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban-Treaty (CTBT) Organization. The IDC is collecting and processing data from the International Monitoring System (IMS), consisting of primary and auxiliary seismic, as well as hydro-acoustic, infrasound and radionuclide stations. IRIS is operating about 30% of auxiliary seismic stations that were used in preparation of IDC products as at June 2005.

The primary purpose of the CTBT verification regime is to verify compliance with the Treaty. In addition, IMS data and IDC products have the potential to offer a range of civil and scientific applications that could contribute to sustainable development and human welfare. These applications demonstrate, in part, how State Signatories could gain additional benefits from participation in the Treaty verification regime. The Preparatory Commission, which is responsible for the policy of IMS data and IDC products distribution, is currently considering whether data and products could be also provided to disaster alert organizations.

The presentation provides an overview of the IDC operations: from data acquisition, through automatic and interactive data processing, to provision of access for authorized users to raw IMS data and IDC products and services. High technical requirements for raw continuous data availability (>98% over the calendar

year) and timeliness (> 97% of the data shall reach the IDC within five minutes) provide a very good starting point for automatic station and network data processing. Data from IRIS stations, together with data from other auxiliary stations, are used to improve location of seismic events and magnitude calculations. Results of automatic and interactive data processing are available to National Data Centres via four access methods. Currently more than 700 authorized users from almost 90 countries have access to IMS data and IDC products.

OpenCourseWare, MIT

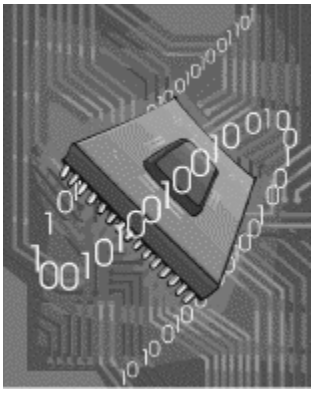
Steve CARSON
OCW Senior Strategist
Massachusetts Institute of Technology

In 2001, the Massachusetts Institute of Technology (MIT) announced that it would be publishing the core teaching materials—including syllabi, lecture notes, homework, projects and exams—from all 1,800 of its courses freely and openly on the world wide web for use by teachers and learners from around the word. Four years later, MIT OpenCourseWare (OCW) has published materials from 1,100 of the 1,800 courses, and is on schedule to complete the publication as planned in 2008.

To date, the site has received more than 8 million visits—and an additional 3 million visits to translations of MIT OCW content—from 224 different countries. Since the announcement of the MIT OCW project, more than 30 higher education institutions in the United States, Japan, China, India, and Vietnam have adopted the opencourseware sharing model and now share their course materials openly. A similar number of institutions have projects in development.

This presentation describes the vision, implementation and outcomes of the MIT-OCW project. It places the initiative in the context of other efforts to share open educational resources and provides early indications of the direction of the global OCW movement. For more information, visit http://ocw.mit.edu/index.html.

BIOGRAPHICAL INFORMATION



BIOGRAPHICAL INFORMATION: CHAIRS

Paul A. DAVID

Paul Allan DAVID is Professor of Economics and Senior Fellow of the Institute for Economic Policy Research at Stanford University. He is Professor Emeritus of Economics and Economic History in the University of Oxford, Emeritus Fellow of All Souls College, Oxford and currently Senior Fellow of the Oxford Internet Institute. DAVID is the author of more than 150 journal articles and contributions to edited volumes, as well as of the author and editor of several books including *Technical Choice, Innovation and Economic Growth* (1975) and *The Economic Future in Historical Perspective* (2003). He was among the pioneering practitioners of the "new economic history," and is known internationally for wide-ranging contributions in the fields of American economic history, economic and historical demography, and the economics of science and technology. Investigation of the conditions that give rise to 'path dependence' -- the persisting influence of historical events in micro and macro economic phenomena – is a recurring theme in his research. Two main areas of contemporary economic policy research have emerged in his work the past two decades: the evolution of information technology standards and network industries, and the influence of legal institutions and social norms upon the funding and conduct of scientific research in the public sector, and the interactions between that latter and private sector R&D. DAVID currently leads an international research project on the organization, performance and viability of free and open source software.

Many professional honors have been bestowed upon DAVID in the course of his career, including election as Fellow of the International Econometrics Society (1975), Pitt Professor of American History and Institutions in the University of Cambridge, as Fellow of the American Academy of Arts and Sciences (1979), Vice-President, and President of the Economic History Association (1988-89), as Marshall Lecturer in the University of Cambridge (1992), Ordinary Fellow of the British Academy (1995), Member of Council of the Royal Economics Society (1996-2002), and Member of the American Philosophical Society (2003). He was made Professor of Economics and Economic History by University of Oxford, 'in recognition of distinction' (1997) and awarded a Doctorate *Honoris Causa* by the University of Torino (2003).

DAVID's extensive service as a consultant to international organizations has included work for the World Bank, the United Nations Commission on Trade and Development, the United Nations University Institute, the OECD, several directorates of the European Commission of the EU, the European Committee for Future Accelerators, the Economic and Social Research Council (U.K.), the Treasury and the Ministry of Science and Technology of New Zealand, and the German Monopolies Commission. He also has had extensive service-experience as a consultant to U.S. government agencies and foundations, including the National Academy of Science (National Research Council), the National Science Foundation, and the Departments of Commerce, and of Energy; the Rockefeller Foundation, the Sloan Foundation and other public and non-profit organizations. He has been a non-executive director of La Compagnie de Saint-Gobain since 2002, and recently was appointed to the board of directors of Science Commons, a not-for-profit organization founded by Creative Commons in 2005.

Paul F. UHLIR

PAUL F. UHLIR, J.D., is Director of the Office of International Scientific and Technical Information Programs at the U.S. National Academies in Washington, DC. He also directs the U.S. National Committee for CODATA. Paul's area of emphasis is on issues at the interface of science, technology, and law, with primary focus on digital information policy and management.

Prior to 1999, Paul was the Associate Executive Director of the Commission on Physical Sciences, Mathematics, and Applications at the National Academies, and from 1985 to 1991 he was senior staff officer at the Academies' Space Studies Board, where he directed projects on solar system exploration and environmental remote sensing programs for NASA.

Before joining the National Academies, he was a foreign affairs officer at the National Oceanic and Atmospheric Administration, where he worked on remote sensing law and policy and on intergovernmental agreements for cooperation in meteorological satellite programs. Paul has published over 20 Academy reports, and written more than 50 articles.

He has been involved in numerous consulting and pro bono activities, and speaks worldwide on a broad range of information policy and management issues. In 1997 he received the National Research Council's Special Achievement award for his work in this area. He holds a B.A in history from the University of Oregon, and a J.D. and M.A. in international relations from the University of San Diego.

Additional information about Paul's work at the National Academies may be found at: http://www7.nationalacademies.org/biso/ISTIP.html.

BIOGRAPHICAL INFORMATION: SPEAKERS

Subbiah ARUNACHALAM

Subbiah ARUNACHALAM (Arun) is an information scientist based in Chennai in South India. Associated with Indian academic and scholarly communities for over three decades, he has been an editor of scientific journals [*Indian Journal of Technology*, *Journal of Scientific & Industrial Research*, *Indian Journal of Chemistry*, *Proceedings of the Indian Academy of Sciences*, and *Pramana - Journal of Physics*], a science writer, a chemistry researcher, an information science instructor, a librarian in a national laboratory, the executive secretary of the Indian Academy of Sciences, and a part-time visiting professor at the Indian Institute of Technology, Madras.

He has more than 60 papers to his credit and is on the editorial boards of six refereed international journals, including *Journal of Information Science* and *Current Science*. He has delivered more than 50 invited talks at international conferences.

A volunteer with the M S Swaminathan Research Foundation (MSSRF), in Chennai, India, since April 1996, his research interests include science on the periphery, scientometrics, information access, and the application of information and communication technologies in development and poverty reduction programs. He is an ardent advocate of open-access archiving and is especially active in persuading researchers and research institutions in the developing countries to adopt open-access archiving. To see his writings, please search for "Subbiah ARUNACHALAM" in http://A9.com or www.google.com.

Arun was trained as a chemist, but came to recognize that his calling was in information science when he was a doctoral student at the Indian Institute of Science, Bangalore. At MSSRF Arun's group is working with the rural poor to see how ICT-enabled development programs can make a difference to the lives of the rural poor. The Information Village Research Project has won many awards. More importantly, it seems to be bringing in benefits to the local community.

John DRYDEN

John DRYDEN is the Deputy Director for Science, Technology and Industry at the OECD. The OECD is an intergovernmental think-tank and policy co-ordination institution based in Paris. The members of the OECD are the governments of 30 of the world's most developed economies.

His responsibilities cover the domains of S&T policy, innovation and international S&T co-operation; information and communications technologies including telecommunications, electronic commerce, Internet and other new technologies, notably biotechnology; in addition to issues related to industry, entrepreneurship and the impacts of technology, globalization and structural change on the economy and society. He leads the efforts of the Directorate in relation with non-member countries, including developing, emerging and transition economies.

Before being appointed to his present position in 2001, Mr. DRYDEN was the Head of the Information, Computer and Communications Policy Division of the DSTI. He joined the Directorate in 1987, and has held several other senior positions. A British citizen, he worked in the Cabinet Office of the U.K. government before joining the OECD in 1980.

Clemente FORERO-PINEDA

Clemente FORERO-PINEDA is professor at *Universidad de los Andes School of Management,* in Bogotá Colombia. The main focus of his current research is on global intellectual property institutions and their impact on science and innovation in developing countries. He was Dean of the School of Economics at *Colombia's National University* and Director General of Colombia's National Science Fund (*Colciencias*). He earned a certificate in Mathematics and Physics, and an Engineering degree at the *Institut National des Sciences Appliquées* de Lyon (France). He completed an MA and a PhD in economics at *Stanford University*.

Tony HEY

Tony HEY is now Corporate Vice-President, Technical Computing at Microsoft. Before this he was Professor of Computation at the University of Southampton and had been both Head of the School of Electronics and Computer Science and Dean of Engineering and Applied Science at Southampton. From March 31st 2001 until June 2005, he was Director of the UK's national e-Science Program. He is a Fellow of the Royal Academy of Engineering, the British Computer Society, the Institute of Physics and the Institution of Electrical Engineers (IEE). Professor HEY is European editor of the journal 'Concurrency and Computation: Practice and Experience' and has been on the organizing committees of many international conferences. He is also a member of the Global Grid Forum Advisory Committee and of numerous scientific advisory boards at both national and project level in both Europe and the USA.

Professor HEY has worked in the field of parallel and distributed computing since the early 1980's and has published over 100 papers. He was instrumental in the development of the MPI message-passing standard and of the Genesis Distributed Memory Parallel Benchmark suite. His personal research interests are concerned with performance engineering for Grid applications but he also retains an interest in explorations of quantum computing and quantum information theory.

Tony HEY is also the author of two popular science books: 'The New Quantum Universe' and 'Einstein's Mirror'. He also edited the 'Feynman Lectures on Computation' for publication, and produced a companion volume entitled 'Feynman and Computation'.

Shuichi IWATA

Professor, Graduate School of Frontier Sciences, The University of Tokyo, working for "Data and Society"; President of CODATA (Committee on Data for Science and Technology) / Chairman of the 122 Committee, JSPS/Vice-Chairman of Knowledge Infrastructure Committee (MEXT, METI)

Born on January 29, 1948 in Chiba, Japan; 1975 PhD., Nuclear Engineering, University of Tokyo/1978-1991 Lecturer, Associate Professor Metallurgy Div., Engineering Research Institute, Nuclear Engineering, University of Tokyo/Guest Researcher, Fachinformations Zentrum, BRG(1985-1986) 1991-: Professor, Design Science, Life Cycle Engineering, Director of RACE, Graduate Schools of Engineering and Frontier Sciences; Award and Honors: Honda Memorial Young Researcher Award/ Iketani Science Foundation Award/ Promotion of Science and Technology Information Award, Japan Science and Technology Agency/ Paper Award, The Japan Institute of Metals/ GIW Best Paper Award. For more details, please visit http://mori.q.t.u-tokyo.ac.jp/~iwata/

Lawrence LESSIG

Lawrence Lessig is a Professor of Law at Stanford Law School and founder of the school's Center for Internet and Society. Prior to joining the Stanford faculty, he was the Berkman Professor of Law at Harvard Law School, and a Professor at the University of Chicago. He clerked for Judge Richard Posner on the 7th Circuit Court of Appeals and Justice Antonin Scalia on the United States Supreme Court.

Professor Lessig represented web site operator Eric Eldred in the ground-breaking case Eldred v. Ashcroft, a challenge to the 1998 Sonny Bono Copyright Term Extension Act. He has won numerous awards, including the Free Software Foundation's Freedom Award, and was named one of Scientific American's Top 50 Visionaries, for arguing "against interpretations of copyright that could stifle innovation and discourse online."

Professor Lessig is the author of Free Culture (2004), The Future of Ideas (2001) and Code and Other Laws of Cyberspace (1999). He chairs the Creative Commons project, and serves on the board of the Free Software Foundation, the Electronic Frontier Foundation, the Public Library of Science, and Public Knowledge.

Professor Lessig earned a BA in economics and a BS in management from the University of Pennsylvania, an MA in philosophy from Cambridge, and a JD from Yale. Professor Lessig teaches and writes in the areas of constitutional law, contracts, and the law of cyberspace.

For more information, please see Steven Levy's profile of Professor Lessig in the October 2002 issue of Wired: Lawrence Lessig's Supreme Showdown or see his curriculum vitae.

Elizabeth LONGWORTH

Elizabeth LONGWORTH (New Zealand) is the director of the Information Society Division, UNESCO. She holds a Bachelor of Laws degree (LLB) from Victoria University of Wellington, New Zealand (1977). In 1979, she was called to the bar of the High Court of New Zealand as a Barrister and Solicitor. She also holds a Master of Laws degree (LLM) awarded by Osgoode Hall Law School, York University, Canada.

Since December 2000, Ms LONGWORTH was the Director of the ICT Sector at New Zealand Trade and Enterprise, New Zealand’s national economic development agency. She was responsible for the development and implementation of national strategies and programs on ICT. This work included the “enablement” potential of the technology to deliver benefits in education and health, as well as other social and economic benefits.

Prior to her work in economic development, Ms LONGWORTH practiced law in New Zealand and developed a specialist legal and international consultancy practice advising on a wide-range of areas, including information policy issues, privacy, e-commerce, dispute resolution, bioinformatics and global information infrastructure.

She has longstanding experience working with international agencies such as OECD, WIPO, and UNESCO, with whom she has collaborated in areas such as transborder data flows, online dispute resolution, e-privacy, copyright and patenting, global networks and e-commerce. She is a trained mediator and facilitator and until recently was a member of the WIPO Panel of Neutrals. From 1998 to 2000, she chaired the New Zealand telecommunications industry body on number administration and portability. Her committee work included being an adviser to the New Zealand Law Commission on E-commerce.

Ms LONGWORTH has attended and chaired numerous international meetings and symposia both in her personal capacity and as a representative of New Zealand. She was a member of the New Zealand National Commission for UNESCO, has been closely associated with many activities of UNESCO's Communication and Information Sector and *inter alia* chaired one of the expert meetings on the draft recommendation concerning the promotion and use of multilingualism and universal access to

cyberspace. She has authored numerous articles in her fields of specialization. Her publications include an extensive text of New Zealand's privacy laws, and she was a contributing author to International Laws of Cyberspace, published by UNESCO 2000.

Koichiro MATSUURA

Mr. Koichiro MATSUURA was appointed on 12 November 1999 to serve a six-year term as Director-General of UNESCO by the Organization's General Conference. Mr. MATSUURA, born in Tokyo in 1937, has served as Japan's Ambassador to France since 1994. Mr. MATSUURA was educated at the Law Faculty of the University of Tokyo and at the Faculty of Economics of Haverford College (Pennsylvania, USA) and began his diplomatic career in 1959. Posts held by Mr. MATSUURA include those of Director-General of the Economic Cooperation Bureau of Japan's Ministry of Foreign Affairs (1988); Director-General of the North American Affairs Bureau, Ministry of Foreign Affairs (1990); and Deputy Minister for Foreign Affairs. He has also served as the Chairperson of UNESCO's World Heritage Committee for one year, until November 1999.

Danny QUAH

Danny QUAH is Professor of Economics at The London School of Economics and Political Science, and Director of the Andrew Mellon program on Information Technology and the Weightless Economy at LSE.

QUAH obtained his Ph.D. from Harvard University and his A.B. from Princeton University. He joined LSE in 1991 after having taught as an assistant professor in MIT's Economics Department. In the UK, he has served on the Academic Panels of H.~M.~Treasury and the Office for National Statistics. QUAH is a Research Fellow at the Centre for Economic Policy Research in London and a Governor of the National Institute of Economic and Social Research.

From 1996 through 1998, he held a British Academy Research Award to study ``Growth and distribution in dematerialized, knowledge-based economies'', and from 1998 through 2000, an ESRC award for ``Trade and growth across weightless economies.'' In July 1998 the Andrew W. Mellon Foundation awarded him a grant for continued study of the weightless economy and the economics of information technology. He continues to work on income distribution dynamics, in research partly financed by the MacArthur Foundation. To do much of his empirical research, QUAH has developed his own econometrics shell tsrf, which he makes freely available (under the GNU Public License).

QUAH is on the editorial board of the *Journal of Economic Growth*. He had previously served on the editorial boards of *European Economic Review Journal of Applied Econometrics*, *Macroeconomic Dynamics* and *Review of Economic Studies*, and was Program Chair for the year 2000 European Economics Association Annual Congress.

His publications include papers in *American Economic Review*, *Econometrica*, *Economic Journal*, *European Economic Review*, *International Economic Review*, *Journal of Economic Growth*, *Journal of Monetary Economics*, *Journal of Political Economy*, and *Scandinavian Journal of Economics*. He has delivered the Sir Richard Stone Lectures, Invited Lectures to the Econometric Society, the International Economic Association, the Royal Economic Society, and the Scottish Economic Society. At the LSE, QUAH has taught research courses in macro-econometrics, the first-year postgraduate macroeconomics course, and the introductory undergraduate microeconomics course to over 700 first-year students.

QUAH contributes regularly to the news media in London and elsewhere. Some of his weightless economy writings have been translated into 18 different languages. In January 2001 he was named one of ten heroes of dissemination by the ESRC. QUAH used to be co-WebWeaver at http://econ.lse.ac.uk/.

Michael SPENCE

Dr. Michael SPENCE is Head of Social Sciences Division in the University of Oxford and a Fellow of St Catherine's College, Oxford. He is a consultant to the London law firm, Olswang. Regularly teaching, researching and speaking in the United Kingdom, Germany, Italy, the United States, Japan and Australia, Michael has a comparative perspective on the law. His work includes articles and books on both intellectual property law and the law of obligations, with a critical focus on suggested ethical and economic justifications of the existing regimes. With Paul DAVID of the Oxford Internet Institute and Stanford University he wrote the report "Towards Institutional Infrastructures for e-Science: The Scope of the Challenge".

John SULSTON

John SULSTON, PhD, FRS graduated from the University of Cambridge in 1963. From 1969 he worked at the Medical Research Council Laboratory of Molecular Biology, studying the biology of the nematode, *Caenorhabditis elegans*. In 1992 he was drawn into the Human Genome Project, directing the Wellcome Trust Sanger Institute until 2000. In 2002 he co-authored with Georgina Ferry The Common Thread, an account of the science, politics and ethics of this enterprise. He shared the Nobel Prize in Physiology or Medicine in 2002. For more information, visit:
http://www.sanger.ac.uk/Info/Press/2002/021007.shtml

Xian-En ZHANG

Dr. Xian-En ZHANG graduated from Hubei University with Bachelor degree in Biology in 1982, and later received Master degree in microbiology and PhD in biochemistry in the Wuhan Institute of Virology, Chinese Academy of Sciences (WIV-CAS) and the Institute of Microbiology, Chinese Academy of Sciences, respectively. He became a full professor in 1993 and deputy director of WIV-CAS in 1992. He has been visiting professor in a few universities. From 1999 to 2001, he acted as the Head of the presidential board of Wuhan Branch, Chinese Academy of Sciences.

He has published about 90 scientific research papers in international and domestic journals in field of analytical biotechnology. He is the author of three books in biosensors and biochips, and the holder of five patents.

Since 2002, he has been served in the Ministry of Science and Technology of China as the director general of basic research department. His current career is management of national major programs for science development, as well as the leader of the working group of China Scientific Data Sharing Program.

BIOGRAPHICAL INFORMATION: CASE STUDY PRESENTERS

Stephen CARSON

Stephen CARSON is Senior Strategist for MIT OpenCourseWare (MIT OCW). He coordinates MIT OCW's support of opencourseware projects at other institutions; manages special initiatives in priority areas; and plans and executes evaluation data collection, integration and reporting for MIT OCW. Stephen was previously a member of the MIT OCW publication team, working with faculty in the MIT School of Humanities, Arts, and Social Sciences. Prior to joining the MIT OCW team, Stephen served as Associate Director of Emerson College's Division of Continuing Education in Boston, where - in addition to managing core academic activities of the division - he developed and taught Emerson's first asynchronous, Web-based distance learning course. Stephen earned his MFA in Creative Writing from Emerson College, and taught creative and expository writing there for five years.

Igor CHERNOBAY

Dr. Igor Chernobay is the Chief of the Services, Review and Training Section of the International Data Centre (IDC) Division of the Preparatory Commission for Comprehensive Nuclear Test-Ban Treaty Organization (CTBTO). He coordinates the review and quality control of automatic and interactive IDC products, provision of technical support and services to National Data Centres (NDCs) and the IDC training programme for NDC managers and technical staff. He is the Project Manager for the first System-Wide Performance Test aimed at testing and evaluating the performance of the verification system elements: the certified International Monitoring System stations, the IDC and the Global Communication Infrastructure. Prior to joining the IDC team, Dr. I. Chernobay served as a Division Deputy Director at Geophysical Service of the Russian Academy of Sciences where he coordinated .the operation of both seismological network and data processing.

James EDWARDS

Dr. James EDWARDS is the Executive Secretary of the Global Biodiversity Information Facility (GBIF), an intergovernmental organization devoted to making biodiversity data freely and openly available via the Internet. He is also the Director of the GBIF Secretariat in Copenhagen, Denmark. He received his B.S. (1967) and Ph.D. (1976) degrees from the University of California at Berkeley. His research interests are the systematics and functional morphology of amphibians and fishes, and biodiversity informatics. From 1974-1976, Dr. EDWARDS was an Instructor in the Biology Department at Queens College of the City University of New York, and from 1976-1982 he was an Assistant and Associate Professor in the Zoology Department at Michigan State University. In 1982, he took a position in the Directorate for Biological Sciences at the US National Science Foundation (NSF), which funds the vast majority of non-medical biological research at US colleges and universities. While at the NSF, he served successively as Program Director for several programs (Systematic Biology, Biological Research Resources, Field Stations and Marine Laboratories, and Biotic Surveys and Inventories), as Deputy Division Director for Biotic Systems and Resources, and as Deputy Assistant Director for Biological Sciences. In the latter capacity, he was the second-in-command of a yearly budget of approximately $500 million. Dr. EDWARDS served on several Federal task forces, and was the chair of an interagency steering committee on Biological and Ecological Informatics. He also chaired a working group on Biological Informatics of the Mega-science Forum of the Organisation for Economic Co-operation and Development (OECD), which in 1999 recommended the formation of the GBIF. Dr. EDWARDS then chaired the Interim Steering Committee which developed the Memorandum of Understanding for the organization and recruited the requisite number of governmental members and funding to allow it to come into existence in March, 2001. Currently, he is on a five-year leave of absence from NSF in order to serve as the Executive Secretary of GBIF.

H.P. KHINCHA

Prof. H P KHINCHA received his B.E. (Electrical) II Rank from Bangalore University in 1966, ME (Power Systems) I Rank and PhD from the Indian Institute of Science in 1968 and 1973 respectively. He then joined the Department of Electrical Engineering as a Lecturer in July 1973. He was promoted as Assistant Professor during 1977, as Associate Professor in October 1982, and subsequently became a Professor at the Department of Electrical Engineering from October 1988. He was the Coordinator for the Quality Improvement Program, Government of India, IISc, from 1984-1986, Chairman, Centre for Scientific & Industrial Consultancy, from October 1986 to August 1989, and Chairman, Department of Electrical Engineering from February 1989 to March 1992. He has also served as visiting scientist, University of Calgary, Canada from 1975-76 and senior visiting fellow, National University of Singapore from 1994-1995. Prof. KHINCHA was the Chief Executive, Society for Innovation and Development from 1996 to 2001, Chairman, GATE from 1997 to 2001. He is now the Head of Industrial Relations & Knowledge Based Services. Presently, he is holding the position of Chairman, Division of Electrical Sciences, since October 2001.

He has to his credit over 160 publications in International and National Journals. He is a Senior member of IEEE and a number of Professional Bodies. Besides, he is a Fellow of the Institution of Engineers, Founder member of Indian Academy for Mathematical Simulation in Engineering and science, Senior Associate, National Institute of Advance sciences, IISc Campus. His areas of research include Power Systems and the main areas of activities are power system control, protection, planning and operation studies and computer applications.

He has been actively involved with the industries utilities and electricity organizations as advisor, consultant and member of committees for technical and techno economical problem solving and decisions. Prof. KHINCHA was responsible for (1) the Planning of Transmission System for evacuation of power from new hydro/thermal generation facilities Techno-Economic Comparison, and (2) planning and Design for Distribution systems and their expansion for the cities of Kandhar and Heart. Presently he is associated with a number of projects of direct relevance to industry as an Advisor.

He was the recipient of a Gold Medal by the Central Board of Irrigation and Power for the Paper 'On-line Computations for Power System Control', January 1973, and for the Report on 'Design and Development of Sensitive Solid State Protective Devices', March 1977. He has received a certificate of Merit by the CBI &P for the Paper 'A Static Sampling Quadrilateral Distance Relay, in January 1972 and 'Off Line Computations to Power System Protection, Parts I and II, in 1973. He was also awarded 'Outstanding Young Person 1978 Award' by Bangalore Garden Jaycees.

He has been involved in teaching undergraduate and post-graduate curses to students, actively involved in organizing short term courses, conferences, seminars (over 25) and deliver special lectures to utility engineers/industries, power system Training Institute. Apart visiting a number of countries for attending national and international Workshops/Conferences, etc., he has served as a member of a number of Organizing Committee of National and International Workshops, Conferences, Advisory Committees and Review Committees.

Patti KRISTJANSON

Dr. KRISTJANSON is a Canadian agricultural economist whose expertise includes poverty analyses, impact assessment, agricultural policy analysis and implementation, and agricultural production and marketing systems analysis. She has 16 years of post-graduate experience leading and managing multidisciplinary teams from international and national agricultural research centers, in collaboration with universities, donors nd governments in 15 African countries, Peru, India, and 5 SE Asian countries. She has teaching experience at the University level and in applied economic and policy analysis training in Africa and Asia. She is currently a leader of the 'Poverty, Sustainable Livelihoods and Livestock' program at the International Livestock Research Institute, based in Nairobi, focusing on better understanding the role that livestock can play in sustainable poverty alleviation throughout the developing world and the policy and technology implications. In the last 5 years, she has published 21 peer-reviewed articles in journals and proceedings, is an author of 2 books and 3 book chapters, and has presented numerous papers at international conferences.

Ulrich PÖSCHL

Ulrich PÖSCHL is heading a research group at the Max Planck Institute for Chemistry, Biogeochemistry Department (M. O. Andreae) in Mainz, Germany. He has studied chemistry at the Technical University of Graz, Austria, and he has worked as a postdoctoral fellow, research scientist, group leader, and university lecturer at the Massachusetts Institute of Technology, Department of Chemistry and Department of Earth, Atmospheric, and Planetary Sciences (M. J. Molina, 1995 Nobel Laureate); at the Max Planck Institute for Chemistry, Atmospheric Chemistry Department (P. J. Crutzen, 1995 Nobel Laureate); and at the Technical University of Munich, Institute of Hydrochemistry (R. Niessner). His current research and teaching activities are focused on the properties and interactions of aerosols and their effects on atmospheric chemistry and physics, climate, and public health (field measurements, laboratory experiments, and modeling of aerosol particle composition, structure, reactivity, and water interactions). As the initiator and chief executive editor of the interactive open-access journal *Atmospheric Chemistry and Physics* (ACP, www.atmos-chem-phys.org) he has started and established an innovative and successful initiative for improved scientific publishing and quality assurance in collaboration with a globally distributed network of co-editors. Moreover, he serves as the president of the Atmospheric Sciences Division of the European Geosciences Union (EGU, www.copernicus.org/EGU).

Elliot SIEGEL

Elliot R. SIEGEL is Associate Director for Health Information Programs Development at the National Library of Medicine (Bethesda, Maryland), a component of the National Institutes of Health, and the Department of Health and Human Services. He oversees NLM's offices of planning and evaluation; outreach development; and international programs. Dr. SIEGEL put in place the long range planning function that for two decades has strategically set the goals and priorities for NLM's research and service activities. Dr. Siegel coordinates the Library's nationwide outreach initiative for minority and underserved populations. He launched the Tribal Connections program to connect Alaska Native villages and American Indian reservations to the Internet and accessible electronic health information resources that help reduce health disparities. A similar capacity development initiative was successfully undertaken with malaria research laboratories in Sub-Saharan Africa. Dr. SIEGEL's current research interests include the creation of new methodologies and metrics that have been broadly applied to the study of medical information system performance, and 'E-Government' web site usage and impact. Dr. SIEGEL serves on book and journal editorial boards in health informatics and information science, and is Editor-in-Chief of the journal *Information Services and Use.*

Anne-Marie VERCOUSTRE

Dr. Anne-Marie VERCOUSTRE is a senior researcher at INRIA, France, in the Axis group involved in usage-centered Analysis of Information Systems. She holds a PhD in Statistics from the University of Paris-6. Her main research interests are in structured documents (SGML/XML-like), Web technologies, XML search, and the reuse of information from heterogeneous and distributed sources. She spent about five years at CSIRO, Australia, where she was involved in Technologies for Electronic Documents and Knowledge Sharing. Back to INRIA she is now focusing on research for XML document mining. Anne-Marie VERCOUSTRE is also responsible for the dissemination of INRIA Scientific and technical Information, through projects like INRIA Open Archive (HAL-INRIA) and the exploitation of the Activity Report.

John WILBANKS

John WILBANKS is the Executive Director of Science Commons, a project of the non-profit organization Creative Commons. He came to Creative Commons from a Fellowship at the World Wide Web Consortium in Semantic Web for Life Sciences. Previously, he founded and led to acquisition Incellico, a bioinformatics company that built semantic graph networks for use in pharmaceutical research & development. Before founding Incellico, John was the first Assistant Director at the Berkman Center for Internet and Society at Harvard Law School. He was previously a legislative aide to U.S. Representative Fortney (Pete) Stark and a grassroots coordinator and fundraiser for the American Physical Therapy Association. John holds a Bachelor of Arts in Philosophy from Tulane University and studied modern letters at the Université de Paris IV (La Sorbonne).

BIOGRAPHICAL INFORMATION: CASE STUDY CHAIRS AND RAPPORTEURS

Robert CHEN

Dr. CHEN is Deputy Director and a Senior Research Scientist with CIESIN, the Center for International Earth Science Information Network, a unit of the Earth Institute (EI) at Columbia University. He manages the Socioeconomic Data and Applications Center (SEDAC), a data center in NASA's Earth Observing System Data and Information System. He is currently Secretary-General of CODATA and an ex officio member of the Task Group on Data and Scenario Support for Impacts and Climate Analysis (TGICA) of the Intergovernmental Panel on Climate Change (IPCC). Dr. CHEN serves as CIESIN's Technical Representative to the Open Geospatial Consortium (OGC) and is a member of the Scientific Advisory Council of the Meadowlands Environmental Research Institute (MERI) of the New Jersey Meadowlands Commission.

Dr. CHEN manages several cooperative agreements with the U.S. Federal Geographic Data Committee (FGDC) on spatial data management and has recently completed a project on managing geospatial electronic records with the National Historical Publications and Records Commission (NHPRC). He co-led a major collaborative project on the assessment of global natural disaster risks with the Center for Hazards and Risk Research at Columbia University, the Hazard Management Unit of the World Bank, and other partners. Dr. CHEN coordinated CIESIN's spatial analysis and mapping support to the Millennium Development Project led by EI Director Jeffrey Sachs and oversees other projects on poverty mapping, sustainability indicators, and public health applications of Earth science data.

Dr. CHEN received his Ph.D. in geography from the University of North Carolina at Chapel Hill and holds Masters and Bachelors degrees from the Massachusetts Institute of Technology.
For further information, see: http://www.ciesin.columbia.edu/chen.html.

Jean-Michel DALLE

Jean-Michel DALLE is an Adjunct Professor with University Pierre-et-Marie-Curie and a researcher with IMRI - University of Paris-Dauphine. He studies the economics of knowledge and innovation, and has focused since 1998 on issues related to software and open-source software. He is also Director of Agoranov, a major non-profit science-based incubator located in Paris. M. DALLE graduated from Ecole Polytechnique and ENSAE, and holds a PhD in economics also from Ecole Polytechnique.

Bernard DUMOUCHEL

Bernard Dumouchel is a career librarian and information specialist, with Bachelor's degrees in history and library science, and an M.L.S. from the University of Western Ontario's School of Library and Information Science (now the Faculty of Information and Media Studies). He began his career in 1970 as a community college librarian. In 1982, he joined the Library of Parliament as Director, Technical Services Branch. In 1987, he came to the National Research Council's Canada Institute for Scientific and Technical Information (CISTI) as Director, Resource Development. He became Director General of CISTI in 1998 after having served in an acting capacity since Fall 1997.

CISTI is the largest scientific, technical and medical (STM) library in North America, and the most important sci/tech publisher in Canada. As Director General, Mr. Dumouchel envisions CISTI as a key driving force in the exploitation of scientific information. He aims to strengthen CISTI's position as a knowledge broker, providing high-value and specialized STM information and publishing services to researchers and innovators in the academic, private and public sectors. Equally important is his work to establish CISTI as a world leader in harnessing the power of digital STM information and facilitating its exploitation. Under his leadership, CISTI is working with information organizations in Canada and abroad to develop a national "infostructure" to provide universal, seamless and permanent access to the world's STM information.

Mr. Dumouchel holds several positions in the broader library community, including Vice-chair of the Council of Federal Libraries, Vice-president of the International Council for Scientific and Technical Information (ICSTI), and President of the OCLC Canada Advisory Council. He is also a member of the Canadian Association of Research Libraries and of the Association of Research Libraries.

In 2001, he was honored by the Canadian Association of Research Libraries with the Distinguished Service to Research Librarianship Award and, in 2005, by the National Research Council with an Outstanding Achievement Award.

Roger ELLIOTT

Prof. Sir Roger (James) ELLIOTT, Kt., F.R.S was educated at New College (Oxford); B.A. (Mathematics) 1949, D.Phil. (Theoretical Physics) 1952. Academic appointments include:

1952-53	Research Associate, University of California, Berkeley
1953-55	Research Fellow, A.E.R.E., Harwell
1955-57	University Lecturer, Reading
1957-64	University Lecturer, Oxford
1957-74	Fellow and Tutor, St. John's College
1964-74	Reader (*ad hominem*), Oxford
1974-89	Wykeham Professor of Physics, Oxford
1989-96	Professor of Theoretical Physics, Oxford (now Emeritus)

University Appointments

1969-70	Senior Proctor
1971-88	Member of Hebdomadal Council
1971-88	Delegate of Oxford University Press; from 1976 Chairman of Finance Committee
1988-93	Secretary to the Delegates and Chief Executive, Oxford University Press

Awards

1968 Maxwell Medal, Physical Society
1984 Hon. D.Sc. (Paris)
1990 Guthrie Medal, Institute of Physics
1991 Hon. D.Sc. (Bath)
1993 Hon. D.Sc. (Essex)

Publications

4 Books and some 200 articles on theoretical solid state physics in learned journals
See also `Disorder in Condensed Matter Physics' - Volume in Honour of Roger Elliott, ed. J.A. Blackman and J. Taguena (OUP, 1991)

View Prof. Sir Roger (James) ELLIOTT's full Curriculum Vitae here:
http://hermes.physics.ox.ac.uk/user/RogerElliott/cv.html

Rishab Aiyer GHOSH

Since 1995 - (Founding) international and managing editor of First Monday, a peer-reviewed journal covering Internet economics, law and technology. Since 1999 - jury member, Global Bangemann Challenge (now Stockholm Challenge Award), a prestigious prize awarded to IT projects with socio-economic impact by the mayor of Stockholm. 1999 - Founder Member of the GII Internet Commerce Brain Trust. 1995 - 1999: editor, The Indian Techonomist, analytical newsletter on Indian media and communications targeted at a global audience. 1996 - 1999: analyst/newsletter contributor, Indian communication and media markets for US-based Paul Kagan Associates. 1994-1995: Writer of a widely distributed weekly column on Internet society, Electric Dreams, http://dxm.org/dreams/ . Since 1990: written widely, with over half a million words published in journals, newspapers and magazines worldwide, from PC Quest India to Wired Magazine, USA. 2000 onwards - initiated and led the FLOSS project and started a research focus on open source software

Wendy GORDON

Wendy J. Gordon is Professor of Law and Paul J. Liacos Scholar in Law at Boston University (USA), where she is Advisor to the Intellectual Property Concentration. Her work focuses on the ethical and economic analysis of the various legal regimes regulating information and expression. Currently Chair-Elect of the Section on Intellectual Property of the Association of American Law Schools and First Vice-President of the Society for Economic Research on Copyright Issues, she has been a Fulbright Scholar, a Visiting Senior Research Fellow at St. John's College, Oxford, a visiting fellow at Oxford's Programme in Comparative Media Law and Policy, a visiting scholar in Comparative Media Law and Policy at MIT, and a member of the editorial board of the Encyclopedia of Law & Economics. She speaks widely, and has published in Australia, Canada, England, Germany, and India, as well as in the US. For more information about her activities and publications, see http://www.bu.edu/law/faculty/profiles/gordon/ and http://www.bu.edu/law/faculty/profiles/gordon/scholarship.html.

Herbert GRÜTTEMEIER

Herbert Grüttemeier is project manager and head of international relations at INIST (Institute for Scientific and Technical Information), a unit of the French CNRS (National Center for Scientific Research). After having received a doctorate degree in mathematics from University of Marseille , he worked several years in German and French universities and high schools, before joining INIST in 1990. Prior to his present work, Herbert was successively involved in INIST's two main traditional activities, database production and document delivery, as well as in library management. In his current position he has, in particular, participated in the INIST actions that aim at promoting Open Access models for the dissemination of scientific information and data, and has presented, at several recent occasions, the actual CNRS policy in this field in an international context. His work has also been focussing on the management of co-operation projects for developing information services in Third World countries. Herbert serves as a Bureau member of the International Council for Scientific and Technical Information (ICSTI).

Alexei GVISHIANI

Alexei Gvishiani is the director of the Centre of Geophysical Data Studies and Telematics Applications in the Russian Academy of Sciences and a professor of mathematics at Moscow State Lomonosov University. Dr. Gvishiani holds a Ph.D. in mathematics from Moscow State Lomonosov University and a doctor of sciences from Moscow Schmidt Institute of Physics of the Earth. Since 1994 he has been the vice-president of the European-Mediterranean Seismological Centre. His areas of scientific interest include artificial intelligence and applied mathematics in applications related to geophysical data acquisition, processing, and analysis, as well as the Internet and telematics applications for science, education, and the environment. Professor Gvishiani was recently elected vice-president of CODATA.

Sara GWYNN

Sara Gwynn is the Coordinator of Programme for the Enhancement of Research Information (PERI). PERI is a programme of the International Network for the Availability of Scientific Publications (INASP). Established in 1992 as a programme of the International Council for Science (ICSU), we work with partners around the world to encourage the creation and production of information, to promote sustainable and equitable access to information, to foster collaboration and networking, and to strengthen local capacities to manage and use information and knowledge.

PERI delivers 'global' information to researchers in developing countries; it stimulates and supports the publication and dissemination of in-country research findings, and it provides training for local researchers, practitioners, librarians and publishers in information production, organization, access and dissemination. PERI is guided by local demands and is coordinated by local organizations. It brings together governments, research institutes and academia, development agencies, commercial and non-commercial publishers, libraries, editors, trainers and information providers.

Sara's first degree was in Physics and prior to joining INASP she worked for the Institute of Physics Publishing, taught Information Systems and did research into the impact of electronic publication on the research process.

Krishan LAL

Lecturer in Physics (1961-62); S.S.A. SSPL (DRDO)- 1962-63; Joined NPL as Post Doc Fellow in Dec 1963 and Scientist B in Feb 1966 and rose to be Director Grade Scientist in 1990. Served as Director, NPL during 2000-2003 and granted Extension in service till 2005. Dr. Krishan LAL has made significant contributions in research and development, scientific leadership, and developing international collaboration. Dr. LAL’s research work on lattice imperfections in crystals, X-ray diffraction physics, and crystal growth has led to deeper understanding of the nature of real materials and their interaction with radiation and external fields. During Dr LAL’s Directorship, NPL had shown an impressive enhancement in R&D output, remarkably improved IPR protection, consistent increase in calibration services and resource generation.

Dr. LAL was awarded an Honorary Doctorate, Russian Academy of Sciences, 1998; (ii) Fellow, Indian National Science Academy (INSA), New Delhi; (iii) Fellow, National Academy of Sciences' India, Allahabad; (iv) Vice President, CODATA,2004-, (v) Editor, Zeitschrift für Kristallographie –1996-2003; (vi) Member, Asia Pacific Network on Materials Evaluation Technology, Korea, 2002-; (vii) Member, Asia-Pacific Academy of Materials, 1997-; and (viii) President, Indian Crystallography Assoc. 2003-.

Dr. Krishan LAL is Honorary Professor, Indian Institute of Technology (IIT), Kanpur. He was IBM India Fellow at Watson Research Centre, New York; Visiting Professor, University of Tokyo, Tokyo, Technical University Darmstadt, Darmstadt and Sr. Visiting Scientist at Physikalisch-Technische Bundesanstalt, Braunschweig. He was Visiting Professor IIT Delhi and Jamia Millia Islamia and Adjunct Professor, IIT Kharagpur. Also, presently Director, CEL Sahibabad and Chairman, Executive Committee, National Science Centre, Delhi for North Zone.

Dr. Krishan LAL has been Chairman of six International Symposia/Workshops/Schools. He has delivered more than 100 invited talks in reputed national/international conferences. Dr Krishan LAL has edited eight Books/Volumes, published 22 Invited Papers in journals / Chapters in Books, more than 100 research papers in refereed journals and 7 patents to his credit.

Barry MAHON

Holds a Masters Degree in Information Science. He ran an information service for industrial users in Ireland before being seconded to the European Union in 1978 to manage the first telecommunications network dedicated to online information. From 1985 to 1991 he set up and managed one of the first email services in Europe and supervised EU research projects. From 1991 to 1996 he was Executive Director of Eusidic, the European Association of Information Services.

Following two years as a volunteer development worker in West Africa in 1997/98, he now works in a half time capacity as the Executive Director of ICSTI, the International Council for Scientific and Technical Information and carries out consultancy work as an Associate Advisor at TFPL, London.

Mohamed NAJIM

Mohamed NAJIM, born on 8 June 1945, Ain Sbit, Morocco. He received the Engineering degree from the ENSEIRB, Bordeaux, 1967 and the Dr.Sci. degree from the University of Toulouse (France) in 1972 (Doctorat d'Etat ès Sciences Physiques).

In 1972, he joined the University of Rabat, Morocco, where he became a Professor in 1974. He founded and was the first director of the ENSIAS, Ecole Nationale Supérieure d'Informatique et d'Analyse des Systèmes within the University Mohamed V, Rabat, Morocco. Since 1988, he has been Professor with the ENSEIRB/University of Bordeaux, France, where he founded the Signal and Image Processing Laboratory. He has worked in various fields, including microwaves, modeling and identification, adaptive filtering and control. His research interests are presently modeling and identification in multidimensional signal and image processing with applications in speech, seismic, biomedical, radar signal processing, textures, and image enhancement. He supervised more than 50 Ph. D. theses and published over 220 scientific papers and co-authored several books, including "Parametric Modelling in Image Processing" (Paris, France: Masson, 1994).

He is author of the book "Modelling and Identification in Signal Processing" (Paris, France:Masson, 1988). He lectured in various universities all over the world: Princeton, Technion, Peking University, Max Planck Institute, EPFL, Bologna, Xian, Shanghai, Budapest, Stanford, Madrid, Havana, Al Quds, Caracas...etc… He set up the "CAD Software Library" group within the GDR-CNRS TdSI, which is a French research program on signal and image processing. M. NAJIM has organized 15 international conferences on Control, Signal Processing, and Friendly Exchange through the Internet. He is the Co-chairman of the IEEE Statistical Signal Processing Conference05 to be held in Bordeaux, July 2005. He was the Editor of numerous symposia proceedings. From 1981 to 1990, he was a member of the IFAC Technical Board. He is currently a member of the Technical Committee on Digital Signal Processing of the IEEE Circuits and Systems Society. Since 1999, he has been an elected Associate Member of the Third World Academy of Sciences. He has managed various projects with industrial partners (including Texas Instruments, Digital Equipment, ST Microelectronics, OCP the Moroccan Phosphate Authority). He is currently the head of the LASIS a joint TOTAL /CNRS laboratory (CNRS: the French NSF). Professor NAJIM has been the Vice –President of the UNESCO IIP (Intergovernmental Informatics Programme).

Jean-Jacques ROYER

Jean-Jacques ROYER is a CNRS Research Engineer. His research interests and active projects include:

- Numerical modeling of heat and mass transfers in reservoirs
- Characterization of rock properties using seismic attributes. Application to the estimation of uncertainty of rock properties using geostatistical methods (in coll. with IFP)
- Advanced geostatistics for quatifying spatial variability and uncertainty of natural objects
- Applied geostatistics
- Modeling fluids and thermal transfers at the Soultz geothermal site (CEE, ECODEV Projects)
- Fluid circulation and crustal cooling at large scale in S. Limousin (GéoFrance3D program)
- Modeling alteration using archeometallurgic slags as natural analog of vitrified wastes (in coll. with A. Ploquin and the CEA)
- Developing 3D numerical methods for modeling thermal and mass transfers in reservoirs (THERMASS projects) in connection with gOcad
- Application to real case studies (Soultz geothermal site, French Massif Central ore deposits, Oklo natural fission reactor)

He teaches various courses at the Ecole Nationale Supérieure de Géologie (ENSG), Nancy, CESEV - ENSG, DEA - Université Henri Poincaré, in addition to supervising several Ph-D thesis projects.

He has served as the Treasurer of CODATA since 1986 and as the National Delegate to CODATA since 1998.

View more details here: http://www.crpg.cnrs-nancy.fr/Equipes/FR/royer.html

Peter SCHRÖDER

Peter SCHRÖDER (* 19.09.1943, The Hague, The Netherlands) studied sociology (mental health and epidemiology as minors) at the University of Amsterdam. He worked as a journalist and Rock critic before joining the Ministry of Education and Science as policy advisor for educational support systems. After a stay at Utrecht University managing the multidisciplinary research program 'Urban Networks', he rejoined the Ministry's Directorate of Research and Science Policy as policy advisor on social sciences and information policies.

Focusing on issues of access to data and information for research he acted as secretary of the Auditor General's committee advising on privacy protection in scientific research that led to the establishment of the Scientific Statistical Agency (WSA) in The Netherlands. As co-ordinator for information policy he is involved in E-science programs for cultural heritage and humanities.

Peter SCHRÖDER was co-chair of the CSTP/OECD group chaired by Peter Arzberger that published the report Promoting Access to Public Research Data for Scientific, Economic and Social Development (March 2003, see http://dataaccess.ucsd.edu and see also Science, Vol.303, 1777-1778, 19 March 2004) and secretary to the OECD Drafting Group that framed the draft Guidelines on Access to Research Data from Public Funding in the Declaration endorsed by OECD science ministers at their meeting on 30 January 2004 in Paris (http://www.oecd.org/document/15/0,2340,en_2649_34487_25998799_1_1_1_1,00.html). Currently Peter is drafting a government White Paper on information policies for science.

Paul F. UHLIR

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