



September 2011 Newsletter

Ernie Malamud, Editor

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Disclaimer—The articles and opinion pieces found in this issue of the APS Forum on International Physics Newsletter are not peer refereed and represent solely the views of the authors and not necessarily the views of the APS.

View from the Chair

Harvey Newman

I welcome you to the Fall 2011 issue of the FIP Newsletter and hope you will enjoy its scope and depth, which reflects FIP's engagement with a broad range of international issues, in cooperation with the APS Office of International Affairs, other APS units engaged in these issues including CIFS, FPS, DPF and many others, and sister organizations around the world. Through these newsletters, and our annual sessions at the March and April meetings, we seek to inform FIP members on many issues and current events from an international perspective, particularly where physicists can potentially help.

Perspective and FIP Activities

This has been a very proactive year for members of FIP, as you can see from this as well as the last newsletter. Focus areas of FIP range from the problems and issues faced by young physicists and women in academia and physics research, to the role of science in the advancement of nations, to the views of science and scientists in many countries, to natural and politically generated disasters and their effects on science and society, to scientific aspects of key issues in science society, to the physicist's role as citizen scientist, innovator on the ground, and diplomat. These themes are reflected in FIP's sessions at the 2011 March and April meetings, most of which are summarized in this newsletter, and they will continue as we continue to plan our 2012 sessions, led by Chair-Elect Bill Barletta.

From my point of view, there are two strong themes that stand out on FIP's agenda this year: the international character of science and APS' membership, which also is a central theme of the APS as a whole initiated by President Barry Barish, and the role of the citizen scientist at home and abroad. We are working with the APS to help expand its programs serving or enabling the research and training of our colleagues outside the U.S, whether non-U.S. citizens or U.S. physicists working overseas far from their home university or laboratory.



We have worked with CISA Chair Karsten Heeger and the APS meeting staff to make the March and April meetings more accessible to those who cannot travel to them, by posting selected presentations online using the Indico system widely used by the high energy physics community and increasingly by other fields of physics. As reported by Heeger in this newsletter, the pilot this April-May (see <http://www.physics.wisc.edu/apsapril2011>) has been successful, and eagerly received by physicists for whom this sort of access is already part of their daily lives. We look forward to more general availability of the presentations, and the future inclusion of video and audio recordings of the plenaries and some other major talks (and perhaps also interactive access) that will make them a lasting resource for the physics community.

The Role of the Citizen Scientist

The role of the citizen scientist has never been more important than this year. Physicists pursuing their science internationally, with colleagues overseas and in some cases throughout the globe, are privileged to pursue common goals as a world community, both in the pursuit of fundamental knowledge and for the betterment of mankind. The understanding of common aims and human needs, without borders, is a living reality for many of us, that remains rare in other sectors of society. Equally rare is the commitment by many of us to use our training and expertise to benefit our sister communities in other nations, as well as the nations themselves, even as we train the next generation of physicists in a global context. It is this experience that

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makes us natural spokespeople for, and promoters of international cooperation and peace, based on mutual understanding and trust among nations, founded in our everyday experience.

Why is the role of the citizen scientist so important, and why this year? While there are no continental wars underway in the classical historical sense, 2010-11 has been a period of abrupt and ongoing change and unrest, marked by the convergence of economic, political, and cultural factors leading to rising tensions, instability, unexpected crimes, and both real and potential crises. The last year has been punctuated by: the ongoing “Arab Spring” across North Africa and the Middle East as peoples struggle for democracy and self-determination; the stark polarization of U.S. politics leading to the threat of default; the possible default of Greece and other nations in the Eurozone; the aftermath and challenging lessons of the Fukushima Daichi disaster in Japan; the lingering wars in Iraq and Afghanistan and their human and economic toll; the continued decline of many nations in sub-Saharan Africa beset by drought, disease, lack of infrastructure or energy, political corruption, or all of the above; the push to regional power and continued rights violations in Iran and elsewhere; and the rise of China as a likely superpower and the challenge of the geopolitical changes it will bring. Never has the role of the physicist as citizen scientist, able to cross borders and bridge divides with a sense of common purpose and unflinching optimism, based on a commitment to advance fundamental knowledge and the hope of addressing key current issues from climate to hunger to energy, been more important.

What is the source of our community’s unrelenting optimism, and the driver of growing mutual understanding in the international scientific community? It is our common mission to advance the frontiers of knowledge, while solving many problems that also advance or create new technologies, triggered in the service of our science. We are inspired by our progress, amidst or poised on the cusp of a new generation of discoveries: at the frontier of high energies and energy densities at

the LHC; in the understanding and harnessing of quantum information leading to the dawn of quantum computing; in the understanding of new states of matter, quantum systems and emerging technologies on the nanoscale and mesoscale; in the search for the dark matter in space and on Earth; in the proliferating number and knowledge of exoplanets; in the emergence of a precise picture of the early moments and evolution of our universe, captured in a “standard model” of cosmology; and in theoretical developments driven by a worldwide quest for a quantum theory of gravity. We are pursuing all these aims in a spirit of international cooperation, collaboration and hope for the next round of breakthroughs, convinced that they lie just over the horizon.

Overseas Physics Groups

In its work on international issues, FIP greatly appreciates its continuing partnership, begun in 2006 under then-FIP Chair Irving Lerch, with several overseas physics groups, including:

- American Chapter of the Indian Physics Association (ACIPA), India; Surajit Sen, President. <http://www.physics.buffalo.edu/~sen/ACIPA.htm>
- Association of Korean Physicists in America (AKPA), Korea; Ho Jung Paik. <http://www.akpa.org/>
- Overseas Chinese Physics Association (OCPA), China; Bill Weng, President. <http://www.ocpaweb.org/>
- Iranian-American Physicists (IrAP) Network Group; Hamid Javadi (JPL). <http://irapnetwork.org/>

We meet with the leadership of these groups annually at the FIP Reception, which was held this year during the March meeting in Dallas, where we presented the citation to Penger Tong, one of our FIP Fellows for 2011, and where AKPA and OCPA who co-sponsored the reception presented awards to their members. FIP Past Chair Koller, OIA Director Flatten and I also attended OCPA’s meeting nearby, where one topic of discussion was a possible joint meeting co-sponsored by the APS and the Physical Society of the Republic of

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China in 2012, to celebrate the 100th anniversary of Mme. C.S. Wu and her role in the discovery of parity violation.

Promoting and Defending International Science and Human Rights

Building on its traditions, FIP will continue to work with Amy Flatten and Michele Irwin of the Office of International Affairs and the APS leadership to uphold the principles of open communication and cooperation

without borders, to promote equality of access globally to the knowledge of physics, to defend human rights both within and beyond the bounds of the scientific community, and to inform our members of these issues and to raise awareness whenever violations occur.

Harvey Newman (newman@hep.caltech.edu) is a Professor at Caltech, a high-energy physics experimentalist and Chair of the FIP. He is also engaged in work on Digital Divide issues in many regions of the world.

American Physical Society Office of International Affairs *Amy Flatten*

The APS International Affairs Office continues to enjoy a partnership with FIP members and many of our activities spring from our close collaborations. Given our shared interests, I want to take this opportunity to summarize a few highlights of our international efforts these past few months:

April Meeting Online Presentations Trial: The APS is working to better serve those members who cannot travel to APS meetings, especially those living outside of the United States (nearly 25% of the non-student members). At the 2011 April Meeting in Anaheim, the Society conducted a trial of the usefulness and acceptance of online presentations from a broad cross-section of plenary, scientific and general-interest sessions. This effort was spear-headed by the Committee on International Scientific Affairs (CISA). In this edition of the FIP Newsletter, Prof. Karsten Heeger, Chair of CISA, has described this effort in greater detail. The information and statistics gathered in this test will be used to guide the long-term planning for providing online access to future APS meetings.

Exchange Programs with Brazil & India: In partnership with the Sociedade Brasileira de Física (SBF), last spring brought our first call for proposals for the Brazil-U.S. Physics Student Visitation Program and Brazil-U.S. Professorship/Lectureship Program. Both APS and SBF will each award travel grants to 10 students and 5 professors each year and will issue a second call for proposals this coming fall. Likewise, our India-U.S. Exchange programs continue to thrive and the APS provided travel awards to 6 graduate students and 3 professors, with another call

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for proposals also coming this fall. More information on these programs is available at: www.aps.org/programs/international/honors/.

2011 Canadian American Mexican Graduate Student Physics Conference (CAM2011): The International Affairs Office is working closely with the Forum on Graduate Student Affairs (FGSA) to host CAM2011 in Washington, D.C., this coming September 29 – October 1, 2011. The CAM conferences are bi-annual meetings cosponsored by the APS, the Canadian Association of Physicists (CAP), and the Sociedad Mexicana de Física (SMF). They provide a unique scientific meeting for physics graduate students and are organized by the students themselves, with mentorship from senior staff of the respective professional societies. Hosting CAM2011 in Washington, D.C. provides a unique opportunity to highlight the links among science, diplomacy and public policy. Along with the traditional scientific presentations in various physics sub-disciplines, 2 additional panel discussions will help the international audience of graduate students to better understand the important contributions of scientists beyond laboratory research: 1) “Careers in Science Policy – Challenges, Opportunities, and Case Examples;” and 2) “Science, Foreign Policy and Diplomacy – Role of Scientific Societies & Other NGOs.”

Beller Lectureship Awards: The Beller Lectureship was endowed by Esther Hoffman Beller for the purpose of bringing distinguished physicists from abroad as invited speakers at APS meetings. Each fall, the APS International Office and CISA invite Chairs of APS units and committees that organize sessions at the APS March and April Meetings to submit nominations. Awardees receive up to \$2000 to travel to the meeting. The Beller Lectureship Recipients for the 2011 APS March Meeting were:

- Rienk van Grondelle
Affiliation: Vrije University, The Netherlands
Nominated by the Division of Biological Physics (DBIO)

- Francisco Guinea
Affiliation: Instituto de Ciencia de Materiales de Madrid, CSIS, Spain, Nominated by the Division of Materials Physics (DMP)

Including International Perspectives in APS Advisory Committees: Last April, the APS Committee on International Scientific Affairs (CISA) provided a memo to the APS Executive Board, recognizing the Society’s efforts to better serve and engage its members living outside of the United States. In the memo, CISA suggested that these efforts to engage internationally can be even further strengthened by appointing more international members to the Society’s advisory committees. CISA noted that while approximately 25% of the non-student members reside outside of the United States, except for the specifically designated “international” APS committees (i.e., CISA and the Committee on International Freedom of Scientists--CIFS), only one of the remaining 19 advisory committees included a member living outside of the United States (Canada). In the upcoming years, the APS will need to grow its internationally diverse pool of nominations for committee positions. Consequently, I urge the members of FIP to suggest nominees, especially for the cross-cutting committees such as Committee on Meetings, Membership, etc. The full list of committees is available at: www.aps.org/about/governance/committees/

International Friends Network – Call for “Activity Grant” Proposals: The Society’s “International Friends” provide a network of APS contacts outside of the United States. These volunteers also serve as links between APS and physicists in their local communities. The Society has approved a modest budget to provide funds for local APS activities planned by International Friends and we issued our first call for “Activity Grant” proposals this past spring. The objective of these grants is to enable additional APS activities for members outside of the United States. Thus, we want to support APS-related events that members organize that their institutions, departments and/or local communities. These activities may include bringing a speaker

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to a physics seminar, supporting a small reception for APS members at a physics meeting, or enabling the Friends to host a joint event in partnership with a local physics institution, other ideas. We received several outstanding proposals this spring, and will issue another call for proposals this fall.

These highlights reflect but a few of our international efforts these past few months and I urge you all to learn more about our activities at www.aps.org/programs/international. The members of the Forum on International Physics serve as an important resource for our

international initiatives and thus, I particularly ask the FIP members for suggestions on how we may: 1) better engage our APS members living outside the United States; 2) strengthen our partnerships with other national physical societies, and 3) expand our service to the international physics community. I look forward to working together and I thank the members of FIP for your ongoing contributions to our efforts.

Dr. Amy Flatten is Director of International Affairs at the American Physical Society.

From the Editor *Ernie Malamud*

The deadline for receipt of materials for the spring 2012 issue is February 1, in time to have printed copies available at the Spring APS meetings. It will help greatly if you can send me material in MSword format and graphical material as JPEGs. I prefer short, newsy (1000 words or less) articles. Photos and other graphical material enhance the newsletter. It also helps if you are covering more than one topic in an article to divide the material into several shorter articles.

The success of the newsletter depends on you, the members of FIP. I encourage you to send me (malamud@foothill.net) suggestions for topics and authors. I'm also happy to hear your ideas by phone.

A forum is "a medium of open discussion or voicing of ideas." Thus, very welcome are (short) **Letters to the Editor** commenting on FIP newsletter articles in recent issues or other ongoing events of interest to our membership.

We don't have a regular column of "Browsing the Journals" but I recommend a few articles that are relevant to material covered in this issue. The July issue of APS News has an important report on SESAME, (Synchrotron-light for Experimental Science and Applications in the Middle East) and how there is significant progress on this important international project despite the turmoil in the Mideast. I found the article in the July issue of Physics Today by Siegfried S. Hecker "Adventures in scientific nuclear diplomacy" a fascinating account touching on many of the points Harvey makes in his View from the Chair and also covered in session Y5 at the Anaheim meeting. In this issue Lidia Smentek interviews John Campbell, a recognized authority on Rutherford who 100 years ago announced the discovery of the atomic nucleus. In the August issue of Physics Today, Steven Weinberg traces the history of Particle physics, from Rutherford to the LHC.

There are contributions to this newsletter from many different parts of the globe. I thank all of the authors for their contributions as well as our Newsletter Committee for their suggestions

Ernie Malamud, after three decades of work at Fermilab on high energy physics experiments and accelerator design and construction, retired to live in California. He is currently on the adjunct faculty at the University of Nevada, Reno.

WORLD FEDERATION OF SCIENTISTS**Erice Declaration on Principles for Cyber Stability and Cyber Peace**

It is an unprecedented triumph of science that mankind, through the use of modern information and communication technologies (ICTs), now has the means to expand economic resources for all countries, to enhance the intellectual capabilities of their citizens, and to develop their culture and trust in other societies. The Internet, like science itself, is fundamentally transnational and ubiquitous in character. The Internet, and its attendant information tools, is the indispensable channel of scientific discourse nationally and internationally, offering to all the benefits of open science, without secrecy and without borders.

In the twenty-first century, the Internet and other interconnected networks (cyberspace) have become critical to human well-being and the political independence and territorial integrity of nation states.

The danger is that the world has become so interconnected and the risks and threats so sophisticated and pervasive that they have grown exponentially in comparison to the ability to counter them. There is now the capability for nation states or rogue actors to significantly disrupt life and society in all countries; cybercrime and its offspring, cyber conflict, threatens peaceful existence of mankind and the beneficial use of cyberspace.

Information and communication systems and networks underpin national and economic security for all countries and serve as a central nervous system for response capabilities, business and government operations, human services, public health, and individual enrichment.

Information infrastructures and systems are becoming crucial to human health, safety, and well-being, especially for the elderly, the disabled, the infirm, and the very young. Significant disruptions of cyberspace can cause unnecessary suffering and destruction.

ICTs support tenets of human rights guaranteed under international law, including the *Universal Declaration of Human Rights* (Articles 12, 18 and 19) and the *International Covenant on Civil and Political Rights* (Articles 17, 18, and 19). Disruption of cyberspace (a) impairs the individual's right to privacy, family, home, and correspondence without interference or attacks, (b) interferes with the right to freedom of thought, conscience, and religion, (c) abridges the right to freedom of opinion and expression, and (d) limits the right to receive and impart information and ideas to any media and regardless of frontiers.

ICTs can be a means for beneficence or harm, hence also as an instrument for peace or for conflict. Reaping the benefits of the information age requires that information networks and systems be stable, reliable, available, and trusted. Assuring the integrity, security, and stability of cyberspace in general requires concerted international action.

THEREFORE, we advocate the following principles for achieving and maintaining cyber stability and peace:

1. All governments should recognize that international law guarantees individuals the free flow of information and ideas; these guarantees also apply to cyberspace. Restrictions should only be as necessary and accompanied by a process for legal review.
2. All countries should work together to develop a common code of cyber conduct and harmonized global legal framework, including procedural provisions regarding investigative assistance and cooperation that respects privacy and human rights. All governments, service providers, and users should support international law enforcement efforts against cyber criminals.
3. All users, service providers, and governments should work to ensure that cyberspace is not used in any way that would result in the exploitation of users, particularly the young and defenseless, through violence or degradation.
4. Governments, organizations, and the private sector, including individuals, should implement and maintain comprehensive security programs based upon internationally accepted best practices and standards and utilizing privacy and security technologies.
5. Software and hardware developers should strive to develop secure technologies that promote resiliency and resist vulnerabilities.
6. Governments should actively participate in United Nations' efforts to promote global cyber security and cyber peace and to avoid the use of cyberspace for conflict.

The Erice Declaration on Principles for Cyber Stability and Cyber Peace was drafted by the Permanent Monitoring Panel on Information Security of the World Federation of Scientists (WFS), Geneva, and adopted by the Plenary of the WFS on the occasion of the 42nd Session of the International Seminars on Planetary Emergencies in Erice (Sicily) on August 20, 2009. Bill Barletta obtained permission for us to reproduce this important document in our FIP newsletter.

ELECTION

*From Noemi Mirkin, FIP Secretary-Treasurer and
Noémie Koller, Chair, Nominating Committee*

The Executive Committee of the Forum on International Physics consists of 13 voting members. The following positions become vacant beginning January 2012: Vice-Chair, for a 4-year term in the Forum's chair line, and two Members-at-Large for 3-year terms.

The Nominating Committee generated the following slate of candidates:

For Vice-Chair: Ercan Alp (Argonne National Lab) and Yvan Bruynseraede (Katholieke Univ. Leuven, Belgium)

For Member-at-Large: Vengu Lakshminarayanan (University of Waterloo, Canada), Sultana Nahar: (Ohio State University), Emanuela Barzi (Fermilab), and Luisa Cifarelli (University of Bologna, Italy)

All members of FIP will shortly receive official ballot information from FIP. The notification will include links to brief bios and statements of the candidates.

The election begins October 1 and ends November 30.

The newly elected members will start their terms January 1st, 2012. They will replace the three outgoing members of the FIP Executive Committee whose terms end December 31, 2011: Noémie Koller, Susana Hernandez and Marie Saboungi.

PLEASE VOTE!



Highlighting APS Opportunities, APS Fellows, Prizes Awards Medals, Lectureships and Travel Grants

Harvey Newman and Noemi Mirkin

APS Fellows

FIP accepts nominations for Fellows each year, based on their achievements in physics, as well as their dedication and leadership to science education and outreach, promoting international collaborations, and/or human rights advocacy. The 2011 FIP Fellows will shortly be announced. We will present their certificates at the 2012 spring meeting they attend, either in March (Boston, February 27 – March 2) or April (Garden Grove, CA, April 30 – May 3). The deadline for nominations for the 2012 Fellows is May 15, 2012.

APS Prizes, Awards and Medals

FIP sponsors or co-sponsors a number of honors (see <http://www.aps.org/units/fip/awards/index.cfm>). Several of the recent awardees are presented in the following sections, including links to further information.

Nicholson Medal for Human Outreach

The Nicholson Medal for Human Outreach <http://www.aps.org/programs/honors/awards/nicholson.cfm> is awarded to a physicist who either through teaching, research, or science related activities,

1. has demonstrated a particularly giving and caring relationship as a mentor to students or colleagues, or has succeeded in motivating interest in physics through inspiring educational works, or
2. has created special opportunities that inspire the scientific development of students or junior colleagues, or has developed programs for students at any level that facilitated positive career choices in physics, or
3. Has successfully stimulated the interest and involvement of the general public on the progress in physics.

As highlighted in the last newsletter, the 2010 medal was awarded at a special session at the April meeting to FIP Past Chair Noémie Benczer Koller "*For unselfish commitment to advocating the freedom of scientists*

around the world and for leadership in fostering equal opportunities for women in science." Her award presentation is briefly reviewed in this issue.

The winner of the 2011 medal will be announced soon. We encourage FIP members to nominate their colleagues for this prestigious award for 2012.

Andrei Sakharov Prize

The Sakharov Prize <http://www.aps.org/programs/honors/prizes/sakharov.cfm> recognizes outstanding leadership and/or achievements of scientists in upholding human rights. The prize is named in recognition of the courageous and effective work of Andrei Sakharov on behalf of human rights, to the detriment of his own scientific career and despite the loss of his own personal freedom. The Prize is endowed by contributions from among others, FIP and friends of Andrei Sakharov.

The 2010 Andrei Sakharov Prize was awarded to Herman Winick (SLAC), Joseph Birman (CCNY-CUNY) and Morris (Moishe) Pripstein (NSF). Details on each of the three recipients can be found on the main Sakharov Prize link.

"For tireless and effective personal leadership in defense of human rights of scientists throughout the world."

We continue to receive valuable advice and ideas from Herman who is FIP's Councillor.

While the due date for nominations for the 2012 prize has passed, we encourage members of the APS, especially FIP members, to nominate truly outstanding colleagues for one of these prestigious prizes, which are awarded every other year.

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John Wheatley Award

The John Wheatley Award <http://www.aps.org/programs/honors/awards/wheatley.cfm> has been established to honor and recognize the dedication of physicists who have made contributions to physics in the Third World. As reported, the 2010 prize was awarded to Miguel José Yacamán of the University of Texas, Austin

"For the great impact that his efforts as an influential promoter of the development of physics have had, not only in Mexico, but also in Latin America and beyond."

Professor Yacamán received his award at the prize session sponsored by FIP at the April meeting, where he gave a presentation that is briefly reviewed in this issue.

We encourage FIP members to nominate their colleagues for this prestigious award for 2012.

Beller and Marshak Lectureships

The Marshak Lectureship <http://www.aps.org/programs/international/programs/marshak.cfm>, endowed by Ruth Marshak in honor of her late husband and former APS president, Robert Marshak, is to provide travel support for physicists from "developing nations or the Eastern Bloc" invited to speak at APS meetings.

The Beller Lectureship <http://www.aps.org/programs/international/programs/beller.cfm> was endowed by Esther Hoffman Beller for the purpose of bringing distinguished physicists from abroad as invited speakers at APS meetings.

We encourage the members of FIP to nominate outstanding candidates for these important lectureships, to help enable physicists from abroad to speak at FIP-sponsored as well as other sessions at the APS meetings in 2012.

Opportunities for International Members

There are many opportunities for APS members residing or working outside the US: the India U.S. Travel Grants <http://www.aps.org/programs/international/us-india-travel.cfm> and the Brazil-U.S. Exchange Program <http://www.aps.org/programs/international/programs/brazil.cfm>, as well as the International Travel Grant Awards Program (ITGAP) overseen by the Office of International Affairs led by Amy Flatten, in cooperation with FIP. These are excellent opportunities for graduate students and professors to receive some travel support to work with their overseas colleagues, or for professors to give a short course or lecture series. While the 2012 applications are not due until next year (ITGAP applications are due in January), it is not too early to think of possible visits and collaborations, and plan to apply in due time. The APS is currently considering additional opportunities for students from abroad to receive partial support to attend meetings, and other international programs. We welcome your ideas and suggestions for additional programs or initiatives that would help us better serve the FIP membership.

International Travel Grant Awards

Sergio Ulloa, FIP Vice Chair, organized and chaired the review committee for the 13th and 14th semiannual cycles of the International Travel Grant Award program (ITGAP). ITGAP, which was originated by FIP, provides funding for collaborations between outstanding scientists in the developed world and the developing world. The success of the ITGAP program is reflected in the fact that 12 APS units, including FIP, have agreed to participate in sponsoring the program together with the Office of International Affairs and the U.S. Liaison Committee of IUPAP.

FIP members are encouraged to apply, and encourage their colleagues abroad to apply for these awards: <http://www.aps.org/programs/international/programs/travel-grants.cfm>

Also see the article by Amy Flatten in this issue.

FIP Sessions at the APS 2011 Spring Meetings - Overview

Harvey Newman

One of the major undertakings of FIP is the organization of the sessions at the March and April meetings. This year we had very interesting and informative invited sessions on a wide-ranging set of issues, including four invited sessions at the March meeting in Dallas and three invited sessions at the April meeting in Anaheim.

As reviewed elsewhere in this issue, many of FIP's key themes, from the challenges facing young and women physicists to governmental research for science, to international collaborations in major science projects, to global issues such as the growing Digital Divide and restrictions on critical materials, and science diplomacy, were well-represented at our invited sessions at the 2011 March and April meetings. In addition, as an experiment that turned out to be successful, FIP was pleased to accept contributed talks under a new sorting category entitled "International Programs, Collaborations and Exchanges".

The contributed session (V24) at the March meeting, chaired by Gloria Lubkin of AIP, editor emerita of *Physics Today*, and co-sponsored with the Forum on the History of Physics, included talks on US-Finland cooperative research as well as an historical review of the first female African American physicist.

The FIP contributed session at the April meeting that I chaired (Q13) covered a broad range of topics, from monitoring antineutrino fluxes for nonproliferation to the use of underground physics laboratories for other scientific applications, to the evolving modes international collaboration, to the biennial Rainbow School of physics in Africa, that aims to "build capacity to harvest, interpret, and exploit the results of current and future physics experiments with particle accelerators, and to increase proficiency in related applications." Following this initial success, we will continue to encourage FIP members to contribute talks in this category at future APS meetings.

At the March meeting, **session B8 "Critical Materials for Global Science and Technology"** chaired by Bill Barletta, explored the impending threat of exhaustion of key materials, from Helium-3 to Lithium to Tellurium, that drive progress in our modern world. This trend, with multiple causes from the rising demand of emerging economies to the highly localized concentration of some elements, has remained below the radar for the population at large, as well as the majority of the physics community.

In the evening of Tuesday March 22, there was a Joint Reception co-hosted by FIP, the Office of International Affairs, the Overseas Chinese Physics Association (OCPA), the American Chapter of the Indian Physics Association (ACIPA), the Iranian-American Physicists Group Network (IrAP), and the Association of Korean Physicists in America (AKPA).



The shaping of regional identities through research funding policies. Session T8 at the March meeting.

Chaired and reported by Giulia Pancheri

Fundamental research funding is a powerful agent towards building regional identity. With its transnational basis, scientific research has long fostered the building of contacts and collaborations extending beyond national boundaries. On the other hand, only after World War II, research funding has acquired the modern day transnational extension. One case at hand is the funding of fundamental research by the European Union. Modern science has always been international, and Europe did not lack in intra-European collaborations and programs, but the so-called mobility programs, requiring young researchers to move from one European Union (EU) country to the other, created the identity of a European young researcher and contributed to the building of a European identity in the post-Berlin wall generation.

To explore the extension of large regions research programs and the impact of research funding on building transnational identities, a session was organized by the FIP, at the Dallas March Meeting on March 23rd, entitled “Shaping Regional Identities through Research Funding Policies.” This session provided an overview of major research projects and funding agencies in Europe, India, Brazil, the Middle East and the U.S., with the following program:

Europe and research: a multispeed scenario by Luisa Cifarelli-U. Bologna, Italy and European Physical Society (President-Elect)

Technology and innovation in Brazil by Carlos Aragao de Carvalho, Vale Technological Institute, CNPq and UFRI, Brazil

Mega physics projects: National and International Initiatives: the Indian Experience by Rohini Godbole, IIST, Bangalore, India

Building bridges by Herman Winick, Stanford National Accelerator Center, U.S.

Science for Energy by Harriet Kung, Basic Energy Science, DOE, U.S.

Luisa Cifarelli, President-Elect of the European Physical Society (EPS) opened the session and presented an overview of physics research in Europe. She discussed the role of the funding agencies, outlining the differences and similarities between the European and the U.S. scenarios. In Europe, funding of fundamental research is based on regional, national and intra-European agencies, with the funding by the European Union (EU) playing an increasing role through a number of programs, such as the Seventh Framework Program (FP7), the European Research Council (ERC), the European Science Foundation (ESF), and the European Strategy Forum on Research Infrastructures. Cifarelli described the role of EPS in fostering research through its scientific activities, and the strategy plan. This presentation of the European scenarios underlined the strength and vitality of European research and the strong commitment by both national and international agencies to excellence and innovation.

Following Cifarelli, Carlos Aragao de Carvalho, former President of the Brazil Research Council, presented the status of technology and innovation in Brazil. With a population of 194 million (the fifth largest) and a GDP, which is the eighth in the world, Brazil has a growing economy coupled with social progress. Until World War II, Brazil had a very small number of scientists and little institutional base for research. Between the 1950's and the 70's, federal agencies were created, together with university graduate programs and full-time faculty positions. As the GDP grew by a factor of 6 between 1994 and 2009, the new federal agencies also increased their share of research funding. And while Science and Technology had not in the past been a decisive driver of development in Brazil, since 2003 there has been a large increase in funds for Science Technology and Innovation.

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The new Action Plan for Science, Technology and Innovation, PACTI, 2007-2010, is integral part of Brazil's growth in this field. Many and positive are the Science and Technology (S&T) indicators, among them the fast rise of scientific publications. In 2010 Brazil's scientists produced 2.7% of the world scientific papers, increasing at the rate of 11.3% per year. Carlos Aragao concluded his presentation by listing Brazil's challenges for the future, namely quality education at all levels, internationalization of Brazilian S&T, globalization of Brazilian companies, with a final goal of reaching a sustainable development, as a lead to economic, environmental and social progress.

Rohini Godbole, Professor of Physics from the Indian Institute for Science and Technology in Bangalore, and a member of the Indian Academy of Science, described the Indian experience on mega physics projects. Mega Science Projects by their very nature have to be international, not just in the funding, but also concerning logistics, scientific resources, etc.

At present there are three major areas where research requires mega facilities: experimental high energy and nuclear physics, astrophysics and astronomy, material research and intense light sources. India is participating meaningfully in all of them, both as a partner and as provider of large-scale facilities. In mega science facilities outside India, such as the CERN LHC, India is presently holding observer status in the CERN Council, while associate partnership is under consideration. Prof. Godbole described how India is also building its own mega science projects, such as the project Chandrayaan, India's space mission, indigenously designed and fabricated. INO, the India based Neutrino Observatory is soon to take off and International participation is encouraged

Herman Winick, from the SLAC National Accelerator Laboratory and Professor Emeritus at Stanford Univer-

sity, described an initiative by Helmut Disc, the Director of the DESY Laboratory in Hamburg. The DESY program uses scientific partnerships with institutions in the Middle East North Africa (MENA) region to promote the development of a long-term reliable, sustainable and economic energy supply. An agreement is being developed between DESY and SESAME, the facility for Synchrotron-light for Experimental Science and Applications in the Middle East, to promote concentrated solar power plants in MENA, initially to power SESAME and the local region, with larger future plants transmitting power to DESY and elsewhere in Europe.

The session was closed by Dr. Harriet Kung, Director of Basic Energy Science (BES), from the Office of Science of US Department of Energy. Dr. Kung's presentation on "Science for Energy" illustrated DOE's strategies to meet the nation's challenges of today and into the 21st century. The strategic planning activities of BES focus on science for discovery, science for national needs and on national scientific user facilities, which are the basic 21st century tools of science. DOE provides 45% of federal support of basic research in the physical sciences and key components of the nation's basic research in biology and computing. Supporting over 27,000 PhD's, graduate students, engineers and support staff at over 300 institutions, DOE provides also the world's largest collection of scientific users facilities to over 26,000 users each year. In the past decade alone, DOE has supported research which has led to 22 Nobel prizes.

The photograph on the next page shows the session participants.

Professor Giulia Pancheri is a theoretical physicist at the National Institute of Nuclear Physics in Italy and is a member of the FIP Executive Committee.



Invited speakers and session chair at the APS FIP session on "Shaping Regional Identities through Research Funding Policies", Dallas, Texas, March 23rd, 2011. From left: Harriet Kung, US DOE, Giulia Pancheri, INFN Frascati, Rohini Godbole, IIST India, Herman Winick, SLAC National Accelerator Laboratory, Luisa Cifarelli, EPS President-Elect, Carlos Alberto Aragão de Carvalho, Brazil Research Council. (Photograph courtesy Noémie Koller)

Migrations of physicists. Session X8 the March meeting

Chaired and reported by Noémie Koller

This session was planned and co-sponsored with the Forum for the History of Physics to display some of the issues that arose in the last century related to the major migrations of physicists, for a variety of reasons, from their country of origin to a more accepting environment somewhere else in the world, and, in some cases, back to where they came from after the crisis subsided. Each case presented unique challenges, and time limits restricted the choice of topics to Europe under the Nazi occupation, Russia before and after the fall of the Soviet Union, Brazil, and China. The transformational effect on the conduct of science in the U.S. and the world at large resulting from these mass movements were highlighted. Five talks were planned for the session. However, Professor Santoro was not able to attend the meeting and a prepared Skype presentation was excluded by the lack of connectivity in the lecture hall. Some of the presentations are available in pdf format in the APS web manager files under <http://www.aps.org/units/fip/meetings/march2011.cfm>.

[Migration of scientists and the International Center for Theoretical Physics: a personal and professional perspective, Katepalli R. Sreenivasan, New York University](#)

Professor Katepalli Sreenivasan was educated in India, Australia and Johns Hopkins University. He held appointments as Dean of Engineering and Applied Science at Yale, Distinguished University Professor at Johns Hopkins, Director of the Institute for Physical Science and Technology, Director of the International Center for Theoretical Physics in Trieste. He was awarded the UNESCO Medal for promoting International scientific cooperation and world peace, and the Nicholson Medal for human rights outreach. He is currently a Senior Vice Provost at New York University and will lead the science and Technology research effort at the NYU Abu Dhabi campus.

[Physicists' Forced Migration under Hitler, Alan Beyerchen, Ohio State University](#)

Professor Beyerchen teaches German History at Ohio State University in Columbus Ohio. He has focused his research on 19th and 20th century German social, economic, political, and cultural history, and on the web of cultural relationships among science technology and

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the values of modernity. His current studies concern Clausewitz and the quest for a science of war and is published in the book “Clausewitz, Nonlinearity and the unpredictability of war”. He is best known to this audience as author of *Scientists under Hitler: “Politics and the Physics Community under the Third Reich”*.

Migrations and the rise of High Energy Physics in Brazil, Alberto Santoro, UERJ, Brazil

Professor Alberto Santoro received his PhD from the Université Denis Diderot, Paris VII. He spent most of his career at the Universidade do Estado do Rio de Janeiro. He is a high energy physicist and participates in the CERN CMS collaboration at the LHC. He has been involved for many years in the development of the HEP Grid with the goal of improving the necessary technology to enhance the collaborations between Brazil, Latin America and European Networks in high energy physics.

Russian, Soviet, and post-Soviet scientific migration: history and pattern, Alexei Kojevnikov, University of British Columbia

Professor Sergei Kojevnikov is currently at the University of British Columbia. He is a senior research associate at the Institute for History of Science and Technology at the Russian Academy of Sciences in Moscow. He has published books on the History of Science in

particular modern physics in the 20th century from Einstein relativity and quantum mechanics to the creation of atomic weapons, modern quantum theory and cosmology. He has also authored a book on the History of the Soviet Union, discussing the role of science and scientists in Soviet culture and politics, the relationship between science ideology and the military and the general social and institutional history of Soviet and Russian science.

Chinese/American physicist: a transnational history, Zuoyue Wang, California State Polytechnic University, Pomona

Professor Zuoyue Wang teaches history and technology developments in the U.S. and China, U.S. cold war policy, and accomplishments by Asian-Chinese-Americans at the California State Polytechnic University. He is the author of “In Sputnik’s Shadow: the President’s Advisory Committee and cold war America”, and “Chinese American Scientists: A transitional History”. He was educated at the Normal University in Xixiang, and the Chinese Academy of Sciences in Beijing, receiving a PhD from the University of California in Santa Barbara.

Noémie Koller, a Professor at Rutgers University and Past-Chair of FIP, is the winner of the Nicholzen Medal for Human Outreach.



**Session participants L to R:
Noémie Koller (Chair), Marty
Blume (APS Editor-in-Chief
Emeritus), Zuoyue Wang, Alan
Beyerchen, Katapalli R. Steeni-
vasan, Alexei Kojevnikov, Amy
Flatten (Director, OIA)**

Experiences and Issues for Young Physicists in the International Arena: Impact on the Future of Physics. Session Y8 at the March meeting

Chaired and reported by Amy Flatten

I had an opportunity to Chair a FIP/FGSA session, “Experiences and Issues for Young Physicists in the International Arena: Impact on the Future of Physics.” The session included talks by graduate students from across the globe on a breadth of topics including visa challenges, overcoming cultural barriers, life in an international collaboration, and perspectives from international female physicists in academic careers in the United States and issues facing women physicists worldwide. The session was well-attended and the audience energetically engaged the speakers during a panel discussion that followed their presentations.

Some of the presentations are available at <http://www.aps.org/units/fip/meetings/march2011.cfm>



Participants from L to R: Amy Flatten, Director of the APS Office of International Affairs chaired the session and led the panel discussion; Azadeh Keivani, Louisiana State University, “Impact of Visa Issues on an International Physics Graduate Student in the U.S.” Rishiraj Pravahan, University of Texas at Arlington, “Life in a large scientific collaboration” J. Pedro Ochoa, Lawrence Berkeley National Laboratory, “Overcoming the Cultural Barrier: An International Physicist’s Experience” Tulika Bose, Boston University, “Perspectives from an international female physicist in academia” (*Photograph courtesy Noémie Koller*)

Dr. Amy Flatten is Director of International Affairs at the American Physical Society.

The Digital Divide in 2011. Session J6 at the April meeting

Chaired and reported by Harvey Newman

“**The Digital Divide in 2011**” presented a current perspective on the evolution, status and outlook for the Divide that separates the more- and less technologically advanced regions of the world. The 21st century has been marked by some leading and emerging nations’ realization that a focus on advances in information technologies, as enablers of education, knowledge sharing, international collaboration and scientific progress, is a powerful means to economic leadership. The speakers at this session included R. Les Cottrell, Assistant Director of SLAC Computing Services, Michael Stanton, Director of Research and Development at the Brazilian National Research and Education Network (RNP), and Alexander Ntoko, head of the Corporate Strategy Division of the International Telecommunications Union (ITU).

Cottrell spoke on “**Quantifying the Worldwide Digital Divide: the Emergence of Africa**” and the role of the Internet End-to-end Performance Monitoring (IEPM) projects that he chairs. Africa, a huge land area greater than the U.S., Europe, China and India combined with a population of more than a billion people beset by many challenges, needs network connectivity if the decline of the continent is to be reversed and the burgeoning scientific community there is to progress. But through his IEPM work that has measured connectivity to Africa over the last decade (now 740 sites in 50 African countries) Cottrell showed that progress has been painfully slow; indeed Africa is in danger of falling even farther behind all of the other world regions in terms of bandwidth and connection quality, as their network infrastructures progress. He also demonstrated how there is a strong correlation between the network throughput to a country, and its development, as shown through indicators such as the ITU’s ICT Development Index.

A recent cause for hope is the arrival of a host of undersea cables to both the west and east coasts of Africa since mid-2009, spurred on by the World Cup being in South Africa in 2010. The use of such cables could

bring a massive increase in capacity as well as a reduction in the time-delay relative to satellite links, resulting in a potential for a radical improvement in network throughput and responsiveness. The IEPM measurements show that the delay to many countries from Angola to Zambia has already been reduced. The next step which is underway is to build the needed optical fiber-based network infrastructure to connect the undersea cables to the interior. Other challenges to be overcome are the extremely high price of bandwidth compared to elsewhere, and going beyond the reach of fiber through wireless, low earth orbit satellites, and perhaps even weather balloons. Another very important step that has taken place is the formation of research and education network organizations in countries throughout Africa, and their formation of consortia such as UbuntuNet, which has been instrumental in the continent’s progress.

Turning to recent events, Cottrell showed how IEPM was able to track the effects of undersea cable cuts in the Mediterranean in January and December 2008 on connectivity, country by country across the region, as well as the beneficial effects of the turn-up of a new France-Egypt cable in 2010, and the disruptive impact of the North African uprisings in January 2011.

Stanton spoke on “**Research and Education Networking in Latin America: A Time of Change**”, with a focus on the transformation of R&E (Research and Education) networks in Brazil over the last decade through the use of optical fibers, where he himself was centrally involved. He reviewed the arrival of optical high capacity cables to the coasts of South America around 2000, the rise of just seven national R&E network organizations, known as NRENs (in Argentina, Brazil, Chile, Costa Rica, Mexico, Uruguay and Venezuela) by 2004, and the absence of international links within Latin America or to Europe up to that time. This was followed by the first Latin American regional network RedCLARA, and links to the GEANT Pan-

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European network through the EU funded ALICE project that also led to the formation of 6 additional NRENs, as well as higher bandwidth connections to the U.S. through the NSF funded Ampath and later WHREN-LILA projects, resulting in the present dual 10 gigabit/sec links between Sao Paulo and Miami.

Turning to Brazil, he reviewed the revolutionary changes in R&E networking that have occurred throughout the country since 2004. The national R&E backbone core progressed from 34 – 155 Mbps to 2.5 – 10 Gbps (a typical factor of 100-300 increase, using optical fibers) in 2005, followed by a second wave of upgrades in 2011 to 10 Gbps across the 4000 km east coast and 3 Gbps to points on the north coast and the interior. Only 3 of the 27 state capitals remain without high capacity optical fiber (as one has to cross the Amazon jungle) and use a satellite link or lower capacity terrestrial links. The architecture of the network also has progressed, using the same hybrid “packet and circuit” architecture prevalent in advanced R&E networks in the U.S., Europe and Asia.

An equally important aspect of the progress in Brazil has been the adoption of “do it yourself” metropolitan area optical networks, which have brought increases in capacity by orders of magnitude (to 1 or 10 gigabits/sec) to hundreds of academic and research institutions while lowering the costs. This transformation has been completed in 21 of the 27 capitals as of this writing and the completion in the last 6 capitals is expected by the end of 2011. The next cycle is to use the extensive optical fiber footprints of the state-owned energy utility companies to reach the interior, together with a national broadband plan, in order to provide 1 Gbps access to most of RNP’s users within the next 5 years. Brazil’s external links to other Latin American countries also are progressing, with Brazil’s rapid progress serving as a model and a motivator for progress in Argentina, Chile, Mexico and other countries in the region. This progress is further spurred on by international advanced network consortia such as GLIF (www.glif.is) in which Brazil as well as the US and many European and Asian countries take part.

Speaking on “**The Digital Divide: A Global View**” from the ITU’s perspective, Alexander Ntoko reviewed the ITU’s key roles, ranging from managing vital shared ICT resources including the international phone numbering system and radio frequency spectrum, to the international standardization of communication technologies including many related to the Internet, and the facilitation of global ICT development. He highlighted the achievements of the last quadrennial Plenipotentiary conference in Guadalajara (Mexico) including resolutions on Accessibility; ICTs and climate change; Measures to help prevent the illicit use and abuse of telecommunication networks; e-Health, Conformance and interoperability; Emergency communications and humanitarian assistance; Electronic meetings; and many more. Compromise resolutions also were reached on the deployment of the new Internet protocol IPv6 and on Internet governance.

A main theme of Ntoko’s presentation was access to broadband, which we in the ICFA Standing Committee on Inter-regional Connectivity (that I also Chair) have come to recognize as the Second Digital Divide. Broadband is a great enabler of sustainable economic development, education, access to modern healthcare, and a wide range of government and business services, and indeed of nearly every aspect of modern life. “Governments need to raise broadband to the top of the development agenda”, Ntoko said, and “we need to assure that ... broadband access becomes much more affordable than today”. He cited figures from the ITU’s “Measuring the Information Society 2010” report that show the great disparity in costs that exist today, that tend to greatly disadvantage the populations who can least afford it.

Progress towards greater global access is now being fostered by a top-level Broadband Commission formed by the ITU whose recent in-depth report “Broadband: A Platform for Progress” <http://www.broadbandcommission.org/report2/full-report.pdf> details the meaning of broadband, documents its overall importance and relation to economic development

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in many ways, and opens by stating that global access to broadband is an essential element in the achievement of the Millennium Goals <http://www.un.org/millenniumgoals> set by the United Nations with a target date of 2015.

The talks can be seen at <http://www.physics.wisc.edu/apsapril2011>

Also see the article in this newsletter by Alberto Santoro: "The Digital Divide in the Scientific Community and Worldwide."

Special Prize Session. Session T5 at the April meeting

Chaired and reported by Harvey Newman

At a special **Prize Session**, two distinguished honorees received their awards: Professor Miguel José Yacamán of the University of Texas in San Antonio, winner of the Wheatley Prize, and FIP's own Past Chair Professor Noémie Benczer-Koller of Rutgers University, winner of the Nicholson Medal for Human Outreach.

Professor Yacamán was honored for his work on behalf of his Mexican colleagues and physics in Mexico, as well as its relationship to the rise of physics in Latin America. He was instrumental in founding new programs in materials science research in Argentina, Brazil, Colombia, Costa Rica, Mexico, and Panama as well as Spain, and for his work educating young physicists of Latin American origin since he joined the UT faculty at Austin and more recently San Antonio.

Yacamán spoke of the close relationship among the populations of the border states in the north of Mexico, and those living in the southwestern half of Texas, where people of Latin American origin are the majority. He noted that Texas has a powerful economy, by itself larger than that of Russia, with a gross domestic product of \$ 1.2 trillion, and that UTSA is the third largest university in Texas with excellent facilities. Yet many of the students at UTSA struggle with advancing into the mainstream, given their relatively weak academic backgrounds, and/or the lack of a strong academic tradition at home. While there have been notable exceptions, of outstanding students who went on to top U.S. universities for graduate school, some of which have been trained in his own electron microscopy laboratory, these have been relatively few. He closed with specific suggestions for education of Hispanic students:

community colleges with 2+2 year programs in physics; remedial programs to improve their academic level so as to improve their rate of acceptance at top graduate schools; and masters programs in physics that include a remedial objective.

Professor Koller, a pioneer as the first female faculty member in physics and later first female tenured member at Rutgers (in 1960 and 1965 respectively), also widely known for her extremely active role working on behalf of the freedom of scientists and the equality of women in science, as well as her leadership as Chair of the APS Nuclear Physics Division (1993-4) and as Chair of FIP in 2010, spoke on "**Physics Outreach: Social Benefits**". She gave compelling historical examples of physicists who have dedicated themselves to outreach, even at the height of their careers, such as Marie Curie who equipped and drove radiology cars with X-ray machines to help the wounded at the front and in hospitals during World War I. She spoke of the role of Szilard and Einstein who first were instrumental in securing the uranium and funds for the Manhattan Project and who later were leading advocates of nuclear disarmament, and of Charpak whose multiwire proportional tracking chamber has had many applications in biological and medical research.

Koller then spoke of Andrei Sakharov's dedication to a life as a human rights activist at great personal cost, as well as the winners of the APS' Sakharov Prize such as Yuri Orlov and others that have followed in Sakharov's footsteps. One of them, Herman Winick (a former Chair of FIP and now FIP Councillor) has been instru-

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mental, together with Gus Voss of DESY, in the SES-AME project that brings together Middle Eastern scientists from Israel and several Arab nations and the Palestinian Authority in a unique spirit of scientific cooperation, in spite of national governments that are decidedly unfriendly to Israel. She also reflected on the dedication of physicists to education of the young in science, notably Nobel prize winners Lederman and Wieman. She called on physicists to Get Involved, in one of the many big issues of our era such as the environment, and especially in work on human rights. She cited the cases of Djordjevic and Sutyagin, where her own work

with colleagues on the Committee on the International Freedom of Scientists (CIFS) made a difference in freeing them, after they were unjustly accused and imprisoned. In closing, she left the audience with these thoughts:

“Physics, by virtue of its universality, openness and independence from human interference, is a natural instrument to strengthen freedom of thought and freedom to pursue our research interests without bureaucratic and political constraints in the world at large. All of us, working together, can make a difference.”

Science Diplomacy. Session Y5 at the April meeting

Chaired and reported by Harvey Newman

“**Science Diplomacy**” presented perspectives on this important issue in its various forms, from encouraging technological progress and economic development in the third world, to promoting equality and peace on a foundation of open international scientific collaboration, to the relationship to political policy. The distinguished speakers included: APS President and Caltech Professor Emeritus Barry Barish, Neal Lane, a Senior Fellow in Science and Technology Policy at the Baker Institute and a former NSF Director as well as the former Science Advisor during the Clinton Administration, and Norman Neureiter who is the Director of the AAAS Center for Science, Technology and Security Policy and was the Science Advisor to the Secretary of State during the Bush administration.

Speaking on “**Science Diplomacy in Large International Collaborations**”, Barish spoke of the emergence of such collaborations in several fields of physics as the result of the imperative to combine resources, skills and ideas in a shrinking world empowered by communications and collaborative technologies, and the implications for U.S. science policy. The importance of pursuing each project varies from national priorities (ITER) to strategic priorities in the South Pole laboratory to transformational science and frontier research in ALMA, AUGER, LHC, AMS, ILC, SKA and many others. The tangible side benefits of such large scale projects are many, from the World Wide Web to accelerator development driving materials science as well as medical and industrial applications, and the development of large state-of-the-art facilities “advances technological technology applications for society, often in unpredictable ways.”

After commenting on the varied forms of partnership in the projects mentioned, Barish returned to his central themes: “Developing and supporting such large facilities must be an important part of U.S. Science Policy, in order to keep U.S. science at the forefront”, and “the U.S. must be part of the most important science to be most competitive and to have the biggest impact on society.” He used the progress of the ILC Global Design Effort as a success example, while highlighting the key role of governments in establishing global projects that can move forward to successful completion over a period of one or more decades. He highlighted the challenges of integrating the U.S. system, with its one-year funding cycle and particular ways of governance, project management and accountability with those of other countries and/or international organizations. Looking to the future, if the U.S. aspires to host a major international project to do frontier science, Barish said: “we must solve problems of govern-

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ance, visas, in-kind contributions, accountability, contingency and [the way we handle] cost overruns” to work effectively with our international partners.

Speaking on “**A Scientist’s Approach to Diplomacy – First Listen and Learn**”, Lane opened by quoting J. Thomas Ratchford (FIP Chair in 1996): “Physics is perhaps the most international of all human endeavors. Physicists naturally think internationally, and their closest research collaborators are as likely to be across the world as across the hall...” This helps explain why scientists, and physicists in particular, have been so effective in facilitating or paving the way for international cooperation, along with the simple fact that many scientists have the ability to listen and learn. Lane spoke of two angles on science diplomacy: Diplomacy for Science which includes “research collaborations, international conferences and shared facilities” and Science for Diplomacy that includes the “use of scientific research to improve relations between nations; help solve world problems; protect the earth’s environment and biodiversity, etc.” As a former NSF Director, he reflected on NSF’s many international activities, noting that NSF funding is largely reserved for international research and education activities in the U.S., or by the U.S. participants in an international collaborative project.

As a former head of the Office of Science and Technology Policy, Lane gave examples of the S&T agreements with many nations regarding exchanges, joint research, and shared facilities, including those with individual nations including Russia, China, India and Japan, as well as international organizations such as OECD, UNESCO and CERN. He also gave compelling examples of his own involvement, as when he discussed nanotechnology with China’s President Jiang Zemin in 2001 (captured in the photo from the China Daily, November 27, 2001):



He then highlighted the 2006 U.S. – China S&T Forum where he had spoken of a “time of unprecedented opportunity for cooperative research between the U.S. and China” and “the time is right to launch a new era in U.S. – China cooperation in science and technology”; sentiments that have been strongly echoed recently by the present Science Advisor John Holdren (“U.S. – China science and technology cooperation remains one of the strongest aspects of our bilateral relationship” http://news.xinhuanet.com/english2010/indepth/2011-04/11/c_13823171.htm) in response to the ‘Wolf clause’ inserted into the April 2011 spending bill that seeks to prohibit

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funding for NASA or OSTP activities that further such cooperation <http://news.sciencemag.org/scienceinsider/2011/04/spending-bill-prohibits-us-china.html> .

The lessons drawn by Lane, based on his decades as a science policy maker and diplomat are both simple and profound. “Science is a unique platform to promote cooperation, understanding and shared values among individuals, communities and nations even in difficult times.” This is as evident now as it was during the Cold War, when physicists unrelentingly maintained a bridge of cooperation with Soviet scientists and laboratories, organized many international activities through the APS, and spoke out repeatedly on the need for nuclear arms control and reduction, and the freedom of scientists through such organizations as the Federation of American Scientists and the Union of Concerned Scientists that they formed. Citing the many global challenges ahead, from the energy to climate change to education and the competitiveness of the U.S. workforce, Lane noted that the solutions to these problems require major actions, with direct involvement by scientists on many fronts to bring about:

Major advances in science and technology

A renewed commitment to university research

Substantial growth in international research cooperation, particularly between the U.S. and Asia, and

Involvement of many more scientists with government policy and the general public, a role some of us call the “civic scientist.”

Lane concluded by calling on the physics community to get involved, or stay involved with renewed effort: “if we are serious about helping deal with global challenges, we will need global ‘civic scientists’, whom we might call ‘science diplomats’.”

Norm Neureiter spoke on “**Science Diplomacy in Action**”, drawing on his own 50+ years of experience in international affairs, science policy and science diplomacy. He reviewed the science policy perspectives and contrasts among the U.S. administrations of Eisenhower, Kennedy, Nixon, Johnson and Carter, illustrating them with many remarkable photographs of moments in history (such as the meetings of Nixon and Khrushchev, Nixon and Brezhnev, Nixon and Mao, Carter and Deng Xiaoping) where he was present.



He then highlighted the role of scientists in arms control through the Pugwash Conferences

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http://en.wikipedia.org/wiki/Pugwash_Conferences_on_Science_and_World_Affairs

founded in 1957, that have evolved into an international organization dedicated to nuclear disarmament.

Turning to more recent times, Neureiter recalled his own visits to Iran, Myanmar and Cuba, and his key role in “backdoor diplomacy” that provides a communications channel and a possible road to improved relations through cooperative work among scientists on non-sensitive issues, even with regimes unfriendly to the U.S. government. He showed how Nobel prizewinner John Taylor, highly revered in Iran, was effective in fostering a spirit of cooperation there. Neureiter then told of the remarkable case of a North Korean self-made businessman whom he met, who dedicated his fortune to establishing the Pyongyang University of Science and Technology, which through a twist of fate was instrumental in saving the businessman’s life when he was accused of spying, while opening a new channel for cooperation with scientists in the U.S.

Neureiter then turned to a series of lessons learned, and the challenges to be faced. The key lessons are that “science is an area where communication is easier and understanding more likely” that “can open doors to influential people” and “lead to real mutually beneficial cooperation in non-sensitive areas”. The challenges are “facing down criticism of helping ‘the enemy’”, carrying on meaningful follow-on visits; finding good cooperators and funding on the U.S. side; and persevering in spite of shifting political winds. His powerful conclusion on the global imperative of international S&T cooperation, closing the session, is captured here:

(The talks can be seen at <http://www.physics.wisc.edu/apsapril2011>)

Advancing Science, Serving Society



International S&T Cooperation is a Global Imperative

- It is very clear that the global science community must cooperate to address the great challenges facing humanity: climate change, environmental protection, natural disasters, food, water, health, energy, etc.
- We see an important role for associations like AAAS, APS, ACS, etc. as well as universities to work toward coherence, or harmonization, within this global community of the standards and norms for the practice and ethics of science.

International Physics

Contributed paper session Q13 at the April meeting

Reported by Harvey Newman

The FIP Contributed Session at the April meeting attracted an interesting, diverse series of talks.

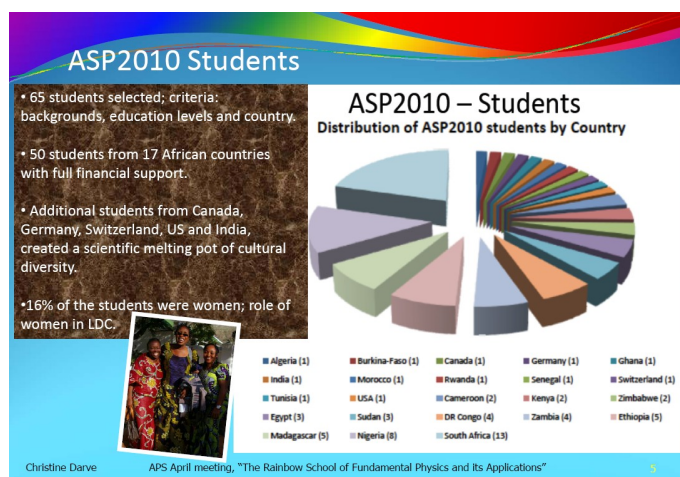
- Monitoring Reactor Antineutrino Flux for Nonproliferation
- Cooperative Monitoring of Reactors with Antineutrino Detectors
- Nuclear reactor Monitoring with an Above Ground Antineutrino Detector
- Collaborations in Underground Laboratories From Bilateral to Multi-countries cooperation
- Fostering International Cooperation in the Middle East
- Asian Physics Foundation
- The Rainbow School of Fundamental Physics and its Applications

The session featured a series of three talks on the subject of nuclear non-proliferation. Shen (MIT), Classen and Keefer (Livermore and Sandia) presented an IAEA project underway to monitor nuclear reactors with a nearby detector using the same inverse beta decay reaction Reines used to discover the (anti-)neutrino. The idea is that the different fissile reactor isotopes have different antineutrino spectra, so that if some plutonium is diverted when the reactor fuel is renewed, or during fuel storage or reprocessing, the change in the rate of inverse beta decays might be detected. Current active deployments are now on-going in: U.S., France, Japan, Canada, Brazil, and Taiwan. There is also strong overlap between the development of detectors for this project and for the next generation of neutrino oscillation, double beta decay and dark matter experiments.

Christine Darve presented the groundbreaking **“Rainbow School of Fundamental Physics and its Applications.”** As illustrated below, the first school ASP2010 was held in Stellenbosch, South Africa. It accepted 65 students, including 50 from 17 African countries who received full financial support. The school’s three week curriculum included theoretical

and experimental subatomic physics, accelerators and applications, and information technology and the grid as used by high energy and nuclear physicists, with both lectures and hands-on demonstrations and labs. There was a video connection to the CERN Central Control Room, and an Outreach/Forum Day with lectures and student posters at which the South African government was represented. Overall, the response of the students was highly enthusiastic. Following the success of the first school, the next school is now being planned to take place in Ghana in the summer of 2012.

[Also see the article by Darve in the March 2011 issue of the FIP Newsletter.]



Jessica Hirschfelder presented the work of the all-volunteer **South Asian Physics Foundation** www.southasianphysicsfoundation.org, that supports international collaboration in physics in Afghanistan, Maldives, Bangladesh, Nepal, Bhutan, Sri Lanka, Pakistan, and India, by supporting student paper presentations at conferences, a science book drive. The SAPF is seeking to expand to support longer term exchanges, research collaborations and joint events.

The Impact of the Earthquake, Tsunami and Nuclear Disaster to Japanese Physics Departments and Laboratories

Tuneyoshi Kamae

Nearly 6 months have passed since a powerful earthquake struck the north-eastern coastal region of Honshu Island of Japan on March 11. A series of hydrogen explosions in the Fukushima Dai'ichi nuclear power plant extended the disaster further inland. The loss of human lives and destruction of the social infrastructure have been concentrated in the coastal region hit by the tsunami. Despite heroic efforts by volunteers and trillions of yen pledged by the government, aid organizations and individuals, the recovery in the region will take more than 10 years. Fortunately for the Japanese physics community, no researcher or graduate student has lost their life or suffered serious injury. There is no major research facility in the hardest-hit coastal region. However, considerable damage has been reported by physics research institutions and facilities, all of which were caused by the earthquake.

As of May 7, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) estimates that the damage to universities and national laboratories exceeds 90 billion yen (about 1.1 billion USD). Tohoku University, located at about 180 km from the epicenter in the City of Sendai, the third oldest national university with world-class science and engineering departments, suffered the severest damage. According to a Japanese news agency (Kyodo Tsushin), about 7000 pieces of laboratory equipment were destroyed and 28 buildings were severely damaged at the university. The total cost for recovery is estimated at 77 billion yen (about 910 million USD). The JPARC facility of KEK lies about 350 km from the epicenter. Tsukuba University and the main campus of KEK are further away. However, these 3 institutions suffered significant damage. Minor damage to facilities has also been reported at many facilities in the Tokyo Area. The extent of damage and the recovery plan are described below for the hardest-hit institutions. Brief summaries of assistance given by the international physics community, effects on non-Japanese scientists in the region, and activities led by physicists in Japan are also added to

this report.

Tohoku University

Research Center for Electron Photon Science on the Mikamine campus: The 300 MeV electron linear accelerator and 1.2 GeV storage ring for synchrotron radiation have been damaged severely. The vacuum, cooling water, RF, and power distribution systems have been broken at multiple locations and many magnets in the ring have been dislocated. The Center hopes the facility will be fully recovered by the end of March 2012.

Institute for Material Research on the Katahira campus: The Institute has a scanning tunneling microscope and other delicate instruments. Most of them were on earthquake-proof platforms but damaged. They are back to normal operation after replacement of damaged parts and some realignment work. The ground under the Katahira campus seems to be more stable than other campuses of Tohoku University.

High Energy Accelerator Organization (KEK) - JPARC

This facility is located on the Tokai campus about 50 km north-east of the main campus or about 350 km from the epicenter. The shoreline along the campus was hit by the tsunami but the breakwater wall stopped sea water from entering the campus. Liquefaction occurred extensively (Photo 1).

Several buildings, outdoor structures, and equipment were damaged. The laboratory has an accelerator complex consisting of a 400 MeV normal conducting proton linear accelerator, a 600 MeV superconducting proton linear accelerator, a 3 GeV proton synchrotron and a 50 GeV proton synchrotron. The accelerator complex shoots an intense beam of neutrinos to Kamioka (T2K experiment). The foundation under the accelerator

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Photo 1: Liquefaction occurred at several locations in JPARC's Tokai campus.

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complex was built on long piles driven deep into the ground, which prevented severe damage to the key accelerator components. Many auxiliary facilities, however, were not on such a foundation and were damaged severely. Heavy concrete blocks arranged to shield radiation moved and fell down (Photo 2).

Most beamline components have moved out of their nominal position. Photo 3 shows the displacement of neutrino line components from the nominal position (0.0 on the vertical axis in mm). The Director hopes the recovery work will be completed by the end of calendar year 2011.

Photos were taken from http://j-parc.jp/picture/2011/04/StatusEnglish0422_1.pdf

KEK-Tsukuba campus

The campus has two accelerator complexes, the B-factory (an electron-positron collider) and the Photon Factory (a synchrotron radiation facility), and various R/D accelerators. An 8 GeV electron linear accelerator serves both accelerator complexes. Photo 4 shows some of the damage to the 8 GeV linear accelerator. The B-factory has been undergoing a long-term upgrade and its collider ring had been decommissioned



Photo 2: Radiation shields fell down at multiple locations in the accelerator complex of JPARC.

since 2010. Hence impact on research activity is minimal. Minor damage has been reported in wigglers and dipole magnets located in the tunnel. The BELLE detector was waiting in the experimental hall for an upgrade: the entire detector slid several centimeters. In the accelerator test facility (ATF), the vacuum system was broken and components were dislocated. Many support facilities were severely damaged

The Photon Factory was operating when the earthquake hit. Several components in the RF and vacuum systems in Photon Factory were broken or dislocated. Restoration is likely to be completed by the end of calendar year 2011. Photos were taken from http://www.kek.jp/intra-e/Introduction/column/quake110311_e.pdf

Tsukuba University

Severe damage has been reported at the tandem electrostatic accelerator: the accelerating column has been destroyed and repair seems to be very difficult. Many other research facilities reported serious damage and only about 10% have been operational as of June 10, 2011. Loss of biological samples due to the long power outage has also inflicted a serious blow to research. The total damage is estimated to be 7 billion yen (85

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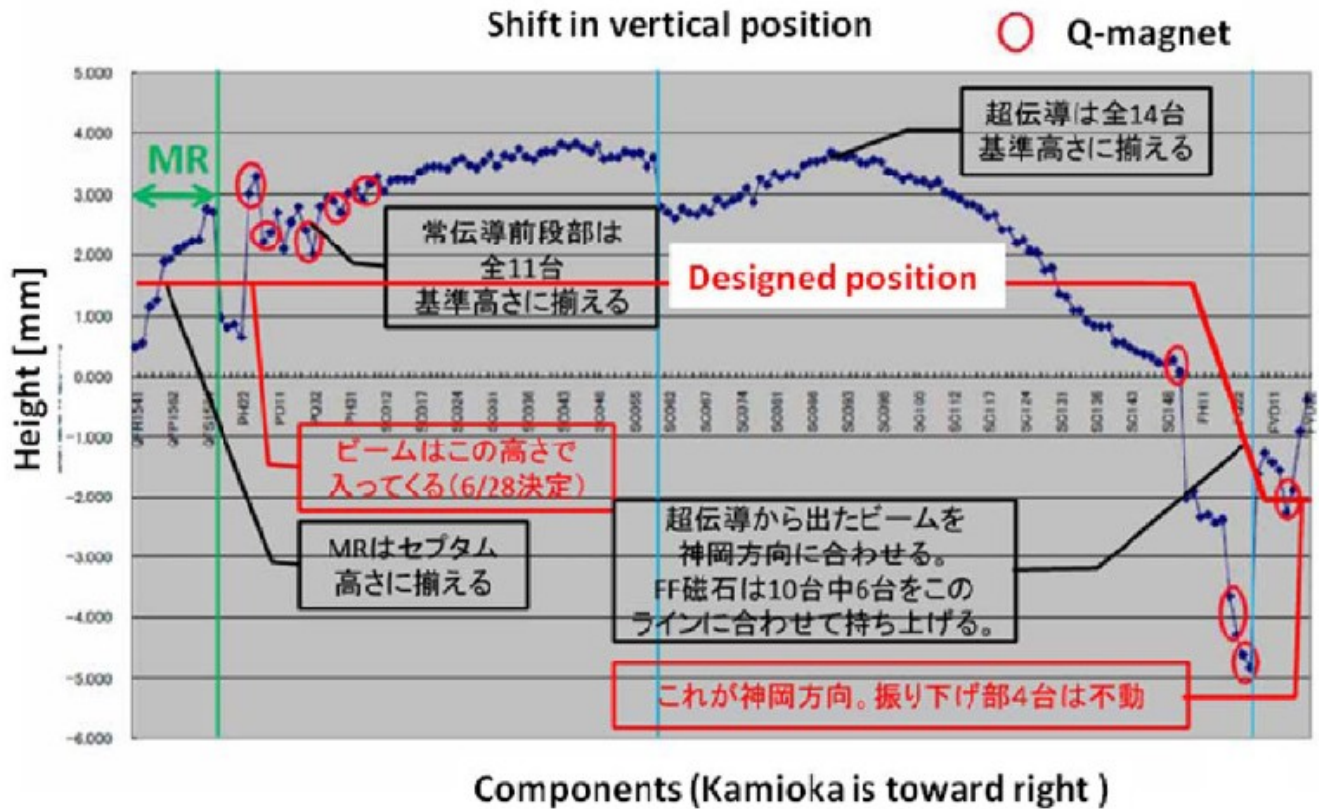


Photo 3: Dislocation of components in the T2K neutrino beam line in JPARC. Blue points represent measured heights and the red line is the nominal height.



Photo 4: Damage to the 8GeV linear accelerator at KEK Tsukuba: A quadrupole magnet fell off the support structure (left); vacuum leak developed at bellows (center); two klystrons were damaged due to vacuum leak (right).

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million USD).

Universities and Laboratories in Tokyo Area

Damage has been reported from institutions farther away from the epicenter. Many pieces of equipment need nano-scale alignment and are susceptible to mechanical damage due to earthquake vibrations. Cracks are found in several older buildings.

Assistance Offered by Other Laboratories

Research Center for Electron Photon Science (Tohoku University), JPARC, Photon Factory and other facilities in KEK Tsukuba campus, and several facilities in the universities affected by the earthquake have been international or national users' facilities. Many users running experiments or scheduled to run experiments were also affected by the earthquake. Other laboratories including those outside of Japan offered beam times for these users. For example visit <http://www.kek.jp/intra-e/press/2011/MLFUserSupport.html>

Public Outreach from Physics Community

Although all national universities are now called "national university corporations" and national laboratories into "Inter-University Research Institute Corporations" or "Independent Administrative Corporations," they are all controlled by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) or some other ministry. Their administrators are appointed by their governing ministry and are not allowed to go out of the bureaucratic boxes. As far as the author knows, no Japanese university acted promptly to inform the public about the earthquake or tsunami or nuclear disaster in a comprehensive way. The MIT Nuclear Engineering department began posting information about the pressurized water reactor and analyses based on TV images. No nuclear engineering department posted technical information in Japan. Many individuals in academia including students, however, acted promptly; the safety of all students was known very quickly by heroic efforts of students' offices and academic staffs. The Japanese internet community and its

users acted promptly. WIDE, an internet research group based at the Keio University Fujisawa campus provided information in English, Chinese, Korean and many other languages. Google and Yahoo linked to information scientists assembled. Many physicists assembled measurements on radiation fall-out and disseminated it through WIDE, Google, Yahoo and MEXT home page. They also disseminated information through Twitters and web postings.

Physicists in Tohoku University provided information on radiation safety to citizens of Sendai. An earliest town meeting was organized by physicists in Tokyo on April 2 where questions about the nuclear disaster and possible health concern were answered by specialists. Physics Society of Japan held a symposium titled "Physicists' View of Nuclear Power and Energy Problems" on June 10.

Nuclear physicists at Research Center for Nuclear Physics, Osaka University organized a volunteer group and measured radioactive contamination in soil in Fukushima Prefecture for 2 weeks in June. About 1000 physicists and students participated in the activity.

Impact on Non-Japanese Researchers and Students

The earthquake was probably the biggest in the history of Japan and gave an enormous shock to those who have come from earthquake-free countries. In an IPMU News (No.14) published by the Institute for the Physics and Mathematics of Universe on the Kashiwa campus of the University of Tokyo (about 400 km from the epicenter), Serguey Petcov writes of his experience. He could not get back home and stayed at a near-by hotel. He took a taxi to get back to his apartment in Tokyo the next day and learned about the disaster in the nuclear power plant. The internet, CNN, BBC, NHK-International and close communication with IPMU administrators helped him become well informed of the disaster. Foreigners' exodus from Tokyo began as U.S. and other European Embassies issued recommendations to evacuate the Tokyo area, but he remained in Tokyo.

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There were many foreign scientists and students working in the north-eastern part of Japan at the time of the earthquake. For most of them, it was a life-changing shock. Embassies, municipal governments, universities, and laboratories made special arrangements for them to take refuge in safer places. The nuclear disaster added a different kind of fear that none had experienced before. According to a report in the IPMU News, 29-52% of foreign researchers working in IPMU's sister institutes (called WPI) left Japan after the disaster. Some newly appointed postdoctoral fellows cancelled their contracts. Misinformation in some news media about the radiation level in Tokyo may be behind this exodus. As of June, according to the article, about two-thirds of them have returned. The number of applications from overseas to Japanese graduate schools is predicted to decline in the next academic year.

In the recovery process, generous assistance and support has been given from all over the world, including from international science organizations and their members. Without this recovery would have been much slower and painful. I feel most repair and restoration work will be complete by the end of the Japanese

fiscal year of 2011 (the end of March 2012). It will take a year or two to see the long-term effects on Japanese basic research. We do not yet know how severe the shortage of electric power will be or how much the funding to basic science will be sacrificed for the disaster recovery.

Acknowledgements

The author thanks Herman Winick for suggesting this article, reading the manuscript and making valuable suggestions. He is also grateful for the information given by Hiro Aihara and Akiko Kawachi.

Tuneyoshi Kamae (SLAC National Accelerator Laboratory) holds a Visiting Professorship at SLAC and leads the GLAST group there. Dr. Kamae has served on many government committees, laboratory advisory committees, and university committees in Japan and the U.S. in areas of high-energy physics, astrophysics, Internet, and administration.

Rutherford's legacy; its virtual and artistic versions

Connections to New Zealand and New Zealand physics

Lidia Smentek

2011 marks the 100th birthday of the Rutherford nuclear atom and the beginning of the nuclear era. Rutherford, a scientist born and educated in New Zealand, is known as the father of nuclear physics. To capture the spirit of this celebration, I interviewed Dr. John Campbell. Campbell a Research Associate in the Department of Physics and Astronomy at the University of Canterbury, Christchurch, New Zealand. He is a recognized authority on Rutherford, has written two books, “*Rutherford Scientist Supreme*” (AAS Publications, 1989) and “*Rutherford's Ancestors*” (AAS Publications, 1996), is Producer of the documentary “Rutherford” and maintains a fascinating website www.rutherford.org.nz.



LEFT: Entrance to Rutherford's Den, in Canterbury, NZ, where Rutherford did his early work before moving to England. The building was damaged during the February 2011 earthquake and aftershocks and may not reopen for some years.

RIGHT: The Rutherford birthplace with display panels in a garden setting.

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Photos courtesy: J. Campbell.

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The interview documents the activities of one person, but involves many. I believe that this is a good example to follow in order to encourage the younger generation to understand and explore nature using scientific tools. The story told by John also sheds light upon our fellow physicists in New Zealand and their devotion to the mission of academia.

Lidia Smentek: Whose initiative was it to create such an extensive and impressive website devoted to everything possible that is or might be connected with Rutherford, including the clarification of existing false information?

John Campbell: Mine. I established the website so that information I had come across, and which was outside the scope of my books, could be made more available. For example, a section on honoring Rutherford gives the background to things named for him: a racehorse, craters on Mars and the Moon, medals, scholarships, a mineral, an element, a hotel, streets world-wide, a wine, a retirement home, a train, a mountain, etc.

Smentek: On the first page of the website I found information about a documentary that will be released this year. Would you be willing to share some details about this project?

Campbell: It is absolutely amazing that there has never before been a documentary on Rutherford. The three-hour Rutherford Documentary, based on my book, has three episodes: (1) The Apprentice (Life, education, and research in New Zealand and at Cambridge until 1898, the early days of radioactivity); (2) The Alchemist (Canada and Manchester which includes his explaining radioactivity as natural transmutation of atoms and his dating of the age of the Earth, Nobel Prize, nuclear atom, World War I work, and splitting the atom); (3) The Statesman (Cambridge from 1919 until his death in 1937).

Smentek: What does it mean that it is a documentary? Is it a “dynamic” presentation (actors play various roles in accordance with your description), or static (just the documents, places, and memorabilia)? Are there dialogues between people, or does one person read the story?

Campbell: A voiceover actor tells the story. There are interviews with many Rutherford associates and historians around the world, reconstructions with actors, artifacts, and animation of experiments. We had one filming trip to Canada, England and the U.S. to record still living interviewees and relevant sites, scenery, and artifacts.

Smentek: Which audience does the movie address?

Campbell: General, with this cut being aimed at school-teachers and senior pupils.

Smentek: What about its distribution?

Campbell: It is being given to all school-teachers of physics in New Zealand. The Principal Patrons have free use of it for any DVDs they gift. It will be on sale to others later this year. It will be offered to television worldwide.

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Smentek: Why should we celebrate Rutherford's genius today? Please talk about his legacy.

Campbell: We should be promoting Rutherford to school children anywhere on this basis. "Rutherford was raised and educated in rural New Zealand. He had fewer opportunities than you do today, yet look how far he went, through application and hard work." We should be promoting Rutherford to scientists, as an ideal example of a pure researcher, a leader of research, and a public spokesperson for science. We should be promoting Rutherford to administrators and politicians. He is the perfect example of pure research for its own sake. He knew applications would follow from any new fundamental discovery, in the same way that the discovery of the electron was undertaken for fundamental understanding, and not for the vast electronics industry that followed. I am reminded of Faraday's comment on the then recent discovery of chlorine by Davy, "...in answer to those who are in the habit of saying to every new fact, 'What is its use?' Dr Franklin says to such, 'What is the use of an infant?'"

Smentek: What was it about Ernest Rutherford that sparked your interest to research him and write books?

Campbell: My involvement started in 1977 when the University of Canterbury finally shifted its last departments to its new suburban site and gifted the old Canterbury College site and buildings to the city for use as an arts center. The Arts Center Board wanted to see the site used fully and there was a basement room with a plaque outside saying this is where "Rutherford carried out his first scientific researches." The architect was going to great lengths to remove the paint from the walls and I thought that if I went into the College's archives I would likely find an instruction to a painter to paint the walls. Instead I found letters to and from Rutherford that hadn't seen the light of day. They showed that New Zealand couldn't give an accurate account of its internationally most famous son and that there were three errors on the plaque outside the Den. That started me on research on Rutherford's life and work in New Zealand and then overseas. That culminated in my books, my website, and now the documentary.

Smentek: At the website, going to *Miscellaneous* and then to *Mythology*, I found your description of Rutherford's positive attitude towards women-scientists; this issue is still valid - would you please explain why you decided to present it on this site?

Campbell: Bodanis' book, $E = mc^2$ (A Berkeley Book, Penguin-Putnam, 2000) made the patently false claim "with women Rutherford was bluff and pretty much a thug" that led to a headline in New Zealand "Scientist hero a sexist thug". I wrote a letter of rebuttal to the editor, cosigned by three other Rutherford scholars. This was submitted to *Nature* and *Physics Today*, which both declined, as they hadn't reviewed the book. I should have written a fuller article, which I will get around to yet, but the website was a place to make the facts available.

Smentek: How will you, as a physicist from Canterbury University, observe the 100th anniversary of Rutherford's model of the atom?

Campbell: I have done enough for Rutherford in New Zealand (books, talks, magazine and newspaper articles, birthplace, website, Pickering/Rutherford/Havelock memorial, documentary, etc.) so I will be celebrating at CERN where I will give an invited talk: "Rutherford's Path to the Nuclear Atom." New Zealand, as is typical, doesn't have a celebration planned as far as I know. It should be pointed out that 2011 is designated the Interna-

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tional Year of Chemistry, to celebrate the centennial of chemical societies forming the forerunner of the International Union of Pure and Applied Chemistry, and also to celebrate the centennial of Marie Curie's second Nobel Prize. As soon as I heard of this early in 2010, I emailed to the international chemical societies and the International Year of Chemistry website to ask if it was merely an oversight that there was no mention of Rutherford's nuclear atom, surely a cornerstone of chemistry. I received only one reply but there were no changes made to any of the websites.

Smentek: Are young people these days interested in Rutherford's scientific achievements? Have schools contacted you through the Website to learn more about him and his work?

Campbell: Sure. I am helping school-children the world over with their homework. Besides questions on his work, there have been challenging questions such as "What was Rutherford's favorite food?" (I could only point to his asking for seconds of scones dripping in butter during a visit to New Zealand.) "Did Rutherford discover anything on Valentine's Day?" (Not that I know of.) Lazy demands such as "Please send me 1500 words on Rutherford by Friday when my assignment is due" get short shrift.

Smentek: From your books it is evident that Ernest Lord Rutherford of Nelson was proud of his roots; do you think he would be proud of the present achievements of New Zealand physics?

Campbell: When visiting New Zealand Rutherford often spoke in praise of research, especially in applied fields to support farming and industry. Today he would be impressed with much applied research in New Zealand. In 1925 he supported the formation of the Department of Scientific and Industrial Research, having been on the board of the British one. Whilst he would be impressed with much of the fundamental research in physics today, he would probably have the same comment now as he did then, that the university's labs were under-funded and hence poorly equipped, and the staff isolated (though less so now with air-travel and email). He would also, I am sure, deplore the current view held by too many politicians and others that university research should only be in fields that will lead to new industries within the current election cycle.

Lidia Smentek (Lidia.Smentek@Vanderbilt.edu) retired after four decades at Nicolaus Copernicus University (Toruń, Poland) and is a Professor at Vanderbilt University.



Historical reconstruction of the Master at work (display in the Rutherford Den prior to its replacement).

Digital Access to APS Meetings: Serving our Overseas Members in the Information Age

Karsten M. Heeger

Email, the worldwide web, and social media have revolutionized our lives. Political and historical events are now shaped by access to electronic communication, and media coverage of world news comes in real time. We expect to be able to “Google” an event as soon as it happens anywhere in the world. Electronic communication, the dissemination of information in real-time, and the archiving of information on the web have fundamentally transformed society. Recent studies have shown that our brains adapt to the change in the way we deal with, share, and store information. Memorizing facts is nowadays less important than the ability to multitask and sort through streams of information. Why would this be different in science and research? And how does it change physics and meetings in physics?

Academia has traditionally progressed at a much slower pace. Information was exchanged at conferences, in the form of letters written amongst colleagues, and through journal articles photocopied and mailed to colleagues. Access to libraries and printed journals was key to scientific success. However, electronic pre-prints, web-based archives, and the electronic publication and distribution of journal articles now define the information flow. Digital technologies provide easy access to information in science and many areas of life. In its 20-year history the well-known pre-print arXiv (<http://arxiv.org/>) has become one of the most popular sources and archives for research information in high-energy and particle physics.

International collaborations and research across borders have always been part of physics research but are now common in many subfields of physics; large experimental projects such as collider physics have long relied on the collaboration of scientists around the globe. It comes to no surprise that the World Wide Web and many digital information technologies were pioneered by high-energy physicists to solve the problems of distributed sharing, archiving, and access to information.

The digital revolution of the past decade has inspired FIP (<http://www.aps.org/units/fip/>) and the APS Committee of International Affairs (CISA) (<http://www.aps.org/about/governance/committees/cisa/>) to consider options and opportunities for how to better serve APS members overseas in the information age.

The American Physical Society is one of the largest professional physical societies. A large fraction of physicists worldwide have worked at one point or another in their career in the U.S. and have been members of the APS. Nearly 25% of non-student APS members live currently overseas. This is an astonishing number for a national professional society. The fraction of overseas scientists who have been APS members at some point in their career and let their membership expire must be even higher. My own research activities have taken me to Japan, China, Taiwan, Italy, and Canada, and for many scientists like myself a 10-minute contributed talk at an APS meeting was their first conference experience in the U.S. – and the start of a career in physics.

The APS and its Office of International Affairs (<http://www.aps.org/programs/international>) are continuously working to develop international relations within the mission of the APS and enhance services for their international members and those living outside of the United States. Travel grants and lectureship programs, international conferences, the network of APS friends overseas, as well as programs for physicists in developing countries have traditionally been the focus of the APS international program. Over the last few years the international activities of the APS have continued to grow and efforts are underway to include an international perspective into APS advisory committees.

In early 2011 CISA together with FIP started an initiative to evaluate and test digital meeting technologies

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for use at APS conferences. The goal of this initiative is to explore options for increasing online access to speakers' presentations at the Society's meetings and aid in the electronic dissemination of information presented and discussed at APS meeting. Our goal is to enable physicists to share their work using modern technologies, allow them to engage in scientific discourse that meets the standards and demands of the information age, and help develop the international reach of the APS. Ultimately, all of this will help increase the relevance of APS meetings in the physics community.

Electronic archives of conference talks as well as the recording of video and audio sound have become the standard at many scientific conferences and meetings. In particle physics we cannot imagine a conference without electronic access to the talks presented. The opportunities and possibilities offered by virtual conference access are numerous: Research results can be disseminated worldwide in real-time. Conference participation is extended to researchers who cannot travel to the meeting. The meeting's carbon footprint is reduced while increasing participation and scientific exchange. Young scientists share and distribute their research in economical ways, and we can build scientific relationships with colleagues without limitations of travel funds. The electronic conference record also becomes an invaluable resource for scientists across the globe including countries in the developing world. A well-done digital conference experience has the potential to transform the way we engage physicists worldwide in the same way email and the World Wide Web have changed our daily lives. By providing a state-of-the-art conference experience we have the opportunity to define the professional meeting experience of physics in the 21st century while enhancing membership services to APS members.

At the 2011 April Meeting in Anaheim, California, CISA organized and conducted a trial of the usefulness and acceptance of online presentations. The effort was supported and advertised by FIP and the various divisions represented at the April Meeting. We provided

online access (<http://www.physics.wisc.edu/apsapril2011>) to slides and presentation materials from a selection of sessions representing a diverse audience and a wide range of interests. Topics ranged from a historical perspective of particle physics (Weinberg), recent results at the Large Hadron Collider (Spiropulu), to presentations on nuclear arms control (Davis), and policy issues in research and education (Wieman).

INDICO, a user-driven, web-based digital integrated conference system developed by CERN, was used to upload and distribute electronic versions of the conference talks (<http://indico.cern.ch/>). The response was overwhelming: The talks posted online totaled close to 40,000 page hits. Every APS plenary talk was downloaded more than a thousand times, and we received numerous requests for talks that were not posted. The number of downloads often far exceeded the number of people present in the session hence increasing the exposure of talks. A web survey accompanying this test trial was used to collect and evaluate the response of meeting participants. Nearly 70% of all respondents felt that access to online conference material would enhance their research and professional development. Amongst senior respondents 80% found that this would be useful for the junior members they work with. The responses indicate that posting talks would be a substantial benefit to the APS membership, and many feel that this is long overdue.

I personally received many emails from APS members who could not attend the meeting who wished that additional talks had been posted. The feedback collected in this trial also demonstrated that people expect more than just the written, archival record of talks and slides. Audio and video were requested specifically for talks on historical topics or policy issues and a fair fraction of respondents indicated that having slides combined with audio or video would be most important. The test trial showed that the combined experience of written material, video, and sound, with perhaps even an interactive aspect is what defines an integrated conference experience in the digital age. The information and statistics gathered in this trial is now being analyzed and

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will be available to guide the long-term planning in the APS for providing online access to future APS meetings.

As the Chair of the APS Committee of International Scientific Affairs I am excited about the opportunity to work with FIP, its members, and the rest of the APS to develop new ways to better serve the international APS members. The pilot to post talks from the April Meet-

ing online was a success. APS is now developing plans for making conference materials from future APS Meetings available online, and I am thrilled to see the benefit for APS members overseas and younger colleagues who are unable to attend the conferences.

Karsten Heeger is a member of the physics faculty at the University of Wisconsin, Madison and Chairs the APS Committee of International Scientific Affairs

The Turkish Accelerator Center Project

Ercan Alp and Ömer Yavaş

In early 1990's, a linac-ring type $c\text{-}\tau$ -factory together with a synchrotron light source had been proposed as an accelerator based regional project for fundamental and applied physics research in Turkey. The Turkish State Planning Organization (SPO) recognized this proposal and a project to study the feasibility (Phase-I) of the Turkish Accelerator Center (TAC) was approved in 1997. When completed in 2001, this feasibility project was followed by a TAC conceptual design project (Phase-II), again with support from SPO. After the successful outcome of Phase-II in 2005, SPO approved a third project (Phase-III) in 2006 to finalize the TAC technical design report and establish a test laboratory, consisting of a superconducting linac-based Infrared free electron laser facility (IR-FEL). This third phase project is the most widespread project ever supported by SPO involving 10 Turkish Universities under the coordination of the Ankara University with a commensurate budget to be completed by 2015. Our projection is then to have the construction of TAC (Phase-IV) finished by the early 2020's.

In 2009, with the approval and support of the President of Ankara University, an International Scientific Advisory Committee (ISAC), and a Technical Advisory Committee (TAC) were formed. With advice from ISAC, five independent projects are now in the technical design phase. The five accelerator proposals are given below, although there are still a number of options with some of them.

IR-FEL: A superconducting electron linear accelerator with energy of 40 MeV, which will be used to generate coherent infrared radiation in a free electron laser mode (IR-FEL) in the 2-250 micrometer range.

Proton Accelerator (PA): A proton accelerator complex with a final energy in the range 1-3 GeV, which could serve as a neutron spallation source, a radioactive ion beam facility, as well as a number of lower energy facilities for use in medicine and other sciences.

Synchrotron Radiation (SR): An electron or positron synchrotron storage ring with energy of at least 3.5 GeV which can be used as a third generation light source in the hard X-ray region using insertion devices.

SASE-FEL: A 1 GeV electron linear accelerator to generate X-rays via the Self Amplified Spontaneous Emission-Free Electron Laser.

Particle Factory (PF): A proposed super charm factory based on colliding a 1-GeV electron beam against a 3.5 GeV positron beam.

Parallel to the development of TAC, a new Accelerator Technologies Institute has been approved and started in 2010 within Ankara University. This institute, with a new location at the Gölbaşı campus in Ankara is also hosting the first accelerator, the IR-FEL. The current director of the project is Prof. Ömer Yavaş of Ankara University.

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Turkey has an ambitious goal of spending two percent of the yearly GDP for research and development by 2013, to be in compliance with EU guidelines. Projects like TAC are in-line with strengthening the research infrastructure, and it is looking increasingly possible that some of original goals of this mega scientific project will be realized.

Parallel to the TAC project, Turkey is a signatory member of SESAME, the synchrotron project located in Amman, Jordan, together with six other countries in the region. Furthermore, Turkey has a candidate status to be a full member of CERN within the next 4 years, a process approved and started in 2010.



The opening ceremony of the first buildings of the Accelerator Technologies Institute, and the IR-FEL building, May 9, 2011, Gölbaşı, Ankara, Turkey.

Prof. Cemal Taluğ, the Rector of Ankara University, and Dr. Ercan Alp, the chair of the International Science Advisory Committee

Ercan Alp chairs the International Science Advisory Committee of the TAC. Ömer Yavaş is a Professor at Ankara University and is the TAC Project Director.



The APS Council – My perceptions as International Councillor

Belita Koiller

After being elected as International Councillor of the APS Council in mid-2009 I realized what a big responsibility this was. I was expected to represent, in a 30 Members plus 7 Officers Council, all regions in the world. Of course I was not prepared to deal with questions relevant to each one of them. During 1 ½ years as Councillor – my 2-years term ends next December – I was lucky to meet many special people and to be able to vote for some important issues impacting the international physics community.

The evening before my first meeting, in April 2010, I met Amy Flatten, Director of the APS Office of International Affairs. She was, and I became, very excited with the possible approval by the Council of a USA/Brazil Exchange Program to be agreed upon and conducted by the respective Physical societies APS and SBF, in terms similar to the already ongoing program with India. This SBF/APS program was approved by the Council in the meeting and is now fully operational. New Exchange Programs are about to be established with Argentina, Chile, China and South Africa, with negotiations at different stages in each case. Amy Flatten enthusiastically presents the reports on International Affairs in every Council meeting.

Also in the first meeting that I attended, the Council recommended a change to the APS Constitution, increasing the number of International Councillors from one to four. This required a vote among all APS members, and the full membership approved this change, which means changing the current composition of Councillors from 8 U.S. and 1 International to 5 U.S. and 4 International Councillors. This keeps the number of seats the same in the Council, and is about to be implemented.

There is a clear trend in the APS towards becoming more international, and that's for good reason: there are of the order of 10,000 international members, meaning nearly 25% of non-student members are from countries other than the U.S. The APS meetings are now truly



international. Besides presenting their work and attending high quality sections, scientists can plan well ahead to discuss with collaborators and other colleagues from different countries during the event. Also, the Physical Review series publishes more papers from abroad than from authors working in the U.S.

Expressing my opinion in the Council meeting was always a bit intimidating, given the number of distinguished members (most native English speakers) and the meeting room layout. Ken Cole, the Assistant to the Council, actually a most efficient assistant, has always been supportive and ready to help. The intervention I remember giving in my first meeting was about the increase of the number of International Councillors, from 1 to 4: I expressed my great relief on behalf of the future International Councillors that would be able to split by 4 the responsibility to represent different regions.

APS journals were always discussed in the Council

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meetings, with regular reports presented by the Editor-in-Chief and by the Treasurer/Publisher. The expansion of the existing building for editorial activities was approved in April 2010 and progress reports were given in subsequent Council meetings. In April 2011 the Editorial Board of the newly created journal, Phys Rev X, was presented to the Council. It has 22 US and 21 International members. Two women from the U.S. are included.

Other topics regularly brought to the Council and that I found of particular interest to developing countries are Education & Diversity, and Outreach. A lot of quality material (books, videos, public events) were proposed and completed by the APS Committees typically within a year. This was true essentially in all other areas where APS contributes.

My latest activity related to APS started in the April 2011 meeting, when Amy Flatten asked me to represent APS in a one-day workshop on “World Cooperation in Physics: Bridging the Gaps” a satellite workshop of the Brazilian Physics Meeting 2011, the SBF Annual Meeting. There I met Raul Grigera, from Argentina, member of the Committee of International Scientific Affairs (CISA), who also participated in the workshop, bringing additional information from his APS experience. The resulting joint presentation was named: “APS from the perspective of Latin American

members of APS committees” went very well. In preparation for this, I got interesting data from Amy, including the APS international members’ regional distribution, which I reproduce here:

To see ideas turn into proposals which become a reality

| Region | Number of APS members |
|----------------|------------------------------|
| Asia/Pacific | 2,340 |
| Western Europe | 4,480 |
| Latin America | 484 |
| Middle East | 486 |
| Eastern Europe | 241 |
| Canada | 934 |

after a year or so was a very stimulating experience and a lesson from APS to take back home.

Belita Koiller, an APS International Councillor is Professor of Physics at the Instituto de Fisica, Universidade Federal do Rio de Janeiro (UFRJ), Brazil and is a Condensed Matter Theorist.

The Digital Divide in the Scientific Community and Worldwide

Alberto Santoro

The Digital Divide has been a constant concern since the dawn of the Internet, the great discovery of the last century. This concern has increased in the High Energy Physics community with the advent of the Large Hadron Collider (LHC).¹

The internet invaded all areas of human society and showed the possibilities of communication in a broad sense.

Computing for high energy physicists was always a concern and this community has experimented with different computer system architectures as technology developed. More recently, this community adopted and developed the GRID architecture as a solution for the treatment of the unprecedented number of events produced by LHC to be processed in order to obtain a new result in physics. LHC is a consequence of the evolution of new technologies during the last century in electronics, new materials, new particle accelerators, chips, and so on, and is opening up new possibilities in physics and other disciplines.

ICFA (The International Committee for Future Accelerators), understanding the Digital Divide problem, created a new group to study the situation internationally. This group is the Standing Committee on Inter-Regional Connectivity (SCIC) and is chaired by Professor Harvey Newman. A subgroup of this Committee was organized specifically to study the Divide Divide.²

One of the most important parameters defining the GRID is the connectivity among institutions and countries. GRID means shared power computing, shared storage and sufficient bandwidth (a minimum of 1 Gbps). We note that the GRID architecture for computing is not only a solution for processing high energy physics data. LHC will gather approximately 20 Petabytes per year of data (1 Petabyte = 10^3 Terabytes = 10^6 Gigabytes = ...). This amount of data will be circulating in the internet. To have an idea of what these numbers mean, the same amount of data in cd's would

be a 20 km high tower of cd's.

The reports of ICFA/SCIC³ produced since 2004 and the Workshops⁴ about Digital Divide clearly show the situation in all countries with respect to connectivity. The maps presented in these reports are very important to understand where we have to work to upgrade connectivity.

An interesting aspect of this reality was the "democratization" of the data analysis. The data now is distributed around the world to the central units of GRID (called Tier1) and the units of the system with less capacity to absorb data but very useful for other functions on the global system of GRID (called Tier 2). Before then, researchers had to analyze data at the physical site of the experiment because the data could not leave the site for security reasons.

Another interesting point is the evolution of the networks in each region of the earth. We have the impression that in regions such as Latin America the Digital Divide increases if we consider the rest of world, and the present situation of each country. Exceptions exist and Brazil is one of them⁵ where new projects to open access to the population have had good success.

The Digital Divide does not appear to be an isolated problem. It is a consequence too of the Economic and Social Divide⁶, or the distribution of wealth in each country. For example, it is not a big coincidence that the moment when the Brazilian economy did well, the Digital Divide in the country decreased.

The velocity of the development in each country is very different. Also for regions within one particular country it is different: notice, for example, differences between North and South Brazil. The announced and expected globalization characterizing a new era does not exist.

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When a developing country joins an International Collaboration everybody agrees that it must have equal work conditions. But this is a dream and only a dream. A GRID unit costs 2 to 3 times more in a developing country. Then they need at least twice as much money to collaborate. And this “divide” is not taken into account by other members in the collaboration. The Economic and Social Divide does not stop with these examples. This fact permeates the entire society.

One good parameter for measuring the Digital Divide is the Internet Penetration rate. For example, let us consider the year 2009:⁹ for North America it was 74.2%, for South America, 34.7%, for the Caribbean 22.6% and 22 % for Central America.

Some countries started very early to take action against the Digital Divide. For example, France in the 70’s introduced PCs in Primary School while Brazil did it

only in the last 5 years. The figure (from <http://www.cbpf.br/~eduhq>) shows criticism by secondary school children. This was the situation on 2004. In the last 5 years the Brazilian Government distributed PCs to significant numbers of primary schools, thus opening new opportunities for the children.

The table shows what is the present situation in Latin America for the distribution of bandwidth per country. The reader will find much more information in the last report of ICFA/SCIC.³

There is no doubt that the Digital Divide is an important subject that warrants our attention. This is a subject that permeates all aspects of life in our society. The Digital Divide is an extension to the Economic and Social Divide and is just one of many problems we face. The development of technology as an added human element will bring us enormous individual and social benefits.



Connectivity in Participating Networks⁷

| Country | Network | Website | Connectivity (Mbps) |
|-------------|------------|--|---------------------|
| Argentina | Innova-Red | www.innova-red.net | 210 |
| Bolivia | ADSIB | www.adsib.gob.bo/adsibnueva | disconnected |
| Brazil | RNP | www.rnp.br | 1450 |
| Chile | REUNA | www.reuna.cl | 210 |
| Colombia | RENATA | www.renata.edu.co | 130 |
| Costa Rica | CONARE_RED | www.conare.ac.cr | 155 |
| Cuba | RedUniv | www.mes.edu.cu | disconnected |
| Ecuador | CEDIA | www.cedia.org.ec | 45 |
| El Salvador | RAICES | www.raices.org.sv | 10 |
| Guatemala | RAGIE | www.ragie.org.gt | 18 |
| Honduras | HONDUNET | www.unitec.edu | disconnected |
| Mexico | CUDI | www.cudi.edu.mx | 45 |
| Panama | RedCyT | www.redcyt.org.pa | 10 |
| Paraguay | Arandu | www.arandu.net.py | disconnected |
| Peru | RAAP | www.raap.org.pe | 14 |
| Uruguay | RAU | www.rau.edu.uy/redavanzada | 132 |
| Venezuela | REACCIUN | www.cenit.gob.ve | 90 |

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1. <http://public.web.cern.ch/public/>
2. <http://www.fnal.gov/directorate/icfa/>
3. <http://icfa-scic.web.cern.ch/ICFA-SCIC/>
4. SCIC organizes workshops about the Digital Divide in many countries Brazil, Romania, Poland, Mexico, Korea, and others.
5. <http://www.rnp.br/en/> and <http://www.redecomep.rnp.br/>
6. http://en.wikipedia.org/wiki/Digital_divide The **digital divide** refers to the gap between people with effective access to **digital** and information technology and those with very limited or no access at all. Like North x South Divide used in some countries we can generalize and say Economic and Social Divide.
7. <http://www.internetworldstats.com/south2.htm>

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Also see the summary by Harvey Newman in this newsletter of session J6 at the April 2011 meeting “The Digital Divide in 2011.”

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Thanks to Professor Lidia Smentek for this interesting collage of stamps honoring Ernest Rutherford (by permission of John Campbell see <http://www.rutherford.org.nz>)

