International Newsletter

The American Physical Society

http://units.aps.org/units/fip/

July 2007

View From the Chair

Irving A. Lerch †

The Conscience of Science

In the long lament of the 20th century, one fact of history looms above all others: the burden of war falls increasingly on the innocent. This is the theme of Andy Sessler's primer in this newsletter on the explosive remnants of war. In World War I, of the more than 15 and one-half million dead, almost 43% were noncombatants (as compared to 29% in the previous century in the Napoleonic wars). In World War II, over 55% of the 55 million dead were civilians. In Vietnam, this fraction is estimated at more than 78%. Butchery in new forms marches with sustained momentum on New York, London, Madrid, Iraq, Afghanistan, Darfur, Lebanon and Israel.

But modern war does not relent when the guns fall silent as Andy so eloquently reminds us. The detritus on the battle field continues to kill for decades. Can physicists contribute to a solution? Read Andy's primer and decide for yourself.

Building Bridges

As noted in our last Newsletter, on March 14 in Baltimore, FIP and APS Director of International Affairs, Amy Flatten, co-hosted a meeting with representatives of the Overseas Chinese Physics association (OPCA), the Association of Korean Physicists in America (APKA), the American Chapter of the Indian Physics Association (ACIPA), and Hamid Javadi (representing US/Iranian physicists). In furtherance of our agreed intentions to form closer ties so that all will benefit and to promote a broad range of activities and initiatives, I will be working with Executive Committee members Anita Mehta and Betty Tsang to explore the implementation of such association. A first step will be a jointly sponsored reception at the March and, perhaps, April meetings in 2007. But at the same time, we will take care to expand our contacts with colleagues abroad, especially in developing countries, with the goal of furthering our common interests. The Matching Membership and Library Outreach programs managed by APS International Affairs will remain a prominent feature of this effort.

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Travel Grants to Promote Scientific Exchange

The International Travel Grant Award Program has been enlarged to include the wider APS community (http://www.fit.edu/fip/documents/TGAP_Nov_2005.pdf) and the third cycle is about to be implemented in partnership with the APS Office of International Affairs, the APS Committee on International Scientific Affairs (CISA), the Division of Nuclear Physics (DNP) and the US Liaison Committee to IUPAP. Other APS units have indicated a desire to join. In this issue, a brief report from Jerry Peterson at the University of Colorado, illustrates how much this modest program can accomplish. Our Vice-Chair, Satoshi Ozaki, has undertaken the arduous effort of screening applications with the help of our partners in this program—an effort made all the more difficult by the excellence of the applications and the meager resources currently available.

Candidates for Election and Fellowship

Soon, a slate of candidates for Vice-Chair, Secretary-Treasurer and Executive Committee Members-at-Large will be circulated and I urge you to take an interest in these nominations and to vote your preference. Gary Steigman has been responsible for superintending the selection of nominees—always a difficult task because the identification of qualified and willing candidates is never easy. Equally important, every member of the Forum must become active in identifying and nominating candidates for office and fellowship. While the slate of candidates for fellowship has increased this year, FIP still lags in recognizing and promoting colleagues for their contributions to physics and international collaboration.

"With fully a third of research faculty and half of all graduate students born in other countries we are an international community."

March and April Meetings

Chair-Elect Herman Winick has embarked on a major effort to invigorate and extend FIP participation in the March and April meetings by organizing important symposia with wide international participation and securing the co-sponsorship of other units who share many of our objectives and interests. With the help of members of the Executive Committee and colleagues in the Forum on Physics and Society, Herman is planning session on scientific cooperation in the Middle East. For April, a large and important exploration of the digital divide will be undertaken with the participation of the Division of Particles and Fields and perhaps other units. These symposia are designed to explore vital issues with a view to developing new programs and goals.

The Newsletter and Web Page

As is readily apparent, our Newsletter editor, Laszlo Baksay, with the help of Assistant Editor Szabolcs Rembeczki, have worked hard to put this—our third edition this year—into your hands. This is no mean feat for a small band of volunteers faced with many other responsibilities, and while members of the Executive Committee have done yeoman service in soliciting relevant articles, we need the recommendations and help of our members. We all share responsibility for making this newsletter relevant and reflective of our priorities, activities and plans. Also, if you have not done so, please regularly visit our web page edited by Gyongyi Baksay. The page has undergone a renaissance under Gyongyi's tutelage and the amount of material is prodigious, of interest and current. Again, your recommendations and evaluations will be important to the continue value of these publications.

Finances and Management

No other member of the Executive Committee bears greater responsibility and makes greater effort in the management of Forum Affairs than does our Secretary-Treasurer, Noemi Mirkin. And because of the increased level of activity of the Forum these past few years, increasing strain has been placed on Forum finances. To manage these finances amid the struggle for relevance is the great issue confronting us today. For this reason, I urge all of us to attend the business meeting that will be held during one of the annual meetings—usually in April. It is important for the officers and Executive Committee members to hear from the rank and file on the issues of governance and program. Noemi will send out an announcement with the particulars for all meetings and social events being organized by the Forum with the hope that many members will be encouraged to attend and participate.

Recruit!

One final word: help us find and induct new members. With fully a third of research faculty and half of all graduate students born in other countries, it should be obvious that we are an international community, dependent on the world for talent, energy and ideas. If you have not done so, spread the word and don't hesitate to call on the members of the Executive Committee for information, suggestions and questions.

† **Irving Lerch** is Chair, Executive Committee, FIP and former Director, Office of International Affairs, APS.

Membership in 2 Fora comes free with APS membership but you have to sign up. Express your interest in international issues by **checking the FIP box** with your APS renewal.
To **join FIP** at **any** other **time**, sign up **on** the APS **website** http://www.aps.org/memb/unitapp.cfm

Chasing Cosmic Particles in the Argentinian Pampa - the Pierre Auger Observatory.

Thomas Hebbeker †

During a balloon flight in the year 1912 physicist Viktor Hess observed the discharge of an electrometer – caused by charged particles passing through the atmosphere. He had discovered that our planet is constantly bombarded by "cosmic rays", energetic elementary particles, mostly protons, produced somewhere in the universe.

In 1938, another scientist, Pierre Auger, placed several particle detectors in the Alps. He found, that sometimes two detectors signalled the arrival of charged particles at the same time, while they were some 30 meters apart. He had discovered that cosmic particles of very high energy can produce an "air shower" when hitting an air molecule. In such a violent collision many secondary particles are created, which subsequently generate even more particles in further collisions in the atmosphere. These particles, in particular electrons and "muons", reach the ground at practically the same time, but are spread over distances of up to several kilometers. This showering is nicely illustrated in the logo of the "Pierre Auger Observatory" (above), the world's latest and largest detector for ultra high energy cosmic rays, which will be presented in this article.

Each tank has been named, many after children from the town of Malargue.

But let us first briefly discuss the scientific interest in cosmic rays of very high energy. The central questions are:
-Which cosmic "accelerators" are able to provide particle energies 100 million times higher than reachable in the best human built accelerators ?
- Is there a maximum energy or not ?
- Of which nature are the particles hitting the atmosphere ? Protons ? Exotic particles ?

In the last years a few large "air shower arrays" have been operated worldwide to answer these questions. These arrays follow the original idea of Auger, but the number of detector stations is large (several hundred) and their distances are measured in hundreds of meters. Again, figure 1 provides a nice illustration of such a grid of detectors at the surface of the earth. These air shower arrays have measured particles with an energy of 10^{20} eV – that is the kinetic energy of a tennis ball concentrated in a single subatomic particle ! But the three fundamental questions are still unanswered.

Therefore, in the 1990s a large and truly international collaboration was formed, under the leadership of Nobel prize winner Jim Cronin and cosmic ray pioneer Alan Watson, to build an even larger and more powerful observatory to tackle the three basic questions again. The observatory, named after the discoverer of air showers, Pierre Auger, must be built at high altitudes, to avoid that too many shower particles are absorbed in the dense lower layer in the atmosphere. And it must cover a huge area, since cosmic particles of 10^{20} eV are extremely rare, the flux is only about 1 / 100 km^2 / year ! A flat and hardly populated region fulfilling these requirements was found in Argentina, in the province of Mendoza, near the small town of Malargue, see figure 1, at an altitude of about 1400 m.

The Auger collaboration includes universities from Argentina, Bolivia, Brazil, Mexico, North America and Europe. In total 17 countries are involved, the number of physicists exceeds 200. The map (figure 1) shows an area of about 50 km^2 x 50 km^2 occupied by the Auger detectors, thus covering an area of about 3000 km^2 – this is the largest particle detector worldwide!

To measure the energy and arrival directions of air showers two detection techniques are applied, i) surface detectors and ii) fluorescence telescopes:
i) In total 1600 big water tanks (of which 2/3 are already operational, see shaded regions in figure 1), will cover the pampa with a spacing of 1.5 km. The tank positions are indicated in the map by points. Charged particles entering the water generate Cerenkov light, which is recorded by photomultipliers. Figure 2 shows in the foreground one of these water tanks, together with a solar panel, needed to supply the necessary energy. Upon arrival of an air shower several neighboring tanks record a signal quasi simultaneously. Each tank has been named, many after children from the town Malargue.
ii) An air shower can also be "seen", since it generates light by exciting nitrogen molecules in the atmosphere. The shower appears as a short and weak flash of light – similar to the light trace produced by a meteorite – which can be observed with special optical telescopes; in total 24 of them are placed at four locations at the boundary of the Auger area, see figure 1

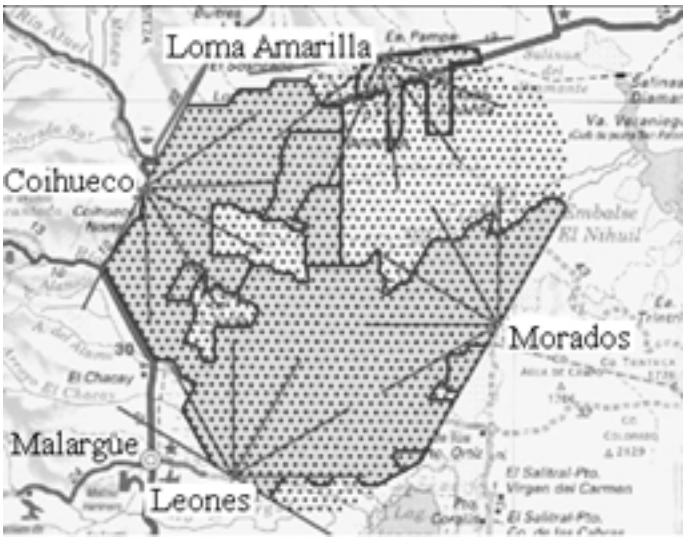

Figure 1.

(Coihueco, Leones, etc). The building on the hill shown in figure 2 houses four such telescopes, overlooking the pampa; the telescopes proper are not visible in the picture, since the white shutters are closed as long as the sun shines; the feeble air shower light can only be detected in dark moonless nights.
With these two detection methods it is possible to reconstruct the same air shower in two independent ways – this allows to cross check the results and to improve the measurement precision by combining the two methods.

The Auger Observatory has started to record cosmic shower data in 2003, and first results have already been obtained. Indeed, air showers of energies near 10^{20} eV have been detected and the energy distribution was measured. It remains to be seen if events at even higher energies will be observed. Another very exciting question to be addressed, once more events have been collected, is related to the origin of these particles: do they come from certain regions of the sky, for example from centers of active galaxies, potential sources of ultra high cosmic rays ?

Since the observatory in Argentina is blind in certain cosmic directions (in spite of the earth's movement), the Auger collaboration is planning for a second observatory, in the northern hemisphere, in Colorado, USA. For additional information: http://www.auger.org/

Figure 2.

† **Thomas Hebbeker** is Professor of Physics and Director, III. Physikalisches Institut, RWTH Aachen, Germany.

Bridging the Digital Divide

R. Les Cottrell † and Harvey Newman ††

There is a dramatically increased interest and need for enabling worldwide collaborations of scientists to address data intensive challenges in High Energy Physics, fusion, weather, astrophysics and genomics, etc. Each of these disciplines has identified network needs in the Terabit/second range in 5-10 years. In addition there are growing needs and demands to enable active collaborations with scientists, researchers and educators on both sides of the digital divide to understand and tackle problems in health, distance education etc. These are exemplified by the increased development and deployment of grid technologies and the creation of worldwide collaborations of scientists to address challenges, provide education and training etc.

"In the first half of 2004 the number of Internet users in China grew from 6 million to 78 million."

At the same time the Internet's usage, performance and coverage is growing dramatically.In the 1st half of 2004 the number of Internet users in China grew from 6 to 78 million[1] and now tops 100 million. Worldwide the number recently topped 1 billion (www.internetworldstats.com). The US Energy Sciences Network's traffic has been increasing by 100% per year for the last 6 years . The traffic flowing through the Amsterdam exchange increased fourfold in 2005 (www.ams-ix.net/about/stats/index.html). The Large Hadron Collider network between CERN and the US grew from a 9.6 kilobits/sec satellite link in 1985 to multiple 10Gigabits/sec today.

These developments have been paralleled by upgrades in the metro, state, national, and continental core network infrastructures, as well as the key transoceanic links used for research and education, to typical bandwidths in North America, Western Europe as well as Japan and Korea of 2.5 and now 10 Gigabits/sec. In addition: the Global Ring Network for Advanced Applications Development (www.gloriad.org) project is providing high speed connectivity especially for Russia and China; the Trans-Eurasia Information Network (www.tein2.net) is improving the connectivity of the Asia Pacific region; the Latin America Cooperation of Advanced Networks (www.redclara.net) and the Western Hemisphere Research and Education Networks (whren.ampath.net/) Links Interconnecting Latin America projects are bringing Gbits/s to Latin America; EUMEDConnect (www.eumedconnect.net) is improving connectivity to the Mediterranean; the East African Submarine System (www.eassy.org) is bringing fibre to the E. coast of Africa; and four Southern African National Research and Education Networks in Kenya, Malawi, Mozambique, Rwanda and South Africa have come together to found the Ubuntunet (www.ubuntunet.net/index.htm) Alliance for Research and Education Networking with the goal of delivering Gigabits/s connectivity to their countries and the rest of the world. The transition to the use of "dense wavelength division multiplexing" to support multiple optical links on a single fiber has made these links increasingly affordable, and this has resulted in a substantially increased number of these links coming into service. At the end nodes the commoditization of Gigabit and 10 Gigabit Ethernet, new buses, and faster cpus are driving

performance higher and costs lower.

All of this adds up to an explosion of opportunities. However, the rapid rate of progress, confined mostly to the US, Europe, Japan and Korea, as well as the major transoceanic routes, threatens to open the Digital Divide between the developed and developing regions further. For example the mean bandwidth per networked computer in Africa is less than 4 kilobits/sec, yet the costs are 50-1000 times that in well developed regions.

The worldwide science and education community is in a unique position to facilitate persistent, non-threatening dialog and increased cooperation between nations that have often been at odds. In the past it has taken a lead: in installing the first permanent Internet connection to mainland China[2]; initiating the "Silk Road" satellite system (www.silkproject.org) to bring connectivity to central Asia; upgrading connectivity to Brazil; leading the installation and demonstrating the first 622 Mbps connection to India; the efforts of the International Committee for Future Accelerators; Standing Committee on Inter-regional Connectivity (http://cern.ch/icfa-scic/); and the free eJournals delivery service (www.ejds.org) of the Abdus Salam International Centre for Theoretical Physics etc. The community must continue to take this leadership in driving the communication needs, utilizing, illustrating and educating on the capabilities, and leading the way for others to take advantage of these opportunities. We are not alone in this effort, for example, the G8 specifically pledged support for African higher education and research by "Helping develop skilled professionals for Africa's private and public sectors, through supporting networks of excellence between African's and other countries' institutions of higher education and centres of excellence in science and technology institutions". Without major efforts to bridge the digital divide, it will continue to increase for many regions such as S. Asia and Africa, leading to increased poverty, distrust, political instability etc.

The efforts required are made more challenging by the continued rapid progress of network technologies. Appropriate solutions today must be based on current-generation infrastructures based on optical fibers if the divide is to be bridged. Today's targets will move as network technologies and their modes of use advance in the economically favored regions of the world.

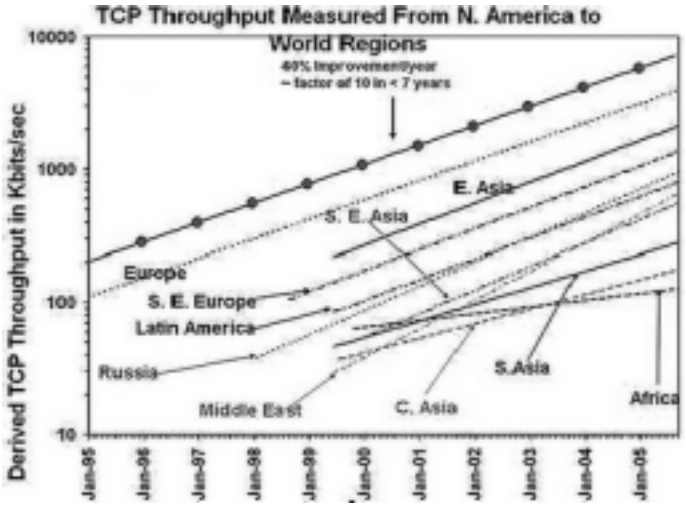

Figure 1: Internet performance (derived from delay and loss measurements) from N. America to various regions of the world. Note that many regions are several years behind Europe, and Africa, Central Asia, and South Asia are falling further behind. (From the PingER project, Sep. 2005,www-iepm.slac.stanford.edu/pinger/)

1 See the Feb. and Aug. 2004 Reports by the ICFA Standing Committee on Inter-Regional Connectivity (SCIC) at http://cern.ch/icfa-scic .

2 "Networking with China", R. L. A. Cottrell, C. Granieri, L. Fan, R. Xu, Y. Karita, CHEP04, Japan, also SLAC-PUB-6478, Aug 1994

† **Les Cottrell** is Assistant Director of SLAC's Scientific Computing and Computing Services and Chair of the ICFA/SCIC Network Monitoring working group.

†† **Harvey Newman** is Professor of Physics at Caltech and Chair of the ICFA Standing Committee on Inter-regional Connectivity.

Nuclear Energy and Peace: a Complex Equation

Ana María Cetto †

On the occasion of the Nobel Peace Prize awarded to the IAEA and its Director-General, Mohamed ElBaradei.

The history of the Nobel Peace Prize since its creation in 1901 shows that the Nobel Committee has a tradition of rewarding achievements, when they are there, but it also rewards efforts when the achievement is not entirely at hand. Unfortunately, the latter is the case more often than not in the area of nuclear disarmament.

In 1995, the Nobel Peace Prize was awarded to the Pugwash Conferences and its former President, the late Sir Joseph Rotblat, "for efforts to diminish the part played by nuclear arms in international politics and, in the longer run, to eliminate such arms". In 2005, the same prize was awarded to the IAEA and its Director-General, Dr. Mohamed ElBaradei "for efforts to prevent nuclear energy from being used for military purposes and to ensure that nuclear energy for peaceful purposes is used in the safest possible way".

Both organizations have other features in common. They were born in 1957, in the heat of the Cold War, when it was evident that the spread of nuclear technology was unavoidable and therefore it became urgent to ensure that this technology was used for peaceful purposes. The world would have to wait until the end of the Cold War for the first decision to reduce nuclear arsenals; in the meantime the reverse was happening, leading to a highly dangerous world scene. Much hard work behind the scenes was needed to create the two organizations. In the case of the IAEA, spurred by President Eisenhower's 'Atoms for Peace' initiative, intense negotiations took place initially amongst eight countries, and finally in 1955 the Soviet Union agreed to join; this agreement represented an initial thaw in the post-war relations between Moscow and Washington. The creation of the IAEA was preceded by the First Geneva Conference, convened in 1955 by the UN, at which a large number of scientists from the powers engaged in the Cold War were able to discuss nuclear-related issues, focusing on the potential of peaceful applications of nuclear energy.

Simultaneously, a small group of distinguished scientists from the nuclear powers made intense efforts to establish a fruitful dialogue aiming to avert the huge dangers of nuclear weapons, which led to the creation of the Pugwash Conferences. The Conferences took their name from the location of the first meeting, which was held in 1957 in the village of Pugwash, Nova Scotia with the participation of 22 eminent scientists, including seven from the United States and three from the Soviet Union. The stimulus for this gathering was a Manifesto issued in 1955 by Russell and Einstein (and signed also by Born, Bridgman, Infeld, Joliot-Curie, Muller, Pauling, Powell, Rotblat, and Yukawa) which called upon scientists of all political persuasions to assemble to discuss the threat posed to civilization by the advent of thermonuclear weapons and the urgent need to prevent the nuclear race.

The two organizations have grown to become well established, on the basis of their original purpose and objectives, but with necessarily broadened agendas to address the complex issues that lie at the crossroads of world politics and diplomacy, peace and development, and nuclear science and technology. In particular the IAEA, with its current membership of 139 States and the support from the international community, is doing as much as it can to make sure that every nuclear facility, every nuclear material or radioactive source, is used for peaceful purposes, in a safe way, and that it is adequately protected. This is a big task, and there is still much to be done.

The mandate of the IAEA also includes ensuring fair access to nuclear technologies, with the purpose of extending their benefits as widely as possible. For this reason the Agency carries out a comprehensive and wide-ranging technical cooperation programme to support Member States in their application of nuclear and related technologies for sustainable development

This aspect of the IAEA's work is perhaps the least well known, yet the most attractive for a large number of beneficiaries in the countries, and also for the scientists that are engaged in the related activities. The major area of the technical cooperation programme is human health – where nuclear medicine and radiation therapy are used to diagnose and treat cancer, radioisotopes are used as tracers e.g. to identify drug-resistant strains of bacteria, nuclear techniques are used to optimize nutrition strategies, etc. Food and agriculture has been another traditional area of application. Isotope hydrology is rapidly gaining ground because of increasing problems of pollution of rivers and lakes and exhaustion of aquifers, scarcity of safe drinking water, lack of wastewater management, dam safety, etc. A variety of nuclear techniques are easily available to monitor, control and protect the land and marine environment and to remediate pollution caused by physical and chemical factors. Last but not least, among the various energy alternatives nuclear power has been and continues to be an option, and is now being considered more seriously by a number of countries; which require the Agency's support in building their physical, technical, human and legal infrastructure, bearing in mind of course the basic safety requirements.

The tensions between *promotion* and *control*, between *benefits* and *threats*, between *peaceful* and *military* applications, have marked the nuclear landscape since the early times, and will continue to do so for strong reasons, some of which are far from being scientific or technical. Physicists have contributed, actively or unwillingly, to the two sides of the equation, and will continue to do so as long as those reasons prevail. International organizations such as Pugwash and the IAEA must continue to exist as long as they help to ensure that nuclear energy is used safely and solely for peaceful purposes. They must also contribute to make nuclear weapons obsolete.

† **Ana Maria Cetto** is Deputy Director General of the International Atomic Energy Agency, Vienna and Professor of Physics, UNAM, Mexico.

Explosive Remnants of War: Land Mines and Pieces of Cluster Bombs

Andrew M. Sessler †

The Problem

All wars eventually end, but their after-effects go on and on, and cause death and destruction long after the war is ended. It is these after-effects; namely the explosive remnants of war (ERW) that we consider here. Sometimes there are large bombs and shells, which are almost always easily located and disarmed. However, land mines and the remnants of cluster bombs are quite another matter.

It is a modern problem: Land mines were first used extensively in WW II (and the remaining ones are still a problem today), while cluster bombs were first used extensively in the Vietnam War (and their remnants are a serious problem). The best estimate is that there are 80 million ERW in some 80 different countries. ERW cause, as we all appreciate, loss of limbs, blindness, deafness, burns, major trauma, and often death. There are 15-20 thousand incidents a year, 80% to civilians (with a third of them happening to children). Put another way, every 22 minutes an ERW claims a victim.

Most of us know a good deal about mines, but not so much about cluster bombs, so let me give some details about the latter. A B52 can carry 45 cluster bomb units. These can be set to explode as an aerial burst or upon impacting the ground. A unit can carry as many as 650 sub-munitions (typically base ball size, but sometimes as small as a size D battery). The sub-munitions can be magnetically triggered (for use against vehicles and tanks and, in this case fewer sub-munitions, but more powerful ones are employed), or with trip wires, or simply set for each to explode. In the last case one can have as many as 200,000 steel fragments spewed, and therefore clearing, as large an area as a few hundred football fields.

> *"Modern war does not relent when the guns fall silent, the battle field continues to kill for decades."*

The sub-munitions are guaranteed by the manufacturer to be more than 95% likely to explode, but often the landings are through trees or on to soft ground so the number not exploded can be even greater than the manufacturer's guarantee. Taking the 95% number, one can quickly estimate that every B52 leaves 1,700 ERW. Just in Laos, during the Vietnam War, and only counting one of 12 different types of cluster bomb units, the US had about 100 B52 sorties and consequently dropped 90 million sub-munitions. During the Gulf War more than 30 million sub-munitions were dropped on Kuwait and Iraq. They were subsequently used very extensively by the US in Kosovo and in the 2003 Iraq War. Most recently they were employed by Israel in the southern region of Lebanon.

Treaties and Activities

The most important treaty is the Mine Ban Treaty of 1997 that prohibits the use, production, stockpiling and trade of anti-personnel mines. This treaty was the result of many years of effort by 1,200 non-governmental organizations (NGOs) in 60 countries. Their work, as we know, was rewarded with a Nobel Peace Prize. As of July 2005, 145 countries have joined this Treaty; not, of course, including the US.

There is not yet a treaty covering cluster bombs, but there is an international civil society movement with just this goal. It is called the Cluster Munition Coalition and includes organizations like Amnesty International, The Red Cross and Human Rights Watch. So far, only Belgium and Norway have adopted bans on cluster bombs, but there has been considerable activity in the parliaments of a number of European countries. One can expect that eventually there will be a cluster bomb treaty.

There are humanitarian de-mining activities sponsored by civilian groups that make a considerable, and ever-on-going effort, to raise money for this purpose. Private groups – and there are about 50 of them — include the Adopt a Minefield Campaign of the UN, the Cranfield Mine Action Unit (UK), the Danish De-Mining Group, the HALO Trust (US and UK), the Mines Advisory Group (UK), and the Vietnam Veterans (US). In addition there are many organizations that are not involved exclusively with de-mining, but also with other activities related to mines, such as education about mines, helping victims of mines, etc.

There are also activities by the governments of states. For example, the State Dept of the US is authorized by Congress to spend about 90 M$ a year on humanitarian de-mining. This money, as well as money raised by private groups, allows the US to contribute about 250 M$ per year to de-mining activities.

It is estimated that 1B$ per year could be effectively used in de-mining. Currently the world spends about 400 M$, including the 250 M$ coming from the US.

Detection Methods

Detection methods range over the disciplines of biology, chemistry and physics. The use of the sensitive smelling apparatuses of bees, rodents and dogs has been considered. Possibly bees could be sensitized so that large numbers of released bees would swarm over the mines buried in a field. Dogs are actually trained, and currently employed, but they are relatively expensive to maintain and they get tired and need to be rested.

Chemical detection primarily depends upon developing "artificial noses" sensitive to explosive material.

Physical techniques (17 have been identified) include ground-penetrating radar (employing centimeter and millimeter electromagnetic waves) searching for electromagnetic signatures such as a change in resistivity/conductivity, sonar, nuclear magnetic resonance, infrared, quadrupole resonance, X-ray fluorescence, acoustic sensing, and neutron activation.

It is important to differentiate between military de-mining and humanitarian de-mining. The military typically employ heavy machinery (specially equipped armored cars or tanks), move quickly, and if a few mines are left un-exploded so be it (better than not moving!). Humanitarian de-mining does not have the press of time, can't usually afford expensive equipment, and cares very much if even one mine is left un-exploded. Consequently, almost all humanitarian de-mining employs lots of de-mining people, properly dressed with heavy shoes and face protectors, and moving slowly through a field with a simple metal detector. To give an appreciation of the problem, modern mines have almost no metal in them (they are made almost exclusively of plastic), and so the metal detector sensitivity is made very high and, hence, is mostly triggered by pieces of shrapnel or even bottle tops. A lengthy process of carefully digging up the potential mine is then undertaken. In short, the primary problem is clutter, not detection.

Humanitarian de-mining money is best spent, at present, employing de-miners, who often work at as low a wage as a dollar a day (which often is more than can be earned in any other available job). Nevertheless, a mine costs as little as $3 to manufacture, while de-mining costs are more like $1,000 per mine located and de-activated. To clear a square kilometer costs between 1 and 2 M$.

A short bibliography of ERW-related websites is given on the Web page of the Forum on International Physics at http://www.fit.edu/fip/useful_links1.htm.

† **Andrew Sessler** is Director Emeritus at the Lawrence Berkeley Laboratory and former President of the American Physical Society.

SCHOLARS AT RISK NETWORK

Robert Quinn †

Scholars at Risk is the only organization of its kind in the world: an international network of universities and colleges promoting academic freedom and defending the human rights of scholars worldwide. Scholars at Risk recognizes that academic freedom and its constituent freedoms (including thought, opinion, expression, association and travel) are essential to open, democratic societies. By involving higher education communities in the defense of these freedoms, Scholars at Risk is working to achieve significant improvements in conditions, not only for scholars but for everyone.

Scholars at Risk was born from the recognition that scholars and other members of the global academic community, often because of their membership in that community, are frequently targeted for repression and violence. The attacker may vary. Depending upon the country or region of conflict, the attacker may be a political, military, paramilitary, or religious authority, or an individual or group seeking to gain favor with such authority. Whatever the source, the attackers' goals are generally the same: to silence dissent and control the quality and flow of information in society, as a means to controlling the society itself. Scholars are obstacles to these goals because their work necessarily involves the development of ideas, exchange of information, and expression of new opinions. Where the ideas, information, and opinions are perceived by authorities as threatening, individual scholars are particularly vulnerable. Such scholars are labeled—explicitly or implicitly—as 'suspect,' 'disloyal,' 'dissident,' 'dangerous,' or 'enemy' of the state, society, faith, family, culture, etc. Once labeled, scholars often find themselves increasingly isolated from colleagues and their community, and ever more vulnerable to more serious, more violent attacks.

Independent of the content of their work, scholars are also frequently targeted as examples—as a means of sending a message to other members of the society. Because of their education, frequent travel and social status, scholars often have a high public profile. This is particularly true in developing countries or repressed societies. Attacks on these scholars as public figures therefore play "an exemplary role, serving as a warning to individuals throughout society that dissent and political opinion [will] not be tolerated."[1] Thus scholars often face greater risks than the population at large. This is especially true for prominent scholars, scholars whose work questions prevailing orthodoxy, or those scholars—like physicists—whose work is viewed as particularly important to the security or image of a regime.

> *"We care about individual scholars because they are at risk and we have the ability to save their lives."*

Why defend scholars? In general terms, we care about increasing the quality and flow of information and understanding in the world, and academic freedom and scholarship promote these goals. By defending scholars and promoting academic freedom in other countries, we invariably open discussions of the importance of academic freedom in our own communities, the results of which can only be constructive. Specifically, we care about individual scholars because they are at risk and we have the ability to save their lives. Through offering temporary visits to their campuses, Network-member institutions have helped to save the lives of threatened scholars and their families. This is reason alone for Scholars at Risk to continue its work, and for universities and colleges to join the Network.

Deeper answers are found in the reasons scholars are attacked.

Scholars at Risk works not only to save lives but to save important voices. In those cases where scholars are attacked for the content of their work, we should ask ourselves what it is about that work that a regime finds so threatening? More often than not, we will find truth and merit in the ideas or opinions expressed. By responding to these attacks, we gain insight and understanding for ourselves and help preserve the local intellectual capital of societies under threat. Moreover the Network-member institutions that invite such scholars to their campuses enrich their communities and introduce their faculty, students and alumni to unique and inspiring educators.

When scholars are attacked as examples or to chill wider society, our efforts not only preserve voices but may help to forestall wider violations. Evidence from a number of countries strongly suggests that attacks on intellectuals precede wider violations of rights generally. By paying attention to these attacks on scholars early on, we may help to sound an alarm, which can help to delay or forestall attacks on the wider community.

Finally, by responding to attacks Scholars at Risk and its member-institutions build solidarity within the global academic community. Through the Network, academic communities are directly involved in the defense of academic communities. Recognizing that a threat to freedom of thought and opinion anywhere is a threat to these freedoms everywhere, Scholars at Risk and its members give example to a better, brighter future.

How does Scholars at Risk work? SAR member institutions offer sanctuary to scholars—professors, lecturers and researchers, as well as some artists, advocates, writers, journalists and human rights defenders—who suffer short-term (surveillance, isolation, harassment and intimidation) or long-term threats (unjust imprisonment, violence/torture, threats to life). Scholars like

- [scholar AA], a Pakistani professor of linguistics whose book on the female role in ancient texts led to charges of blasphemy against her;
- [scholar BB] a Ukrainian marine biologist imprisoned for publishing reports of plankton migrations that Soviet-style bureaucrats labeled "state secrets"; and
- [scholar CC], a Sri Lankan mathematician suffered death threats triggered by his condemnation of human rights violations in that country's on-going conflict;

Network members have helped these and other extraordinary individuals. The benefits are clear: SAR members have provided literally career- and life-saving assistance to the scholars themselves, allowing them to continue contributing to local, national and global discourses, while keeping alive the hope that they might someday all be able to return home in safety. The host institutions also benefit by exposing their faculty, students and campus community to a unique class of dedicated educators. The global academic community benefits by increasing awareness of on-going threats to scholars and increasing recognition of the importance of academic freedom in open societies.

Scholars at Risk also works to educate the public about attacks on scholars and the importance of academic freedom, through e-mail messages, newsletters, and lectures on campuses of Network member schools and periodic Network-wide conferences.

Scholars at Risk welcomes inquires from universities and colleges in any country interested in participating in the Network and assisting threatened scholars, as well as from faculty, students and other individuals interested in supporting our efforts. More information can be found at http://scholarsatrisk.nyu.edu, by emailing scholarsatrisk@nyu.edu or by calling 1-212-998-2179.

[1]Human Rights Watch, Human Rights Watch World Report 1999 at 452 (Dec. 1998).

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† **Robert Quinn** is the Director of the Scholars at Risk Network at New York University.

Congratulations!

New FIP Sponsored APS Fellows

Congratulations!

Cerdeira, Hilda A.
The Abdus Salam International Centre for Theoretical Physics
"For her contributions in superconductivity, nonlinear dynamics and synchronization of chaotic systems and her development and management of outreach programs in communications and literature for colleagues in developing countries."

Hernandez, E. Susana
University of Buenos Aires, Argentina
"For her contributions to international physics, including remarkably diverse scientific contributions derived from her continuing efforts to bring together researchers from different areas and disciplines with particular emphasis on young scientists."

Hernando, Antonio
Instituto de Magnetismo Aplicado, Spain
"For significant contributions to applied magnetism in soft magnetic materials and magnetism in metallic nanoparticles for his many contributions to international physics through his participation in IUPAP committees and activities."

Schopper, Herwig
CERN, Geneva, Switzerland
"For his contributions to particle physics and accelerator technology; for fostering world-wide scienctific collaborations; for leadership in the SESAME project towards the advancement of physics and peaceful regional cooperation."

Wang, Enge
Chinese Academy of Sciences
"For his contributions to the synthesis of tubular graphite cones, nanobells and other nanostructures and for developing the Institute of Physics, Chinese Academy of Sciences, as a premier institution to promote international collaborations."

The American Chapter of the Indian Physics Association in North America

Surajit Sen †

India has long been a contributor in the areas of mathematics[1], astronomy[2] and in certain areas of the physical[3] and biological sciences[4]. For complex reasons, as J.V. Narlikar writes in his recent authoritative book, The Scientific Edge, Indian science suffered significantly in the period beyond the 12th century A.D. Even so, the nation has seen physicists such as Chandrasekhara Venkata Raman, Vikram Sarabhai, Homi Jehangir Bhabha, Jagadish Chandra Bose, Satyendranath Bose, Meghnad Saha and many distinguished others in the past 150 years, which in turn reflects India's deep and time tested commitment to physics.

Today, India is a democracy of 1.1 billion people with some 28% of its population in urban areas and the rest in the rural areas. There are many universities but relatively few that can compete with the top institutions of the world. It would be years before India can reach a level where science and technology would pervade the lives of the majority of her people. Yet, the country has made a renewed commitment to science and technology and has been making remarkable strides to insure India's long-term sustenance in a technology driven and highly networked, global society.

There is presently a large group of successful physicists of Indian origin in the academic, industrial and government sectors in North America. Indian students comprise the largest group of foreign students in the US and are hence a significant force in shaping the future of North America, India, and beyond. There is a need to provide a platform to support and to recognize this cohort in North America. There is also a need for this group to play some role in empowering Indian physics in particular, as well as supporting developments in Indian science and technology in general. Established by Jogesh Pati as a tax-exempt society in January 1985, the American Chapter of Indian Physics Association (ACIPA) endeavors to provide just such a platform.

In recent times, ACIPA has been working to maintain a close dialog with the American Physical Society (APS) and the Indo-US Science and Technology Forum, which is an autonomous body that works harmoniously with the US Department of State and the Department of Science and Technology of the Government of India to promote bi-national collaborations. In due course, ACIPA could become a venue to represent physicists from the entire Indian subcontinent in North America.

ACIPA strives to maintain an online directory of North American physicists of Indian origin and of the many major government establishments, academic centers and laboratories in India. An effort is under way to actively involve the Indian student body in the US and Canada and to provide them with support in their job search efforts should they decide to return to India or remain here for further career advancement. Through the years ACIPA has cost shared and facilitated the transfer of journal back issues to Indian colleges and institutions in need of resources to maintain their scarce library facilities. In addition, usually at the March and April APS meetings, ACIPA has organized invited sessions that feature public lectures by distinguished Indian scientists, an award ceremony to recognize distinction in physics, and a forum to discuss issues of common interest.

In closing, ACIPA needs a close relationship with the APS to remain an effective organization in the US and Canada. Linkages with the Overseas Chinese Physics Association (OCPA), Association of Korean Physicists in America (AKPA), the proposed Iranian-American Physicists (IrAP) network group and other international groups is also increasingly important and are being pursued whenever opportunities arise. Ultimately, the challenges of pursuing physics, physics education, and technological advancement are almost universal. Language barriers and cultural differences tend to vanish in the spirit of friendship and the sharing that define these pursuits. It is also fair to say that physics and in a broader context, science, remains one of the most powerful universal languages and physicists can play a positive role in influencing political goodwill in these difficult times. This reason alone amply justifies the need for ACIPA and the other groups of physicists of international origin.

1 See, e.g., Shulva Sutra (c.1500-c.200 B.C.) discussed the rules of measurement,

2 See, e.g., the Aryabhatia by Aryabhata written around 499 A.D.

3 It is difficult to conclusively establish evidence of concrete developments in the physical sciences in India. However, the metal pillar near the Kutub Minar in Delhi, which is made mostly of iron and has not rusted for more than 1500 years bear testimony to the metallurgical advances achieved in India in ancient times.

4 See e.g., Sushruta Samhita by Sushruta that was available during the period of the Mahabharata

† **Surajit Sen** is Professor of Physics at State University of New York, Buffalo and President of ACIPA

Capacity Building: Opportunity for Enduring Peace*

Henry J. Hatch †

I have been working on capacity development since the late 80's, initially from my perspective as an Army engineer and since my retirement in '92 as a member of several private sector organizations. I suggest that the three key elements of enduring peace are security, stability and sustainability. An enabler in achieving this is **capacity building**.

First, the "three S's", Security, Stability and Sustainability:

Security in this context refers to freedom from fear of harm from external and internal threats that interfere with the pursuit of human, social, economic and political activity necessary to enjoy a reasonable quality of life. It includes the absence of armed conflict, no threat of terrorism and good health. **Stability** does not refer to preserving the status quo, but establishing conditions in which orderly change can occur for example toward free and democratic societies and market economies. **Sustainability** is the ability to perpetuate into the indefinite future human enterprise that meets today's needs without preempting future generations' ability to meet theirs. With that as a context, I will now explore capacity building.

My first involvement with this notion was in 1988 when some of us in the Army were considering post-Cold-War roles for the Army and its engineers. We argued that the Army's purpose was not solely "to fight the nation's wars" as most firmly believed, but to ensure what I have already referred to as "enduring peace." That concept included multi-agency and international coalition actions to promote the conditions for peace, military deterrence and fighting if necessary, and, just as important, returning to an enduring peace (locally, regionally, or globally).

The term we selected then was "nation assistance". We wanted to avoid the "nation building" baggage of Viet Nam and we wanted to acknowledge that we were subordinating ourselves to others in promoting enduring peace. The term "capacity building" is a rare expression that actually uses generally accepted definitions of two common words together without some hidden or sinister agenda: Capacity - the ability to do something or aptitude - and Building – to cause to be or to grow.

From my limited experience, I offer the following, the what, why and how:

(What)"Capacity building is the **building** of human, institutional and infrastructure capacity (Why) t**o help societies develop** secure, stable and sustainable economies, governments and other institutions (How) **through** mentoring, training, education, physical projects, the infusion of financial and other resources, and most importantly, the motivation and inspiration of people to improve their lives."

Capacity building should not be a side benefit but an intended outcome as pointed out in a December 2002 Rand study for AID entitled "USAID and Science and Technology Capacity Building for Development". The National Academy of Science published a report urging USAID to "… reverse the decline in its support for building S&T capacity in developing countries.

In the interest of pursuing capacity building, in 2004 at the suggestion of the US, The World Federation of Engineering Organizations (WFEO) created a new standing committee on capacity building that is hosted by the American Association of Engineering Societies (AAES).

There remains a gap between [the] State [Department] and civilian agencies' stability efforts and those of [the US] Defense [Department]. For example State talks about preventing conflict as well as post-conflict reconstruction whereas Defense seems to focus on stability after conflict.

Another capacity building development, but on the international front is in UNESCO. Since the United States withdrew from UNESCO in 1984, US engineers have worked with UNESCO through partnerships with engineering NGOs, particularly WFEO and International Union of Technical Associations (UATI) in a number of technical areas. With the return of the US to UNESCO in October 2003, the US engineering community led by AAES proposed to the State Department and WFEO a new core UNESCO program in capacity building in engineering, and the application of engineering and technology for poverty eradication, and secure and sustainable social and economic development, particularly in the developing countries. The overall strategy of the proposal titled "Engineering for a Better World" was to promote human and institutional capacity building, particularly in the developing countries, through the transfer and exchange of knowledge and innovation in international networking, cooperation, intercultural dialogue and partnership.

This somewhat ambitious proposal was reworked by State and became the first substantive U.S. resolution to be presented to the UNESCO Executive Board who approved the "Creation of a Program in Technical Capacity Building".

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* In 2005, the former Commander of the U.S. Army Corps of Engineers, General Hank Hatch, briefed civilian and military leaders at the Pentagon on planning by the engineering community to develop an international program of capacity building for developing countries. This is an edited version of General Hatch's presentation. In a subsequent issue of this newsletter, we intend to publish accounts of the physics community's efforts within and outside the UN system—Ed.

† **Henry J. Hatch** is a retired Lieutenant General from the U.S. Army. He most recently served as the Chief Operating Officer of the American Society of Civil Engineers (ASCE) and is currently the coordinator for the Science and Engineering Committee of the US National Commission for UNESCO.

Guest Society:

The Eötvös Loránd Fizikai Társulat, Hungary

András Patkós †

Loránd Eötvös of "Eötvös Experiments" fame, founded the Hungarian Society of Physics and Mathematics in 1891. Among its founding members were not only physics and mathematics teachers of universities and high-schools, but also leading entrepreneurs and bankers. In 1950 the society separated into the János Bolyai Mathematical Society and the Roland Eötvös Physical Society (in Hungarian Eötvös Loránd Fizikai Társulat = ELFT).

In contrast to many other countries, teachers were part of the Hungarian Physics Society from the beginning. The resulting close interaction between researchers and teachers has for over a hundred years critically contributed to the high quality of physics education in Hungary, which then produced many outstanding scientists of global stature including the legendary "Martians" (Szilárd, Teller, von Kármán, von Neumann, Wigner).

At present, ELFT has about 1500 members. We carefully preserve our historic heritage: the Society provides common professional forum for researchers and physics teachers (working in primary and secondary education). The dual structure consists of regional organizations mostly involving teachers and 12 thematic divisions of researchers. Additionally, there are two thematic teacher's divisions, one focusing on developing curricula, supporting talented pupils, etc. in primary schools and one for secondary school physics teaching.

A peculiar boundary condition to our work is represented by the existence of a physics division also within the Hungarian Academy of Sciences. In a fruitful cooperation initiatives related to physics teaching (at all levels) and dissemination of physics-related knowledge in the society originate mostly from ELFT and are supported by the Academy of Sciences. Our thematic divisions organize summer schools in specific branches of physics. Recent examples are one-week lecture series in material sciences, particle physics, nuclear safety, and vacuum technology.

Particular attention is paid to the organization of continuing education courses (called „enquêtes") for teachers. Last year's course of secondary school teachers concentrated on different aspects of "Energy" and was generously supported by the Paks Atomic Power Plant, including a visit to this plant with professional guidance. An important pioneering event was the organization of a one-week lecture series for physics teachers at CERN (Geneva). Lectures were provided partly in Hungarian, partly in English by staff scientists of CERN, including some Hungarian particle physicists. Encouraged by the success of this pilot event, CERN is going to offer such program also to other countries. We wish to extend this kind of continuing education program for teachers also to other important European research institutions (ESRF, ESA, etc.).

A central role is played in the Society's program by student's physics competitions proposed to a wide range of age groups. ELFT has two centrally organized competitions: the Eötvös problem solving competition, which has some 90 years of historic tradition and the Öveges Primary School Physics Competition named after a very popular high school physics teacher who was a high-flying TV star in the 1960's. Beyond these two, there are more than 40 competitions organized by our regional organizations. The common trend one might observe is that these competitions try to offer a very broad spectrum of approaches to physics from active experimentation and tough problem solving to candid observation of natural phenomena and adequate criticism of pseudo-scientific "interpretations".

These activities received a major impetus by the events of the World Year of Physics in 2005. Some 30 thousand people attended the events and physics was positively featured under quite unexpected circumstances like the flower-carnival in Debrecen (see picture). Hundreds of students attended Open Houses at research institutes and physics departments. The drop in the number of physics students in higher education actually slowed down substantially.

In conclusion, I wish also to mention two important scientific lectures in 2006 realized under the umbrella of ELFT. It was just hundred years ago that Eötvös, Fekete and Pekár started their measurements checking the equality of the gravitational and inertial mass. A talk at the October meeting of the Society reviewed in detail how the equality could be established with an accuracy unsurpassed until the 1960's. Last May ELFT again commemorated the late Prof. George Marx, a central figure of the renewal of our Society after WWII (Editor's note: and an FIP sponsored APS Fellow). On this occasion the story of the discovery and scientific and applied perspectives of geoneutrinos were followed with great interest, since this was a subject where the pioneering role of George is highly praised even in our days.

The next General Meeting of ELFT will be held in 2007 under the theme "Renewal of ever-young Physics". The floor will be given predominantly to the young promising generation of Hungarian researchers and physics teachers, who are dispersed all over the world and are now expected to come back home.

†András Patkós is President of the Roland Eötvös Physical Society and Professor of Physics, Eötvös University, Budapest, Hungary

The APS Committee on International Freedom of Scientists

John Gillespie†

The APS Committee on International Freedom of Scientists, CIFS, is responsible for monitoring concerns regarding human rights for scientists throughout the world and informing the APS of problems encountered by scientists in the pursuit of their scientific interests or in effecting satisfactory communication with other scientists. It has been a standing committee of the APS since 1980. Clearly FIP and CIFS have significant common interests.

CIFS actions include developing extensive sources of information on human rights violations, communicating with governments, courts and prison systems to encourage respect for human rights as guaranteed in national laws and international treaties and to make clear that human rights violations have international visibility. We also communicate with individual scientists and their families to assure them that the international scientific community is aware of their situation and supports them in their efforts.

CIFS Activities

We summarize here several of our recent and typical activities which are of obvious pertinence to FIP's efforts in supporting international physics collaboration. CIFS monitors cases in many countries including Russia, China, Ukraine, Belarus, USA and Iraq.

Most of the serious cases in the past year have arisen in **Russia**. These cases reveal systematic intimidation of scientists who, using open information sources, have collaborated with foreign researchers. This issue is of obvious concern for future collaborations with Russian scientists. A number of eminent Russian academicians have recently written to their government to protest this persecution of scientists. CIFS has been active in writing letters to Russian government officials and to The Council of the Public Chamber of the Parliament of Russia on this issue and to support individual scientists, several of who have received severe prison sentences. There appears to be a categorical refusal of the Russian government to acknowledge the distinction between open and secret information used for research. The Council is currently reviewing the use and abuse of the "state secret" concept for accusing scientists of treason and espionage.

We have very closely followed the cases of three scientists, Valentin Danilov, Oscar Kaibyshev, and Igor Sutyagin, who have been accused of espionage. In addition to writing letters in support of each of the scientists, CIFS read a letter of support for Igor Sutyagin from the APS President at the annual AAAS Science and Human Rights reception. During this year's reception, which honored Sutyagin, the AAAS made arrangements for participants to make video recordings of messages of support for Sutyagin. These were then transmitted to him and his family.

In the **USA**, CIFS has been following problems related to visas, asylum and immigration for scientists. There is serious concern that the quality of American research and education in the sciences and engineering is being compromised by restrictions and delays for visas for foreign students, researchers and faculty. Many national scientific societies have encouraged the government to expedite these procedures and to make the process more transparent. A representative of Homeland Security met with CIFS on these issues. We are closely following three cases of individual scientists currently seeking asylum in the U.S.; some are threatened with deportation.

CIFS has previously monitored several cases in **China**. Physicists Tong Shidong and Wang Youcai were imprisoned for several years for their peaceful human rights activities. Tong Shidong was released from prison in March of this year. Wang Youcai was released in 2004 and is now living in the U.S. We maintain contact with John Kamm, the director of the Dui Hua Foundation, who has met with CIFS and who has offered valuable advice on human rights in China.

In **Iraq** there is evidence that scientists, engineers and health professionals are being systematically sought out for intimidation and murder. A review by AAAS is found at http://shr.aaas.org/emerging_issues/iraq.htm.

We have written to Secretary of State Rice and to General Abizaid at the Department of Defense to encourage efforts to control this serious situation.

We have evidence, direct and indirect, that our letters have been received by governments and administrations. In China, there are cases for which prison conditions have been ameliorated when administrators learned of outside interest in specific individuals. We have received direct replies to our queries regarding a possible violation of human rights of a Ukrainian physicist.

Collaboration With Scientific Human Rights Organizations

CIFS actively communicates and collaborates with other human rights groups in the international scientific community, including AAAS (and their Human Rights Action Network), the New York Academy of Sciences, and The Committee of Concerned Scientists (CCS). Information exchanged among these groups has proven to be extremely valuable for our efforts. Important sources include the press, observers in different countries, and personal contact with persecuted scientists, their colleagues and families.

In response to a query regarding our experience with human rights cases in Russia, we have provided information to the Council of Europe's Parliamentary Assembly, which is developing a report on science and espionage. We are collaborating with the Scholars At Risk (SAR) Program, which finds temporary academic positions for scholars whose safety and research are threatened in their home countries. SAR's director, Robert Quinn, has met with CIFS and we will exchange information on any cases involving scientists.

Andrei Sakharov Prize

In 2005 the APS created the Andrei Sakharov Prize for human rights, which is coordinated by CIFS. The first Andrei Sakharov

Prize was awarded to Yuri Orlov of Cornell University at the APS April 2006 meeting in Dallas. Orlov met with CIFS to discuss human rights in Russia and elsewhere. Two CIFS members, one chairing, served on the first selection committee. CIFS encourages all APS members to identify worthy nominees for future prizes, which are awarded every two years.

CIFS Membership

CIFS welcomes from the FIP membership nominations for motivated and qualified new members who will be actively engaged in our efforts on behalf of the human rights of scientists throughout the world.

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† John Gillespie is Chair of CIFS and Professor Emeritus of Physics and Astronomy at Lehman College of The City University of New York

Brazil Celebrates the 40th Anniversary of the Brazilian Physical Society

Hilda Cerdeira†

The Brazilian Physical Society (SBF) celebrated its 40th anniversary last October. The event included an extensive scientific program, with a presentation of the diversity of areas of physics research in Brazil. The history of the SBF follows the development of physics in the country, which is tightly tied to its economical and political situations.

Physics research in Brazil started in the 30's and it was strengthened in the late 50's and 60's, with scientists returning from abroad, and a high degree of enthusiasm. Brazil enjoyed a free atmosphere, which permeated the meetings of the Brazilian Society for the Advancement of Science (SBPC), the only national scientific events that were regularly attended by local scientists in those days.

It was within this broader scientific society that the idea of an independent Brazilian Physical Society was born. The foundation happened at the XVIII Annual Meeting of the SBPC, on 14 July 1966. The physics meeting was chaired by Jose Goldemberg, from the University of São Paulo, and Paulo Leal Ferreira, founder of the Institute of Theoretical Physics, also in São Paulo. During this meeting, the participants adopted the by-laws of the new Society, which came from a proposal by Jayme Tiomno, Amelia Imperio Hamburger, Ross Alan Douglas and Sergio Mascarenhas. These statements are still today the basic rules of the Brazilian Physical Society. The board of the Society was elected in this meeting, with Oscar Sala, from the University of São Paulo, as the first President.

The initial task of the Society was a "survey on the situation and needs of physics in Brazil" to be presented to government agencies. However, hard political times had already settled in Brazil. In 1969, the government imposed the compulsory retirement of several university faculty members, including Jose Leite Lopes, from CBPF, in Rio de Janeiro, who had been elected as President of the Society, Jayme Tiomno, from Rio de Janeiro, the Vice-President, and Mario Schenberg, from the University of São Paulo, who was a member of the Council.

The Brazilian Physical Society continued to work, in spite of the lack of support by the government agencies. During its first meeting, in 1970, members of the Society used the opportunity to express their deep disagreement with the governmental actions. Some of the compulsorily retired heads of scientific institutions were not even allowed to set foot in their own institutional premises. During these hard times the Society also began the publication of the Brazilian Journal of Physics, which is today an established scientific publication, and the Revista Brasileira de Ensino de Fisica, which is published in Portuguese and dedicated to all areas and questions of physics teaching. Both publications came to join the Bulletin of the Brazilian Physical Society, which is today one of the best sources of documents for those who are interested in the history of Physics in Brazil. The Bulletin has been replaced by an electronic news system.

The Society had a continuous participation in the discussions and monitoring of the Brazilian nuclear program. Together with the Argentinean Physical Society (AFA), the Brazilian Physical Society has a longstanding position in favor a nuclear weapons free continent. It has been a satisfaction to know about the statement of the Brazilian civil President José Sarney, in 1986, in a visit to Buenos Aires, who pointed out that Brazil was not going to engage in producing nuclear weapons.

During the late 70's, the Society started to organize topical national meetings in condensed matter, nuclear and high energy, and elementary particle physics. In particular the meeting on Condensed Matter grew from an initial participation of 150 to an outstanding 1300 in 2006. The Society had also an important role in discussions on the expansions of physics research, and on the first analysis of the quality of research in Brazil.

The Brazilian Physical Society has continued backing the development of physics in Brazil, which has acquired recognized international standards. It is to celebrate this success that Brazilian scientists met at the beginning of October, 2006, in the city of São Paulo, to present to the Brazilian people the state of physics in the country, and to remember the past with a strong look at the future.

The program for the conference can be found at:
http://www.sbf1.sbfisica.org.br/eventos/40anos/inicial.shtml

I want to thank heartily to Silvio Salinas(*), on whose previous work is based this article, for reading and correcting these notes. Special thanks go to Amelia Imperio Hamburger(*) for sharing her personal views and to Adalberto Fazzio(*), president of the SBF, for providing documents about the Society.

(*) Institute of Physics, University of São Paulo, São Paulo, Brazil.

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† Hilda Cerdeira has been professor of phsyics at USP and UNESP, Sao Paolo, Brazil and retired from the ICTP, Trieste.

News from the Membership

We intend to give as much exposure to individual FIP members as possible. All are invited to submit short (50 words or less) news items with a photo, for this section and our Webpage. Write about yourself and encourage others to make a submission. We would like to help the membership to come closer together as individuals and as groups and share personal recent events (within a year or so) and achievements within our community. Looking forward to receiving your News !

László Baksay (Editor), Szabolcs Rembeczki (Ast. Ed.) FIP Newsletter, Gyöngyi Baksay, Editor FIP Webpage

Seung Joo LEE of the Quantum-functional Semiconductor Research Center at Dongguk University in Seoul, Korea has been appointed to the executive committee of the Commission on Semiconductors of IUPAP. The Commission also manages the biannual International Conference on Physics of Semiconductors, the biggest conference in this field. Dr. Lee will participate in policy making, such as deciding the site of the ICPS.

Jorge Lopez of the University of Texas at El Paso has spearheaded a program of international physics talks, called "Ciencia de Frontera", across the U.S.-Mexican border. Presentations - in Spanish and aimed at high school students - have attracted between 30 to 300 attendees. http://jorgelopez.utep.edu/CienciafronteraF2006/index.htm

Miroslav Synek is an Independent Consultant in Physics, Chemistry and World Affairs. He is an APS Fellow and Life Member, Fellow of The American Association for the Advancement of Science, and a Fellow of the American Institute of Chemists. His abbreviated message is: "Nuclear age requires free elections."

Andrej (Andy) **Inopin** started his "Virtual Physics Teacher" tutoring services in Vancouver, Canada in 1996. Through the internet he has helped students and researchers world-wide to obtain their goals. (http://www.vacuum-physics.com/inopin) Now he is also providing expert PhD thesis and research paper review.

Surendra Tiwari was inducted into the Hall of Fame of the Department of Mechanical Engineering , Old Dominion University for his distinguished research in Reacting High Speed Flows and Planetary Flows. AS Research Advisor for numerous M.S. and Ph.D. students he is known for his tireless mentoring efforts and generosity.

"I think it is a jolly good idea, to have a 'News from the Membership' column in your FIP Newsletter."

Jag J. Singh, APS Fellow

Travel Grant Assistance Program (TGAP) Reports

A few years ago FIP created TGAP as a small but significant seed-program to support research visits, especially between APS members and physicists from developing countries. Due to the program's success APS has recently broadened it into I(International)TGAP also including other units: CISA, DNP, DPB, DPF, DPP. Further information, including the application process, can be obtained at www.aps.org/programs/international/programs/travel-grants.cfm .

Summaries of two examples of TGAP are given here.

1. "Intense laser interactions" **Nikolai Manakov**, Voronezh State U.,Russia and **Anthony Starace**, U. of Nebraska.

The FIP TGAP grant enabled Prof. Manakov to visit Nebraska for 6 weeks. He presented joint papers at the APS DAMOP meeting, which was held in Lincoln. Much work was carried out on 2 different joint projects, which resulted in 2 collaborative publications in Phys. Rev. and J. Phys. B.

2. **Rakhim Yarmukhamedov**, Inst.of Nuclear Physics, Tashkent, Uzbekistan and **R. J. Petersen**, U. of Colorado, Boulder.

The FIP TGAP grant enabled Prof. Yarmukhamedov to spend one month in residence at the U. of Colorado, Boulder and Colorado School of Mines, Golden. The collaborative research with colleagues was devoted to methods for the analysis of laboratory data on nuclear reactions important within stars. A joint paper has been submitted for publication in Physical Review C. Dr. Yarmukhamedov also gave a series of lectures on R-matrix and asymptotic normalization methods to graduate students and faculty the CSM. Details of theoretical and experimental future plans were established as were arrangements to collaborate on coming studies of specific reactions, which are key for understanding solar neutrinos. A specific joint research proposal has also been drafted. Prof. Y. also met with UCB faculty in the taskforce for International Graduate Education, developing schemes for Central Asian students to attend US graduate schools and for future faculty-to-faculty connections in areas other than nuclear.

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Standford University
winick@ssrl.slac.stanford.edu

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ozaki@bnl.gov

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University of Michigan
930 North University
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nmirkin@umich.edu

APS Councillor
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Vanderbilt University
david.l.ernst@vanderbilt.edu

Member at Large
Raymond F. Bishop
Dept of Physics
University of Manchester
Manchester, United Kingdom
r.f.bishop@umist.ac.uk

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Hilda Cerdeira
International Centre
for Theoretical Physics
Trieste, Italy
cerdeira@ictp.trieste.it

Member at Large
Anita Mehta
S.N. Bose National Centre
Calcutta, India
anita@bose.res.in

Member at Large
Lydia Smentek
Institute of Physics
Copernicus University
Torun, Poland
Smentek1@aol.com

Member at Large
Betty Tsang
National Superconducting Cyclo-
tron
Lab and Michigan State University
tsang@nscl.msu.edu

Member at Large
Galileo Violini
Theoretical Physics
University of Calabria, Italy
violini@fis.unical.it

Newsletter Editor
László A. Baksay
Florida Institute of Technology
Phone: (321) 674-7367
Fax: (321) 674-7482
baksay@fit.edu

Assistant Editor
Szabolcs Rembeczki
Florida Institute of
Technology
srembecz@fit.edu

Web Editor
Gyöngyi Baksay
Florida Institute of
Technology
gbaksay@earthlink.net