



View from the Chair

Joseph L. Birman, City College of New York

Dear Forum Member:

As your 1999 Chair of the Forum I want to report to you some very disturbing information we learned at the meeting of the FIP Executive Committee on the 21st of March, during the Centennial Meeting. This concerns a new "advisory" from the US State Department which we are reliably informed is likely to have very negative effects on the issuance of visas to scientists from the PRC coming as scientific visitors, or students.

As one example of the application of this advisory, we were informed that Dr. Jianjun Hu, invited by Northwestern University to visit in March 1999, had his application greatly delayed, and in fact not approved, owing to the long delay encountered. The wording of the State Department advisory which applies to "Applicants who are nationals of the Peoples Republic of China and who will be involved in an activity related to materials technology" is vague. We are concerned that it will be interpreted to encompass many fields in Physics, Materials Science, Chemistry, and other related fields. The "advisory" requires that the application must get an additional "advisory opinion" from Washington before being issued. This extra step can take at least one month additionally, or longer. In the face of this information, the Executive Committee passed a Resolution (which I repeat below) strongly objecting to this new US policy and asking the Officers of the American Physical Society to take strong action in opposition to this new State Department action. On behalf of the Executive Committee of FIP, I appeal to all members of FIP to contact your Representatives and Senators in the US Congress to oppose this new, vague, regulation which is in spirit and in practice opposed to the Free Circulation of Scientists.

*With Best Wishes to All,
Joseph L Birman
City College of New York*

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The Los Alamos Incident and its effects on Chinese American Scientists

Cheuk-Yin Wong, Chairman of the Overseas Chinese Physics Association

On March 6, 1999, the New York Times broke the news about an alleged "Chinese spy". The attention of the media and the government was soon focussed on Dr. Wen Ho Lee of the Los Alamos National Laboratory as the suspect. On March 8, Dr. Wen Ho Lee was fired from his Los Alamos position by Energy Secretary Richardson for security lapses. Dr. Lee has not been charged with any crime even today.

Past espionage allegations were centered on the individuals without implicating the ethnic group of the suspects. This was, however, not the case with Dr. Wen Ho Lee. Without taking time to check the evidence, certain members of the media stated uncritically that a hundred thousand Chinese students and scientists working in this country provided ready targets for PRC intelligence gathering. The source of these categorical statements was the Cox Report, which was subsequently published on May 26, 1999. These categorical statements have incited irrational public fears and misconceptions about the ethnic Chinese-American scientific community. The good reputation of the Chinese-American scientists, which took many generations of hard work to build, has been tarnished. Their loyalty and their contributions to this country have been challenged and questioned. Chinese-American scientists wish to state on the outset that they strongly support rigorous measures to safeguard America's national and military secrets. They oppose categorical statements which damage the reputation of the whole community, especially when the statements were not based on substantiated facts. They believe strongly that the serious charge of espionage should be prosecuted and punished according to the due processes of law, but not be tried in the news media by innuendoes. They oppose ethnic profiling in security matters. They strive to uphold equal opportunity for Chinese-Americans and support America's good values of fairness, justice, and equality. Chinese-Americans do not know all the facts about possible charges against Dr. Wen Ho Lee. However, they are painfully aware of the tragic Chinese Exclusion Act of 1882 and the internment of Japanese-Americans in 1942. They are therefore deeply concerned and disturbed that Dr. Lee might have been singled out for investigation because of his ethnicity, as stated

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recently by the former head of the counter-intelligence unit at Los Alamos. If the statement is true, it will be an act of ethnic discrimination which should itself be taken seriously and be thoroughly investigated.

Before we discuss how the Los Alamos incident has affected the Chinese-American scientific community, we would like to briefly describe this community. Most of the Chinese-American scientists came to study in this country as foreign students. They became permanent U.S. residents and were later naturalized to become American citizens. Many others were born in this country. By recent accounts, Chinese-American scientists amount to about 8% of the

American scientific population. Chinese-American scientists are therefore an important component of the work force in American science and technology, both in unclassified research and classified works. They have contributed their shares to the advancement of American science and technology, and to the development of American national defense. In their ranks are six Nobel Laureates and numerous recipients of science and technology awards.

They are law-abiding, and along with other American scientists, working hard to build a strong basis for American science, technology, and national defense.

How has the Los Alamos incident affected the Chinese-American science community? The effects depend on the nature of their work. Chinese-American scientists performing classified work in weapons labs and in defense subcontractors find their loyalty severely questioned. They have been subject to distressful jokes and innuendoes. Equally awkward are instances when their fellow American colleagues avoided conversations on classified projects in their presence, as if their loyalty could not be trusted. In such a climate of distrust and suspicion, some Chinese-Americans in classified work have requested transfers to unclassified projects. Some have opted for early retirement. Others stay on knowing very well that their upward mobility will be even more limited now. Chinese-Americans are concerned that in this atmosphere, project managers in weapons labs and defense subcontractors may have reservations about employing Chinese-American scientists, about promoting



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Chinese-Americans in leadership roles, and about putting them to head a major project. The working environment of these Chinese-American scientists has deteriorated as a result. Their contribution to American science, technology, and national defense may also suffer as a consequence.

For those Chinese-American scientists doing unclassified research in national laboratories and universities, the immediate impact is not as severe. Chinese-American scientists are however concerned whether the negative media reports might affect the perception of science programming officers and proposal reviewers when they apply for research grants. For those ethnic Chinese scientists who are not U.S. citizens (Chinese nationals) working in unclassified research in national laboratories, there are now greater restrictions on security matters and on funding of some areas of unclassified research. These restrictions apply to foreign nationals from sensitive countries which include Chinese nationals. For example, in one of the unclassified areas of a national laboratory, nationals from sensitive countries performing unclassified work must be escorted by Americans when they walk outside their own building to go to the cafeteria or the library. In another national laboratory, several foreign nationals from sensitive countries have been denied access to their offices, postdoctoral fellows have not been renewed based on newly-applied criteria, foreign nationals have been denied the opportunity to apply for laboratory positions for which they are qualified, and foreign national staff members are sometimes unsure about their sources of funding. In that weapons laboratory, a number of talented foreign national postdoctoral fellows, limited term staff, and permanent staff have already accepted positions elsewhere because of the uncertainty associated with the environment at the laboratory. A number of laboratory staff members who traditionally mentor postdoctoral fellows have decided not to recruit foreign nationals because of their uncertain future.

The long-term effects of the Los Alamos incident are not easy to predict but we are particularly concerned about the opportunity for upward mobility for Chinese-American scientists. Racial prejudices come in many different ways. Some of the prejudices are so well entrenched that the people holding these prejudices may not be aware of them. It has been known for a long time from employment statistics that there exists a disparity between the Chinese-American scientific population and their ranks as senior managers and administrators in national laboratories, defense industries,

and universities. For example, in a typical science subcontractor, about 14% of the white-male population are in official and manager positions, while only 4% of the Asian-American scientists are. In universities, there are only six Asian American administrators for every hundred Asian American faculty and professionals. This number is less than one third of the 20 white American administrators for every hundred white faculty and professionals. Chinese-Americans are greatly under-represented in senior and leadership positions. While part of the disparity may be attributed to the characters of the Chinese-Americans themselves, a

significant part arises from prejudices in which Chinese-Americans are often considered as "outsiders" in matters of upward mobility or leadership positions. The end result is the existence of a glass ceiling above which Chinese-Americans (and other Asian-Americans) have great difficulty breaking. Because prejudices already exist in the working environment, the additional distrust brought on by the Los Alamos incident will only further reinforce the existing prejudices.

It is important to take actions to prevent the above adverse effects in order to bring the best out of the Chinese-American scientific community. It is also the right thing to do, in accordance with the honorable American tradition of fairness, justice, and equality. Therefore, we urge people in leadership positions to rectify the gross misconceptions which may have been propagated by the media about Chinese-American scientists. The American public statements to uphold scientific freedom and speak against unjustified ethnic generalizations. Proactive steps from capable leaders are needed to maintain a favorable working environment for Chinese-American scientists, for the benefit of the nation and the whole world.

The Overseas Chinese Physics Association is a professional association established in 1990 and chartered in the State of New York. It has about 400 members, with about 160 life members. Most of the members are Chinese-Americans, with a small number of foreign members. The author Dr. Cheuk-Yin Wong graduated from Princeton University in 1961, and earned his Ph. D. also at Princeton in 1966. He has been working in Oak Ridge National Laboratory since 1966, with sabbatical leaves at Niels Bohr Institute, Copenhagen, M.I.T., and Institute for Nuclear Studies, University of Tokyo. He is a fellow of the APS since 1978.

In universities, there are only six Asian American administrators for every hundred Asian-American faculty and professionals. This number is less than one third of the 20 white American administrators for every hundred white faculty and professionals



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The Threat to Free Circulation of Scientists

Irving Lerch, Director of APS international Affairs

1999 began badly for the international physics community as regional conflicts abroad and domestic barriers to scientific exchange in the U.S. threatened to undermine worldwide scientific commerce.

In January, the 13th Topical Conference on Hadron Collider Physics in Mumbai was marred by the absence of 8 FermiLab representatives when the State Department advised the Department of Energy not to permit their attendance. The action was taken to satisfy the proscriptions of the "Glenn Amendment" enacted into law in 1994 as an impediment to nuclear weapons proliferation. But the Mumbai conference, hosted by the Tata Institute for Fundamental Research, was not the only casualty. Within six weeks of the first Indian nuclear tests in May of last year, an initial list of Indian and Pakistani institutes implicated in weapons programs was compiled by government officials and sent to the Department of Energy laboratories, stating that the visas of visiting South-Asian physicists would not be extended beyond the expiration dates. The immediate result was the interruption of long-standing scientific collaborations of no apparent significance to nuclear weaponeers. By the end of last summer, seven Indian physicists involved in a joint program with U.S. counterparts at Argonne National Laboratory and Brookhaven were unable to prolong their stays. The same treatment was extended to seven Indian scientists visiting the National Institute of Standards and Technology.

But, the implication of the Mumbai incident posed a serious challenge to a major international collaboration, the "DO" research program at the Tevatron collider, an important precursor to experiments being designed for implementation on the new Hadron Collider at CERN. With 450 scientists from more than 60 institutions in 15 countries, India had invested in excess of a half million dollars in equipment central to the collaboration. Despite the protests of many colleagues from around the world pointing out that this association in no way promoted weapons development, the U.S. government was unmoved.

Even students are not immune. One undergraduate was denied admission after his acceptance by Stanford for graduate study because he took a job at the Indian Institute of Science in a condensed matter theory unit at the conclusion of his undergraduate studies (the IIS is one of the spiraling number of institutes now cited by

our State Department as contributing to the Indian and Pakistani nuclear programs, a contention disputed by the Institute's director). Other students have been rejected because of "technology transfer" concerns.

In March, a Chinese physicist who had been invited to visit Northwestern University was delayed several weeks in obtaining a visa. The local Congresswoman, Janice Schakowsky, inquired about the reason for the delay and was informed by the Consul in our Tokyo embassy: "Applicants who are nationals of the Peoples Republic of China, and who will be involved in an activity related to materials technology, need an advisory opinion from the State Department before we can issue a visa." This policy seemed to implicate one of the largest categories of Chinese scholars—one that accounts for thousands of students and researchers. Widely applied, the policy could desolate important areas of US research. The theory of this provision of the INA is that such visits result in a hemorrhage of US technology. The reality is that the talent and industry of such visitors contributes to the advance of the US, and the worldwide technology base.

Such reviews often delay the travel of scientists beyond the date of the meeting they seek to attend. This was the case in March when a distinguished Chinese physicist sought a visa to participate in the General Assembly of the International Union of Pure and Applied Physics convened in Atlanta in March. The international rules for these meetings burdens the host country with the obligation to facilitate visa applications without regard to political considerations.

Now, with the advent of charges of espionage at Los Alamos, a poisoned debate has emerged with calls for barring foreign visitors from both the weapons and non-weapons labs. A few colleagues have cited incidents where visits have been delayed or postponed and foreign colleagues have been subject to extraordinary procedures which threaten to isolate them and impair their ability to do their work.

Worse, there is a growing perception promoted by overheated rhetoric that certain visitors—immigrants and their descendants—constitute a danger to the US. The Los Alamos imbroglio which has incriminated a Taiwanese-born American, has led newspapers around the country to impugn the patriotism and loyalty of Chinese-Americans, a deplorable reminder of the wartime hysteria which sent Japanese-Americans into internment camps during World



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War II. As we all must acknowledge, Chinese-Americans have made a glorious contribution to our culture, science, technology and security, and it is shameful and unjust to claim otherwise.

The APS and other societies have responded to this environment of fear and distrust with the publication of statements calling for appropriate measures to secure the nation's secrets without imperiling freedom in the conduct of science. FIP was among the first to call for such action.

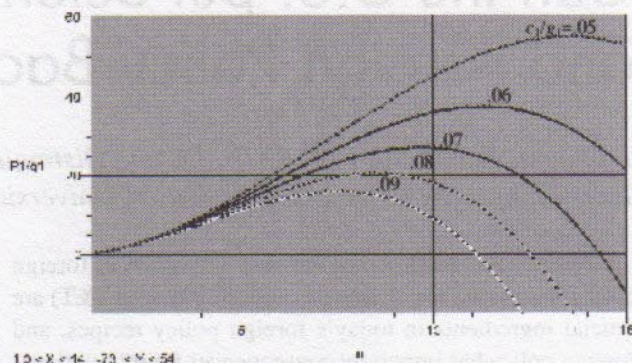
In the past, the main concern of APS members has been the sometimes arbitrary application of immigration laws to deny visas to visiting scientists for economic reasons (e.g., to prevent the possibility of illegal immigration). Increasingly, however, the technology transfer provisions of the INA are being invoked for political reasons as a burgeoning catalog of countries is added to the State Department's "sensitive countries list." This is in marked contrast to embargoed goods which technically may not be shipped to these countries but which are often exempted to prevent economic injury to US manufacturers.

What is needed is an understanding of the cost exacted from the domestic U.S. scientific effort by the loss of scientific collaborations. Even a simple estimate serves to make the point. The productivity per member of any group may be assumed, as a first approximation, to be dependent on the numbers of partners minus the cost of interaction (usually assumed to vary as the square of the numbers of partners). Such a simple description was proposed for complex systems in a combinatorial model by Barbara Drossel, University of Manchester (PRL, vol. 82, pp 5144-47, June 21, 1999). Thus, we may write,

$$\frac{P_1(n)}{n} = g_1(n-1) - c_1 n(n-1)$$

where $P_1(n)$ is the measure of group productivity and the dimensions for the measure are dependent upon the parameters g_1 and c_1 . By normalizing the expression to the "gain per added member" parameter, g_1 , we can plot

a series of productivity curves as shown below:



When the costs of maintaining a group are less than 10% of the gain in productivity per added member, total group output can rise from one to two orders of magnitude. By forming "supergroups" of two or more collaborations, the gain can be another two orders in magnitude as is clear from the equation for second-order collaborations given below:

$$P_2(n) = \sum_{i=1}^l P_1(n_i) + g_2 \sum_{i \neq j} n_i n_j - c_2 I(I-1) \sum_{i=1}^l n_i$$

This makes apparent that science is an international collaboration by necessity and attempts to curtail such partnerships will almost certainly backfire. Congressional efforts to isolate the scientific communities of our adversaries inevitably lead to our own isolation. More importantly, perhaps, is that cultural exchange is often the only means to abridge the political chasm dividing nations. The interactions of scientists were essential to the development of safeguards and arms control proposals that kept the Cold War in check.

At the end of last year, Jerry Friedman and Andy Sessler carried this message to the General Conference of the Third World Academy of Sciences in Trieste, Italy, in an effort to promote dialog among colleagues in South Asia. The first stirrings of a forum entitled, "Asian Dialog," were developed in Trieste and carried forward at the Centennial meeting in Atlanta, Georgia, this past March. It is a new chapter in a heroic book written by physicists to acknowledge the unique responsibility borne by the community that helped develop and maintain the nuclear arsenal.



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Can the U.S. put Science, Technology, and Foreign Policy Back Together?

J. Thomas Ratchford, CEA STTA, LC and Distinguished Visiting Professor National Center for Technology and the Law, George Mason University School of Law

Science and engineering are very important to foreign policy—and vice versa. Science and technology (S&T) are crucial ingredients in today's foreign policy recipes, and foreign policy has important consequences for international science and engineering activities. It is time the physics community joins with others in mainstream U.S. science and engineering to work out new relationships between S&T and the foreign policy development process. The key players (State Department and the federal technical agencies, especially the National Science Foundation) must work together closely and share human and financial resources to meet the challenge.

Like most physicists, my professional life has had a decidedly international cast. The advisor for my Master's thesis was a Spaniard. My Ph.D. advisor was a New Zealander, first transplanted to Great Britain, then to the United States. I have spent time at AAAS (American Association for the Advancement of Science), in the Executive and Legislative Branches of the federal government, including a tour with Allan Bromley in the White House, universities, and other organizations. All included substantial involvement with international S&T.

I feel strongly that S&T and U.S. foreign policy are important to each other. My ideas appeared in print in 1998 in *Science* magazine and the NAE journal, *The Bridge*. I testified last year before the House Science Committee on this topic, and earlier this year before the National Academy of Sciences Study Group and the National Science Board Task Force on International Science and Engineering Issues. Rod Nichols, President of the New York Academy of Sciences, and I treated international science issues carefully in our chapters describing the current state of S&T in the U.S. that appeared in three editions of UNESCO's World Science Report. Umberto Colombo, former Italian Science Minister and I wrote a chapter in World Science Report 1996 specifically addressing governmentally supported 'megascience' projects. This piece for the FIP Newsletter is based, in large part, on this earlier work.

The interaction between S&T and foreign policy has not suffered from a lack of attention and analysis in the past. House Foreign Affairs Committee Chairman Clement

Zablocki's mammoth Congressional study in the 1970s led to Title V of Public Law 95-426, the State Department Authorization Act of 1979. I shared the optimism of many others who believed that implementation of this legislation would strengthen S&T in the Department of State and integrate S&T and foreign policy as never before. But it failed. The Carnegie Commission on Science, Technology and Government's 1992 report noted that resources for S&T in the Department of State had decreased by half since enactment of Title V. Today the U.S. brings up the rear of the pack among the industrialized countries with respect to its process for integrating S&T and foreign policy.

Federal Objectives in International Science

There are two distinct objectives of the federal government in international science. The first is to incorporate S&T into our foreign policy decisions and into the development of various international policies and programs inside and outside of the State Department, and to do so in an effective and timely manner. The second is to develop and implement policies that favorably affect U.S. science internationally, as it is carried out in the public and private sectors. This includes national security and environmental issues, publicly funded research programs, especially the government supported 'megascience' projects, and the framework for commercial S&T cooperation and trade (policies affecting intellectual property rights, for example).

Foreign Policy for S&T

Foreign policy for science is the sum of all federal policies governing international S&T interactions and relationships. Modern transportation and communications make the need for these policies and supporting mechanisms unnecessary for cooperation in most fields and types of research. Governments are becoming more irrelevant as sponsors of R&D anyway. In the U.S., for example, R&D supported by the federal government has decreased from about 70% of the national total to about 30%.

There are a variety of reasons for cooperating internationally in S&T. Perhaps the most obvious relates to geography. Tropical flora must be studied in the tropics, while



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arctic systems must be examined in the arctic. Similarly, certain types of social science or earth science research must be done at specific locations. The best scientific or engineering talent for specific S&T tasks is routinely recruited from a global talent pool. The recent growth in number and size of so-called 'megascience' projects, those very large R&D efforts that are too expensive for any one country, has also placed greater importance on international cooperation. There we need more involvement of governments and organized science to prevent foolish things from happening. In the private sector, U.S. foreign policy encompasses intellectual property, trade, investment, and many other issues crucial to a global economy that is increasingly technological in character. A sound foreign policy environment is necessary for effective U.S. participation in a wide variety of international science activities.

S&T for Foreign Policy

Science for foreign policy is easy to understand, in principle: you feed the best information and judgments related to issues dependant on S&T into the foreign policy development process. It helps if there is a 'think tank' to develop and analyze policy options and global trends affecting policy. The focus for this policy development process is the State Department.

The State Department Needs Help

The State Department does not have a robust S&T capability. Further, it does not have the incentives, the resources (budget and people), or the personnel system to nurture expertise in S&T and foreign policy. The technical agencies of the federal government must provide the resources that State does not have and almost certainly will not get. Many, if not most other industrialized countries, do it this way. They second staff from science-based agencies and carry out relevant analytic studies in institutions other than the foreign ministry. In the U.S. the technical agencies should be tasked with providing the support needed for the State Department to meet both policy requirements: foreign policy for S&T, and S&T for foreign policy.

Five Things to Do Better

There are many things that could be done better if human and financial resources from the federal technical agencies (those with substantial R&D budgets) were made

available to assist the State Department. Here are some of the most important.

1. Improved and more efficient reporting on foreign S&T developments. Dozens of federal agencies collect information on foreign S&T related to their missions. Why not encourage them to develop regional 'condominium' arrangements outside the embassies to share housekeeping expenses and provide intellectual interchange?

2. More and better assistance for U.S. based high-tech companies is needed. Perhaps 'Technology Attaches' based in the Commerce Department could help, both in the U.S. and overseas.

3. The process for approving bilateral S&T agreements is cumbersome. Why not streamline it, but require 'full disclosure' reporting AFTER the agreements are signed, as well as for the many 'off the books' informal agreements? Sunshine is often more effective than regulations.

4. An S&T and diplomacy 'policy shop' is badly needed to provide high quality, prospective and other studies of major S&T and foreign policy issues. NSF is the logical home for such an analytic capability.

5. If our embassies and the Department of State itself are to have staff consisting of S&T experts seconded from the technical agencies, these human resources need to be recruited carefully and coordinated across government. This should be done by NSF.

NSF Special Role

There is a clear need for the NSF to have a special role in supporting S&T in foreign policy. One of the most important is recruiting and coordinating staff seconded to State from the technical agencies. Assuring proper staffing and overseeing a 'policy shop' are basic and very important responsibilities. Why NSF? The NSF Organic Act provides authority to the Foundation to do this, while such authority is not so clear for the other technical agencies. NSF covers most areas of science and engineering, unlike other technical agencies. NSF is highly respected domestically and internationally, and has the human resources and the personnel system that are needed.

In the past a commitment on the part of the White House, Congress, State, and NSF to solve the S&T and diplomacy dilemma has been lacking. It's time to try again. But if the NSF is to get out in front, the scientific and engineering communities need to lend their strong support.



Report of the Expert Meeting on Virtual Laboratories

James P. Vary

full text available at: www.iitap.iastate.edu/reports/vl

Advances in high-speed digital communications are revolutionizing how businesses interact, information flows, where new jobs are created and even the nature of those jobs. In a similar way, scientific/technological activity is experiencing major changes and, in some cases, is leading these communication developments.

The motives, opportunities, mechanisms, and challenges presented by the development of "Virtual Laboratories" (VL) require critical analysis, especially if developing country participation is to be insured. To accomplish this analysis and arrive at findings and recommendations, UNESCO asked the International Institute of Theoretical and Applied Physics (IITAP) at Iowa State University to organize an Expert Meeting on Virtual Laboratories, 10-12 May, 1999 in Ames, Iowa. This report is intended to present the analysis, findings and recommendations of that meeting in order to disseminate this information as broadly as possible.

Major challenges exist in ensuring widespread sharing in the benefits of this emerging technology. Hence, the Terms of Reference of the Expert Meeting were to determine:

i. The definition of the Virtual Laboratory in terms of objectives, techniques and participating communities;

ii. The state-of-the-art and trends of Virtual Laboratories with respect particularly to geographical and institutional participation, subject coverage and technologies applied, paying special attention to low bandwidth and "small science" applications of Virtual Laboratory techniques;

iii. The potential relevance of Virtual Laboratory techniques in advancing and monitoring research and analysis bearing on problems of development, and the technical, organizational, social and psychological, and economic factors affecting the application of these techniques to these problems;

iv. Recommendations for action at the international, regional, national and professional levels, with particular reference to developing countries and the research and international communities.

This report begins with the Participants' Policy Statement which takes into account the background, findings and recommendations of the meeting. Then the report's first five chapters summarize the current situation as seen by the meeting's participants. The remaining chapter presents the consensus findings and recommendations.

The Participants' Policy Statement, as well as the findings and recommendations were presented at the World Conference on Science (WCS), Budapest, July 1999. As a result of this presentation and the vigorous discussion which followed, the World Conference on Science - Framework for Action states: "Research and education institutions should take account of the new information and communication technologies, assess their impact and promote their use, for example through the development of electronic publishing and the establishment of virtual research and teaching environments or digital libraries."

Readers having inquiries on the expert meeting are invited to send them to:

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Matching Membership Program

Irving Lerch, Director of International Affairs, The American Physical Society

In 1983, the American Physical Society established the Matching Membership Program in order to make APS membership available to physicists living in developing and hard-currency-poor countries. Through the Matching Membership Program, individuals residing in eligible countries—especially those who are members of their national physical societies—may apply for a reduced-cost membership (Matching Membership). Members of the forum are encouraged both participate in this program and to bring the following information to the attention of colleagues in other countries. Matching Membership is available in one of two categories:

1. A half-price membership at \$45 will be available for those who have an individual or institution who will sponsor them and provide payment. Members at this level can subscribe to a maximum of one (1) journal at member rates and register for APS meetings at member rates, in addition to receiving APS News and Physics Today. Membership will be renewed on a yearly basis via invoice. A maximum term of six (6) years' participation in this reduced-cost program will afford other colleagues the opportunity to participate.

2. A graduated, reduced-cost membership beginning at 20% of the full membership rate in the first year is available to individuals on a limited basis. Applicants who are unable to pay and who do not have a sponsor may request APS support. No journal privileges are included*, but

members in this category will receive APS News and Physics Today and can register for APS meetings at member rates. In each of the next three (3) years, membership dues will increase by 10%. Upon reaching 50% in the fourth year, a maximum of one (1) journal is available at member rates. This, too, is a maximum six-year reduced-cost membership, which must be renewed annually.

Membership in the applicant's national society is desirable to strengthen the association between APS and Reciprocal Membership Societies

As mentioned, each member sponsored through this Program may participate for no more than six (6) years in order to accommodate as many physicists as possible. At the completion of the six-year term, all participants will be billed at full member rates. Enrollment in this Program is limited to 1.5% of the current membership level. Thus, in 2000, the Program can accommodate 640 participants.

We encourage the physical societies and institutes with which we share reciprocity to inform their members of this beneficial program. We emphasize that membership in the applicant's national society is desirable to strengthen the association between APS and Reciprocal Member Societies.

For further information, please contact Michele Irwin, Office of International Affairs (HYPERLINK mail to: mirwin@aps.org).

***Members who have difficulty accessing APS journals may apply to APS International Affairs to enroll their institutional libraries in the APS Journal Outreach Program.**



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Internationalizing Physics

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The most international of all sciences is physics because it deals with the laws that apply to all phenomena and processes in the universe. Physics has no frontiers and physics education and research are of global importance. For that reason physicists have a moral obligation of sharing their scientific knowledge with the rest of the world. It is well known that cross fertilization of ideas among scientists dealing with similar problems has been and still is the most important factor in scientific and technical progress. Today information technologies have changed radically the way people interact, exchange ideas, communicate, and learn. This contributes in a unique way to internationalizing science in general, and physics in particular, making research and education available to all people in the world. This is of particular importance to the less developed countries, which have more limited resources for science education and research.

Using information technologies (IT), it is relatively easy to practice distance education, hold virtual seminars and conferences, and carry out in real-time distant experiments, facilitating complementarity and cooperation in education and research. For example in July 1999, an international meeting on Information, Education, and Health was held in Bogota, Colombia, and the follow-up to the meeting was conducted by means of virtual panels open to a large international audience. Similarly, the Moscow Power Institute has a set-up for conducting virtual heat transfer experiments in real-time by engineering students in other parts of Russia, and in principle in any other part of the world. However, many scientists and institutions in less developed countries can not yet make full use of IT, for lack of equipment, software, and/or know how. Fortunately, many international organizations are trying to change this situation, but a lot more needs to be done.

To contribute to improve this situation, the World University Federation is organizing some pilot projects, some of which bear relation to physics. One is in Africa, based at the East Africa Science Library and Information Services (EASILS), in Makerere University, Kampala, Uganda, taking advantage of the assistance being provided

by the World Bank to develop computational capabilities. Another is in the Andean countries (Bolivia, Chile, Peru, Ecuador, Colombia, and Venezuela) taking advantage of what the Inter-American Development Bank and Organization of American States are already doing. An important idea behind both projects is that the countries involved must develop their own capabilities themselves for inter-university collaboration taking advantage of IT, for

which some technical assistance and training might be necessary. I will elaborate briefly on the second project. It will consider four areas: (i) distance education and seminars, (ii) joint research projects, (iii) rural medical services, telemedicine and alternative medicine, and (iv) information services. The role of physics in those four areas will be considered since it is important to show that physics

is important in those countries beyond teaching it as an academic subject.

Under the leadership of the coordinator Dr. Carlos Aguirre, a physicist from Bolivia and President of the Bolivian Academy of Sciences, a group of universities from the Andean countries has been chosen to participate in the project. Each university has to designate one or more persons in each area that will be in charge of preparing a background document indicating the current situation and what else needs to be done to promote more regional use of IT for inter-university collaboration in the respective area. For example, the International Center of Physics (CIF), in Bogota (the director is Dr. Eduardo Posada and Dr. Aguirre and myself are members of the academic Advisory Board), which is very concerned with the industrial and medical application of physics in the Latin American countries, is being asked to assist in the preparation of a background document related to physics in the context of the four areas. After several virtual meetings to prepare and discuss the national documents, they will be integrated into a general document, that will be widely circulated among appropriate persons and institutions. The results will be a series of guidelines for organizing regional academic and research projects using IT, that can be supported nation-

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ally or through multinational agencies and national and international scientific groups, such as AIP and IUPAP. It is expected that the preliminary stage of the project will be finished by the middle of 2000. As a follow-up, national and virtual seminars open to a broader audience, may be organized to discuss the document and promote academic, technical and financial support for the implementation of the recommendation. The advantage of this procedure is that the countries themselves have to decide what needs to be done and make a commitment for doing it rather than having outsiders tell them what to do.

I am fully aware that this method is not entirely new and in some form has been tested in prior cases, such as the

Regional Program for Scientific and Technological Development in Latin America, sponsored by the OAS. Also, many scientists and institutions in the US and elsewhere are involved in bilateral projects for exchange of persons and technical assistance. However, I believe this would be the first project oriented towards the practical utilization of IT in a regional and inter-institutional sense, designed and implemented by the institutions themselves for cooperation in scientific research and education.

I would appreciate receiving comments and suggestions from those that have experience in carrying out these kinds of programs.

Together We Can Do Things We Can't Do Alone

An International Roundtable at the APS Centennial Meeting

Cherrill Spencer, Stanford Linear Accelerator Center, Stanford University

Shang-Fen Ren, Illinois State University

At the APS Centennial Celebration in Atlanta in March 1999, hundreds of physicists working in other countries came to join the APS's celebration. The APS committee on International Scientific Affairs (CISA) hosted four International Roundtables focussing on different aspects of the globalization of physics in the 21st century. One of these roundtable discussions, which was organized and facilitated by Shang-Fen Ren from Illinois State University, considered the roles of Physical Societies, and it was organized and facilitated by Shang-Fen Ren from Illinois State University. Bernd Crasemann, from the University of Oregon, moderated the discussion, and Cherrill Spencer, from the Stanford Linear Accelerator Center, Stanford University, was the rapporteur. The seven leading discussants were Carmen Cisneros, the President of the Federacion Latinoamericana De Sociedades De Fisica (Federation of Latin-American Physical Societies)-FELASOFI; Annick Suzor-Weiner from the European Physical Society (EPS) and the French Physical Society (FPS); Jia-Er Chen, the president of the Chinese Physical Society (CPS); Luz Martinez-Miranda of the Canadian, American and Mexican Physical Societies (CAMS) joint meeting; David J. Ernst, Director of the Pan American Association for Physics (PAFP); Jeeva S. Anadan, the president of the American Chapter of the Indian Physics Association, (ACIPA) and Ngee-Pong Chang, the past president of the Oversea Chinese Physics Association (OCPA).

Besides these leading discussants, about 25 other people participated in the discussions, including faculty and student members from a variety of countries and physical societies. This was a roundtable full of talent, world-

wide experiences and ideas for solving problems common to all geographical areas. In this article we summarize some basic information about the above seven organizations and share some ideas coming from our roundtable discussions for the further consideration by the members of the APS.

These seven organizations could be categorized into three styles of alliances, some are based on a common language, some on geographic proximity, and others on the ethnic origin of the physicists. Consequently, the purposes and structures of the organizations differ although the problems they perceive are remarkably similar.

FELASOFI started in 1992, with seven Latin American societies, now they have 17, which include the Dominican Republic and others from the Caribbean. The Federation took about eight years to get going which indicates that even with good intentions these alliances are difficult to created. The one thing their countries have in common is their language (Spanish, plus some Portuguese). International collaboration to assist the development of scientific and technological capabilities in a group of countries requires human and economic investments from each country. The main objective of FELASOFI is to promote, in a coordinated way, the development of physics in Latin-America and the Caribbean so as to contribute to the general progress and development of the region. FELASOFI is the first interlink in a complex process that next involves political interlinks and, ultimately, the physicists from the member countries will be able to work together.

Most European countries have their own Physical Society, and they all (36) gather together in the European Physical Society (EPS) which was founded in 1968, much



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before the political European Union. These Societies pay much attention to international activities, in particular to East-West and North-South cooperation, within or outside Europe. Besides the well established EPS publications (Europhysics News, European Physics Letters) the French, German and Italian Societies have recently joined their journals into the European Physical Journal which is electronically connected with the AIP publications. New initiatives, especially towards young physicists and toward developing countries are being encouraged. They help to pay for young people to visit other countries and support thesis and employment exchanges. They encourage co-directed thesis and regional centers of excellence in the developing countries. These efforts are supported by a Solidarity Fund that comes from excess money from successful EPS events.

The Chinese Physical Society was established in 1931. It has 37 provincial societies and 27 specialized committees and 40,000 members. The CPS's main goals are to elevate R&D in Physics and to encourage students to study physics. They have a special committee which facilitates international collaborations. Their international activities include: joining IUPAP in 1984, they now have 10 Chinese physicists on IUPAP committees. They joined with 13 other Asia/Pacific Physics societies to form the Association of Asian Pacific Physics Societies (AAPPS) in 1980. The CPS co-sponsors approximately 50 domestic conferences yearly and five international conferences yearly, for example on statistical physics and on nuclear physics. They publish 22 periodicals, three are in English (all have English abstracts).

CAMs was a series of meetings that happened during the 1990's between the Canadian PS, the APS, and the Mexican PS. These three Physical societies have not yet formed a federation. A discussion is ongoing whether there should be a more formal organization. These three countries represent a very large geographic area with a very diverse constituency, four official languages, and different approaches/styles of doing research. CAMs has stimulated the exchange of ideas between the three countries. These meetings, where physicists meet face to face, have encouraged discussions on the organization of scientific collaborations; encouraged the development of exchange programs among the three countries; and have served as a forum for the sharing of information on educational and outreach programs, as well as the discussion of issues, such as environmental studies, of great importance to the three countries.

There are other kinds of international organizations besides societies, for example the Pan American Association

of Physics (PAFP), is six years old, and has 75 member universities in the western hemisphere (Canada, USA, and Latin America). PAFP functions reasonably informally, it is a totally volunteer-based association, so that things can be done quickly. However, the level of activity of the association goes up and down with the volunteers' available time and energy. Examples of PAFP activities are meetings between physicists in Texas and northern Mexico on how to teach introductory physics and high school physics. They used foundation dollars for support for these meetings. In the summer of 1999 they will sponsor a workshop on symmetry, in Mexico, which will help advertise a new program at a Mexican University. They solicited money from the NSF and a Mexican government agency to do this workshop, thus leveraging money from one country to get more money from the other.

*international alliances
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The difficulties in doing these workshops stem from the different rules and regulations in the two countries. The PAFP, with money from the Sloan Foundation, set up the National Society of Hispanic Physicists and the World Laboratory Center for Pan American Collaboration in Science and Technology at the University of Houston. This Center supports six Latin American physicist post-docs per year, mostly in applied physics.

The American Chapter of Indian Physics Association (ACIPA) was formed in 1986 in order to serve the large community of physicists from the Indian subcontinent who live and work in America, and to help promote physics in India. An important focus of Physical Societies for the 21st century should be on bringing science to the households of people of the Third World and to use science to improve their living conditions. Science should be taught taking into account the relevant social conditions of the region. ACIPA wishes to develop and maintain good relations with other international physical societies in order to achieve common goals and to promote cooperation and good will among the international communities of physicists. Recently, for example, the ACIPA has worked closely with the APS in promoting a dialog among Asian physicists in order to address issues which concern them, and increase security in view of there now being two new nuclear powers (India and Pakistan) in South Asia.

The Overseas Chinese Physics Association (OCPA) is a non-governmental organization. It is a grass roots organization, run by volunteers, which sprang up in 1990 to give voice to Chinese physicists in mainland China, Taiwan, Hong Kong, Europe and SE Asia. They have bridged the gap across the borders by hosting two joint meetings of



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Chinese Physical Societies, in Shantou and in Taipei. They have, over the years, organized Physics Without Borders sessions at the spring meetings of APS, providing a forum for research reports from colleagues in Asia Pacific. The OCPA adheres to high professional standards and has a good working relationship with the APS. They have also initiated the series of prestigious Outstanding Young Researcher Awards and the Achievement in Asia Awards that highlight the many bright young stars in the ethnic Chinese physics community around the world.

All the discussants agreed that these international alliances work better when the people from different countries really get to know each other, when they meet regularly over extended periods. Also, the grass-roots nature of some alliances is seen as an advantage. A few, hardworking, volunteers can get things moving whereas a large professional society is often hampered by inertia.

Two related topics that attracted the most discussion were the decreasing enrollments in physics courses and the poor public perception of physics. The discussants made clear that these trends are occurring worldwide, not just in the US. These two facts are connected to the decreasing funding for physics research in many countries, although it is increasing overall for science.

It was acknowledged that these problems are partly caused by the arrogance of physicists. We have looked down on other technical disciplines and isolated ourselves. Now it is time to reach out to other professional organizations such as the American Chemical Society and to work with engineering departments in our universities. We need to modify our physics teaching curriculum. It needs to emphasize problem solving more and show how physics is related to life, argued some of the participants, especially the students. If college students prefer to go into other sciences (e.g. *computer science*) how can we encourage them to enter physics? The CPS has set up prizes to recognize student accomplishments in physics (e.g. 80,000 high school students enter contests and the winners become candidates for the International Physics Olympiad). In Mexico there are more kudos to being a physics major than in the US, so students are more enthusiastic for doing physics.

To alleviate our isolation we need to educate the public and especially our politicians about the benefits of long-term physics research. Up to now technology has been mostly triggered by engineers, but new technologies are closer to fundamental physics than previously. In the next century physicists will have the keys for important technological contributions and we must make sure these public understands the connections. Economists have already shown the connection between basic R&D and the economy, there is a phenomenal rate of return but most people are not

aware of this, partly because it can take 20 years or more to realize the payback. Nevertheless we have to convince our politicians that it is worthwhile and hence the science budget must be increased. In order to see the connections the public has to have a better understanding of science in general, and our physical societies must put more attention and resources into public outreach. This should also help combat the public's belief in creationism and astrology.

Individuals, nations, and physical societies are already working on these problems, but by sharing resources and information through collaborative ventures such as those described at this roundtable they can be solved more effectively. Our world, with its enormous diversity, is becoming increasingly and rapidly interconnected because of the spread of science and technology, and the resulting electronic and computer revolution. Physics, because of its universality, could serve to promote collaborations and cooperation between different regions in the world, and international physical societies could play a major role in facilitating this process.

The 1998 IUPAP "Statement on the Importance of Physics to Society" states, "Physics is an international enterprise which plays a key role in the future progress of humankind," and, "Physics is an essential part of the educational system and of an advanced society." The roundtable participants hope that all physics societies can work together to promote worldwide governmental support of the science of physics in the 21st century. Together we can do things we cannot do alone.

Fellowship Nominations

The Forum on International Physics can sponsor the election to fellowship of a member of the American Physical Society. The Forum is anxious to recognize our foreign members who meet the criteria for fellowship. The deadline for nominations for FIP is April 1, 2001. Complete instructions can be found at:

<http://www.aps.org/fellowship/fellinfo.html>

The procedure is for the nominator to submit an official nomination form signed by himself and one other member of the APS, together with a vita and a number of supporting letters to:

Executive Officer
American Physical Society
One Physics Ellipse
College Park, MD 20740-3844
Attn.: Fellowship Program

It is very important that you support your colleagues and nominate them for fellowship in APS!



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The 1999 Sponsored Fellows

Garg, Umesh

University of Notre Dame

For his pioneering studies of giant resonances and his nuclear structure investigations using gamma ray spectroscopic methods with large gamma ray detection arrays.

Groeneveld, Karl Ontjes

Wolfgang Goethe University

For ingenious, inventive, pioneering, and creative exploration of several previously non-existent interfaces among atomic collisions in dilute gasses vis-a-vis solid surfaces, and superconductors consistently generated over more than two decades.

Kimura, Yoshitaka

High Energy Accelerator Research Organization

For the design, construction, and operation of the TRISTAN storage ring; and for his leadership role in accelerator science research in Japan.

Reed, Kennedy

For his tireless efforts to promote collaboration in atomic, molecular, and optical physics among US, European, and African laboratories and for his success in organizing international workshops to showcase these collaborations.

Molinari, Elisa

University of Modena and INFM, Italy

For her contribution to the theory of semiconductors and their interfaces, in particular, her fundamental work on electron-electron and electron-photon interaction in nanostructures; and for her involvement in the training of young theorists from many countries and the organization of international confer

Matsuzawa, Michio

For original contributions to theoretical methods in both static and dynamic few body systems.

Muller, Alfred

University of Giessen

For fundamental experimental studies of charge-charge collisions of highly charged ions, and for leadership in the application of heavy-ion storage rings to such studies.

Obregon, Octavio Jose

University of Guanajuato

For his contributions to gravitations and mathematical physics, particularly the proposal and development of supersymmetric quantum cosmology and the promotion of science in Mexico, Central American and the Caribbean.

Skrinsky, Alexander N.

The G.I. Budker Institute

In recognition of innovation and leadership on colliders for high energy physics.

Vina, Luis

Universidad Autonoma de Madrid

For his contributions to the understanding of optical properties of semiconductors and for his intense international collaborations and the development of new solid state spectroscopies in Spain.

Young, Kenneth

The Chinese University of Hong Kong

For his seminal theory of optical resonances in microdroplet cavities and quainormal modes, and contributions to the organizations and promotion of international physical societies throughout Southeast Asia.

Lackner, Karl

Max-Planck-Institut fur Plasmaphysik

For his fundamental contributions to theoretical methods in both static and dynamic few body systems.



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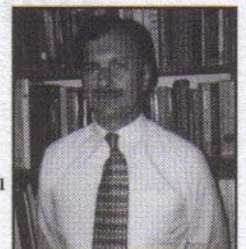


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FIP Newsletter

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FIP Membership

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The Forum on International Physics is a grassroots group within APS to represent **your** views on international activities and relations. As a member **you** will have direct input as to what APS should or should not do concerning international affairs.

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Fellowship nominations can be made through FIP.

Journal/Book Exchange allows for the donation of books and journals to other countries.

How to Become a Member

To become a member of the Forum on International Physics sign up on the web at: <http://www.aps.org/memb/unitapp.html>.

An e-mail request can also be sent to:

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You can also sign up by contacting Trish Lettieri at the address listed below:

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