# M E M O R A N D U M

**To:** **Participants in the Workshop on University Science Education, 5-8 April, 2004, Baku, Azerbaijan**
**The US Civilian Research and Development Foundation**
**The Azerbaijan National Science Foundation**
**The American Physical Society**
**The US Office of Naval Research, UK**

**From:** **Irving A. Lerch, Senior Consultant, the American Physical Society**
**George Gamota, Science and Technology Management Associates**

**Copy:** **UNESCO Science Sector**
**The Abdus Salam International Center for Theoretical Physics**
**Office of the Science and Technology Advisor to the Secretary of State of the US Department of State**
**World Bank Human Development Network**
**Nominated representatives of Armenia and Tajikistan (unable to participate in the workshop)**
**Office of the US Ambassador to Azerbaijan**
**The Open Society Institute**

**Date:** **April 22, 2004**

**Subject:** **Report of Workshop**


## *Summary*

*The objective of the workshop was to bring together national authorities on university science education from Central Asia and the Caucasus with international experts to discuss the current status of programs in the region, outline needs and deficiencies, and develop a structure to find resources, plan, implement and administer programs to strengthen university science education. Eight national representatives participated in the workshop along with 21 observers, organizers and guests representing 15 international, national and regional organizations to include the US Ambassador to Azerbaijan, the Honorable Mr. Reno Harnish, the Azerbaijan Minister of Education, the Honorable Dr. Misir Mardanov and the Deputy Head of the Science and Education Commission of the Azerbaijan Parliament, the Honorable Dr. Asaf Hajiev. After due deliberation, the discussants signed a Memorandum of Agreement to organize national committees and a regional coordinating committee to realize a program to promote excellence in the education of young scientists. The national representatives agreed to serve as an interim regional coordinating committee and unanimously elected Academician Janybeck Jeyenbayev, President of the National Academy of Sciences of Kyrgyzstan, as their Chair. The Vice Chair for Central Asia is Professor Durbek Akhmedov, Vice-Rector of the Tashkent State University of Economics, Uzbekistan, and the Vice Chair for the Caucasus is Dr. Fuad Mushtagov, Vice President of the Azerbaijan National Science Foundation (and one of the organizers of the workshop). The interim coordinating committee approved a plan of action and scheduled a follow-up meeting to be convened in Bishkek, Kyrgyzstan, December 2, 2004.*

## 1. Introduction:

The nations of Central Asia and the Caucasus enjoy a distinguished history of excellence in science, education, technology and engineering. There is almost universal literacy and a record of S&T accomplishment derived from the academic and university system developed during the period of Soviet rule. Nonetheless, with the advent of independence and the financial exigencies attending the collapse of the Soviet Union, the inefficiencies of the old, centralized structure, threatened the integrity of the science education system and the legacy of academic and research excellence. Colleagues in Ukraine and the countries of the region recommended to the American Physical Society (APS) the convening of a forum to discuss these exigencies and what might be done to overcome them. The APS viewed this initiative as an opportunity to reach out and develop associations with colleagues in the region.

The US Civilian Research and Development Foundation (CRDF) provided APS with an "Opportunity Grant" to support a workshop on university science education and recommended that the Azerbaijan National Science Foundation (ANSF) be our partner in organizing the event. In addition, the US Office of Naval Research Global (ONRG) agreed to provide supplementary funds to support the participation of colleagues from Ukraine and Russia, traditional partners throughout the former Soviet Union.

In preparation for the workshop, consultations were undertaken to identify participants in each of the 8 nations of the region (Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) and to consult with organizations with expertise and interest in the issues (World Bank Human Development Network, Open Society Institute, UNESCO Science Sector, Department of State Office of the S&T Advisor to the Secretary, US AID, the Abdus Salam International Institute for Theoretical Physics, and experts on university science education in many countries).

Unfortunately, owing to unforeseen circumstances, the delegation from Armenia was denied entry to Azerbaijan for the workshop (owing to ongoing tensions derived from a military confrontation between the two nations) and the delegation from Tajikistan did not receive the prepaid airline tickets in time to attend. These delegates will be provided full reports of the results of the workshop and will be contacted by the coordinating committee to enlist their participation in all programs.

## 2. Workshop Outcomes:

The Memorandum of Agreement signed by the workshop participants is given in the Appendix.

The general features of the MOA consist of 1) national committees to define local needs and programs; 2) a regional coordinating committee to facilitate the identification of resources, development and coordination of plans, and interfacing with international institutions and assets; 3) a statement of objectives, priorities and programs. APS and

CRDF will apply any surplus funds not expended during the workshop to support the activities of the coordinating committee and ONRG will seek to provide modest, limited, additional funds to maintain the committee until such time when operating funds become available from other sources.

2.1 Trans Caucasus/Central Asian Coordinating Committee for the Education of Young Scientists.

- 2.1.1 Organization: Chair, Academician Janybeck Jeyenbayev; Vice Chair for Central Asia, Professor Durbek Akhmedov; Vice Chair for the Caucasus, Dr. Fuad Mushtagov.
- 2.1.2 Tasks to be accomplished before the next meeting (scheduled to be held in Bishkek, Kyrgyzstan, December 2, 2004):
  - 2.1.2.1 Statement of Purpose
  - 2.1.2.2 Development of a Charter
  - 2.1.2.3 Development of regional and international partnerships (MOAs to be signed with universities, academies, international and national organizations and appropriate government ministries)
  - 2.1.2.4 Program Development (a program of 3-5 years duration is to be defined and will contain the following elements):
    - 2.1.2.4.1 Identify funding organizations and develop proposals for support
    - 2.1.2.4.2 Make submissions for recognition to
      - 2.1.2.4.2.1 UNESCO
      - 2.1.2.4.2.2 ICTP
      - 2.1.2.4.2.3 National Commissions to UNESCO
      - 2.1.2.4.2.4 National Governments (in all cases, the national committees and the regional coordinating committee require government recognition so that official representations may be made to intergovernmental organizations such as UNESCO, UNDP, IAEA and other organizations
    - 2.1.2.4.3 Prepare proposals and submit requests for assistance to
      - 2.1.2.4.3.1 UNESCO—the coordinating committee charter should be submitted to UNESCO and ICTP for recognition. This will enable the committee to interact directly with the administration of the Organization's Science Sector.
      - 2.1.2.4.3.2 Various funders capable of providing modest non-program support for the national and regional committees (to enable them to continue to function)

2.1.2.4.4 Develop liaison and communications with the following
- 2.1.2.4.4.1 UNESCO and its regional offices
- 2.1.2.4.4.2 ICTP
- 2.1.2.4.4.3 CRDF
- 2.1.2.4.4.4 Virtual Silk Road program
- 2.1.2.4.4.5 NEN (network of national education institutions)
- 2.1.2.4.4.6 Industry
- 2.1.2.4.4.7 International learned and professional societies
- 2.1.2.4.4.8 Allied regional grouping of national commissions to UNESCO (Asia-Pacific, etc)
- 2.1.2.4.4.9 Students and Student organizations (graduates, undergraduates)
- 2.1.2.4.4.10 Teachers and teacher associations
- 2.1.2.4.4.11 Researchers and research communities
- 2.1.2.4.4.12 Tacis Tempus
- 2.1.2.4.4.13 NATO

2.2 Program and Priorities for Funding
- 2.2.1 Language Programs in Universities
  - 2.2.1.1 Develop English Proficiency
  - 2.2.1.2 Sustain Russian Proficiency
  - 2.2.1.3 Promote National Languages in each country
- 2.2.2 Obtain needed Educational Materials (books, prepare and develop manuals, computer resources)
- 2.2.3 Widen Internet Access (acquire computers, routers, hubs, infrastructure development, broad-band access, network management and programming of routers, servers and networks)
- 2.2.4 Mobility of Scholars (Student/Faculty/Young Scholar Exchanges)
  - 2.2.4.1 Conferences, Workshops and Schools
  - 2.2.4.2 Study Programs
  - 2.2.4.3 Research Collaborations
  - 2.2.4.4 Short-term visits
  - 2.2.4.5 Associations with regional and international centers of excellence
- 2.2.5 University/Academy integration (the development and implementation of MOAs and MOUs to link universities and academies)
  - 2.2.5.1 Development and recommendations on Standards to promote international recognition of degrees and programs (along the lines of the European “Bologna Agreement” to promote European integration and mobility of scholars)

2.2.6 Dynamic Review of emerging and ongoing needs
- 2.2.6.1 Teacher preparation and in-service training
- 2.2.6.2 New pedagogic technologies (international programs under development in the UK—British Council—Northern Europe, the US, Russia and elsewhere)
- 2.2.6.3 Continuing evaluation of national needs and program outcomes
- 2.2.6.4 Policy development and review
- 2.2.6.5 Studies of national innovation systems to include the role of entrepreneurial development, jobs and private sector roles

2.2.7 Evaluation of major research programs and the acquisition of major research equipment

## 3. Important Considerations in the Development of Regional Programs:

An overarching consideration in the development of a regional program is the integration of young scholars in the international community through the mediation of centers of excellence. Specifically, the most important research centers and universities both within the region and internationally should be enlisted to provide an outlet for the talents and scientific expression of scholars. It is envisioned that the regional coordinating committee will submit and sign memoranda of agreement with such centers and universities to promote the mobility of young scientists in the mainstream scientific enterprise.

An international umbrella is needed to provide the context for a regional program and we submit that UNESCO is best positioned to erect this umbrella. Since each of the 8 countries in the Caucasus and Central Asia are members of UNESCO, it will be important for their UNESCO national commissions to petition the UNESCO Board for recognition of the coordinating committee as the representative body of a regional network. Thus, each government must recognize the coordinating committee as a legitimate body for implementing, coordinating and administering such a program.

And while it is recognized that UNESCO cannot fund a program outside of its budgetary framework, it can assist in the identification and allocation of resources. Such resources may come from either special extra-budgetary subventions of the member states or from other organizations and governments inside and outside the UN family, either as part of bilateral or multilateral programs. Regional development banks and the World Bank Group may also play a role once governments in the region have recognized and developed policies and priorities to implement the committee's programs.

Thus, a high priority task for the regional coordinating committee is to establish a series of agreements with national governments, national commissions to UNESCO, universities, academies and other institutions to develop linkages which will be the scaffolding on which a program may be developed. In the meantime, the UNESCO

Science Sector may approach the Governing Board for approval to recognize the regional coordinating committee as the operating body for the program.

The issue is the preservation and promotion of intellectual capacity in the region to maintain academic and scientific excellence as the principal ingredient for economic and cultural development. Thus the importance of policy as the strategic driver is clear. The strengthening of the region's innovation system will lead to improved economic activity and will assure the continuing contribution of the science and academic sectors to the national life and well-being of each country.

Many of the program priorities and elements listed in paragraph 2.2, above, are designed to promote the international integration of young scholars. English proficiency, for example, is currently an essential ingredient promoting the mobility of scholars in the international arena. Internet access is equally important but the need varies from country to country. In Georgia, for example, there is a lack of hardware: computer work stations, servers and routers. In other countries, the need is for broad band access. While the "Virtual Silk Road" is a regional program designed to deliver access, it is hampered by a lack of bandwidth and availability. In the meantime, internet service providers are aggressively developing and expanding commercial links too costly for local researchers and scholars. To confront this need, the regional coordinating committee will work with government, service providers, commercial partners and others to develop extensive, subsidized, access.

This is crucial to any academic and research community since the internet is the gateway to scholarly publications, databases, digital libraries and scores of other resources. Thus another task for the coordinating committee will be to negotiate with publishers and institutions some level of subsidized access to subscriptions for their scholars and researchers.

International integration will also depend on the mobility of credentials—the acceptance of degrees and qualifications by institutions, laboratories and universities outside the region. European integration has been facilitated by the "Bologna Agreement" which has led to increased mobility of students and faculty. The task before the committee is to rationalize regional differences and to find the means for operating within the Bologna framework. Traditionally, inter-institutional concords (such as bilateral agreements between universities) have served to bridge these gaps. Thus a catalog of such arrangements may be made to facilitate exchanges in the early phases of the regional program.

The complexity of the committee's task is intrinsic to the science and academic structure inherited from the Soviet Union. The traditional split of academy institutes—responsible for most research—and the universities has prevented the integration of research and pedagogy. This is further complicated by the fact that pedagogy, itself, is the province of the pedagogical institutes—principally responsible for teacher preparation.

The discussants felt that by focusing on excellence in scientist preparation, the groundwork would be laid to tie the academies and universities together and to improve science teacher preparation. Thus, institutional reform is best achieved by strengthening of the region's research base. In sum, the issue is not capacity-building (the education and academy system provide a good supply of talent) but institutional reform and acquisition of resources—to better and more efficiently exploit existing intellectual capacity.

The absence of the Armenian and Tajik delegations will be repaired as quickly as possible. Academician Jeyenbayev will undertake negotiations to submit the workshop MOA for their approval and consultations will be undertaken to record their views on all of the issues that were discussed.

And finally, there is a need to enlist the participation of the international learned and professional societies. Free and open intellectual exchange is the essential ingredient for a vigorous and productive science enterprise. Again, UNESCO is the ideal bridge to mediate and promote such exchange.

## 4. Acknowledgements:

We wish to congratulate all participants for their dedication and will to find a productive path through the maze of issues confronting them. The discussions were long, arduous, complex and productive.

We are grateful to Fuad Mushtagov and the staff of the ANSF for their contributions in organizing and managing this forum. They were beset by a variety of difficulties that they confronted with determination. The hospitality of the ANSF was crucial to the success of the workshop.

We thank CRDF and ONRG for their support, interest, participation and expertise.

We are particularly grateful to Janybeck Jeyenbayev for his willingness to add to his already considerable burdens the chairmanship of the regional coordinating committee.

We were saddened to hear of Academician Kerimov's (President of the ANSF) sudden illness which prevented his participation in the discussions and we wish him a speedy and full recovery.

## APPENDIX--BAKU MEMORANDUM OF AGREEMENT ON EDUCATION OF YOUNG SCIENTISTS IN CENTRAL ASIA AND THE CAUCASUS

Representatives of the Republics of Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan along with representatives of organizations ANSF, APS, CRDF, ICTP, JINR, Murdoch University, OSI Baku, Science & Technology Management Associates, UNESCO, US Office of Naval Research met in Baku, Azerbaijan 5-8 April 2004. The participants, recognizing the legacy of strong development of science education in the countries of the region, and the need to continue this development during the period of transition, agreed on an organizational structure (attachment 1) to develop, implement and manage a regional program (attachment 2).

It was agreed that the program should focus on developing excellence in the education of young scientists.

The delegates agreed:

To encourage formation of National Coordinating Committees of all interested stakeholders to support the work of the Regional Coordinating Committee.

The Regional Coordinating Committee will meet on a regular basis, develop a statement of purpose, Charter, identify affiliates, and coordinate the development of a 3-5 year program for discussion at a meeting in Bishkek on 2nd December, 2004.

The international organizations and country representatives will seek funding to allow the Regional Coordinating Committee to perform its work.

The Regional Coordinating Committee will address a list of agreed high priority tasks (attachment #2) before the second meeting of the larger group, which will take place in Bishkek, Kyrgyz Republic on 2 December 2004.

The Regional Coordinating Committee shall inform the National Coordinating Committees and the participants of their progress and problems.

It is the responsibility of the National and Regional Coordinating Committees to disseminate information about the initiative on a national, regional, and international level, as identified in the program such as universities, researchers, teachers, etc.

The Chairman of the Regional Coordinating Committee should arrange to establish a special section within the web site of the Kyrgyz Academy of Sciences and each participant should establish an appropriate link to that section to give the initiative the widest possible access and dissemination.

The participants of the workshop express hope and a strong desire that the Republics of Armenia and Tajikistan will support this memorandum and the decision of the science education workshop. The Regional Coordinating Committee will contact the representatives of the aforementioned countries and report to the participants of their agreement to participate.

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| Acad. Arif Mekhtiyev | Vice-President | National Academy of Sciences |
| Prof. Dr. Asaf Hajiyev | Deputy Head | Science & Education Commission of the Parliament |
| Prof. Nugzar Skhirtladze | Head of Educational Methodology Department | Tbilisi State University |
| Acad. Satybaldin Azimkhan | Vice-President | National Academy of Sciences |
| Dr.Prof. Janybeck Jeyenbayev | President | National Academy of Sciences |
| Acad. Amanbek Jainakov | Vice-President | National Academy of Sciences |
| Prof. Dr. Chariyar Amansahatov | Main Expert | Supreme Council of Science and Technology |
| Prof. Durbek Akhmedov | Vice-Rector | Tashkent State University of Economics |
| Prof. Seifallah Randjar-Daemi | Head of High Energy Section | Abdus Salam International Centre for Theoretical Physics (ICTP) |
| Ms. Elmina Kazimzade | Director of Education Programs | Open Society Institute Baku |
| Dr. John Webb | Prof. of Chemistry | Murdoch University |
| Dr. Yuri Pantebratsev | Head of Department of the Basic Research | Joint Institute for Nuclear Research |
| Ms. Minella Alarcon | Programme Specialist | Physics & Mathematics Division of Basic Engineering Scientists, UNESCO |
| Dr. Judy Franz | Executive Officer | American Physical Society |
| Dr. George Gamota | President | Science & Technology Management Associates |
| Dr. Irving Lerch | Senior Consultant | American Physical Society |
| Ms. Cathleen Campbell | Senior Vice-President | U.S. Civilian Research & Development Foundation |
| Ms. Siri Oswald | Senior Program Manager | U.S. Civilian Research & Development Foundation |
| Col. John O'Neil | Associate Director, Science & Technology | U.S. Office of Naval Research |
| Dr. Fuad Mushtagov | Vice-President | Azerbaijan National Science Foundation |

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|  | Dr. Asaf Zamanov | Head of Department | Ministry of Education |
|  | Dr. Adalat Hasanov | STCU Information Office in Baku | Science & Technology Centre in Ukraine, Baku office |
|  | Mr. Adil Zhugralin | Student | Massachusetts Institute of Technology |

Attachment # 1

**TRANS CAUCASUS/ CENTRAL ASIA COORDINATING COMMITTEE FOR THE EDUCATION OF YOUNG SCIENTISTS**

Chair: Dr. Prof. Janybeck Jeyenbayev
Vice-Chair for Central Asia: Prof. Durbek Akhmedov
Vice-Chair for Caucasus: Dr. Fuad Mushtagov

**Organizing meeting:**

Statement of Purpose
Charter (election cycle, constituents, etc.)
Affiliations (Memorandum of Agreement with universities, academies, organizations, ministries)

**Program Development (3-5 years)**

- Proposals for Support

- Submission for Recognition
  - UNESCO
  - ICTP
  - National Commissions
  - National Governments

- Request for Assistance
  - Charter (UNESCO, ICTP)
  - Modest funds to support activities of Regional and National Committees

- Liaison and Communications
  - UNESCO - Regional Grouping of National Commissions (Asia-Pacific Regional Meeting)
  - CRDF
  - Regional Offices of UNESCO
  - Virtual Silk Road
  - National Education Network (Central Asia and Caucasus Regions)

- Industry

- International Societies

Attachment # 2

# REGIONAL PROGRAM

1. **Language Programs in Universities**
   - Develop English Proficiency
   - Sustain Russian Proficiency
   - Promote National Languages

2. **Materials**
   - Books & Manuals (purchase, publication, preparation and development)

3. **Internet**
   - Computers
   - Routers
   - Hubs
   - Infrastructure
   - Broad-band Access
   - Programming (routers, servers)
   - Network Management

4. **Student-Faculty Exchanges (Mobility)**
   Conferences, workshops, schools at facilities of acknowledged excellence

   - Study Programs
   - Research Collaborations
   - Short-term visits (schools, meetings)
   - Regional, International

5. **University/Academy Integration (Memorandum of Agreement, Memorandum of Understanding)**
   - Accreditation standards (Bologna Agreement)

6. **Dynamic Review**
   - Teacher Preparation
   - New Pedagogic Technologies (British Council, etc.)
   - National Needs
   - Policy
   - Jobs, private sector, entrepreneurial development

7. **Research Equipment**