The Third World Academy of Sciences: Celebrating two decades of progress

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Founded in Trieste, Italy, in 1983, by a distinguished group of scientists from the South under the leadership of the late Nobel Laureate Abdus Salam, the Third World Academy of Sciences (TWAS) is an autonomous international organization that is dedicated to promoting scientific excellence in the developing world. Today TWAS is considered a leading voice in discussions on the advancement of science in the South and a major player in efforts to promote South–South and South–North cooperation on issues related to science-based sustainable development.

About TWAS

FOR nearly two decades, the Third World Academy of Sciences (TWAS), whose secretariat is located in Trieste, Italy, has served as one of the most articulate and forceful voices for the promotion of excellence in scientific research and the advancement of science-based development in the developing world. TWAS's current membership, which includes 16 Nobel Laureates, totals 586 scientists (480 Fellows from 62 developing countries and 106 Associate Fellows from 14 developed countries).

The enthusiasm and commitment that TWAS members have consistently displayed for their organization has been the primary source of the Academy's strength. Many organizations point to their membership as the key to their success. What makes TWAS unique, however, is that its members often cite the organization as a pillar of inspiration and strength that has bolstered and sustained their careers at critical junctures.

When TWAS was launched in the early 1980s, largely due to the inspiring vision and dogged determination of the late Nobel Laureate Abdus Salam, who served as the organization's first president and the driving force behind its development during its first decade of existence, a critical goal of the Academy was to serve as an institution that would honour the most prominent scientists from the developing world.

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TWAS continues to fulfil this key objective through the annual election of new members, its yearly awards and prizes, and its conferences and workshops that showcase the excellent work being done by scientists in the South. A fundamental aspect of the Academy's success, however, has been its ability to broaden its own agenda – and spur the creation of new institutions – to meet the ever-changing challenges faced by scientific researchers and science policy makers throughout the South.

Specifically, as scientific expertise became more deeply rooted in a number of developing countries – most notably, in Argentina, Brazil, China, India and South Korea – TWAS officials and members realized that the Academy's role as an honorary society for the developing world's best scientists was a laudable but insufficient strategy for fulfilling its lofty goals. TWAS officials were particularly interested in linking scientific research to issues related to sustainable economic development in ways that would allow science to tackle both the short- and long-term everyday problems of everyday people. In other words, they very much wanted to put science to work for their societies.

For example, TWAS officials and members recognized that their vision of science-based development in the developing world would never be completely realized without engaging political officials in detailed discussions on the vital role that science plays in long-term economic and social development strategies and action programmes. Consequently, in the late 1980s the Academy spearheaded the effort to create the Third World Network of Scientific Organizations (TWNSO), which

Box 1. TWAS objectives.

- Recognize, support and promote excellence in scientific research in the South
- Provide promising scientists in the South with research facilities necessary for the advancement of their work
- Facilitate contacts between individual scientists and institutions in the South
- Encourage South–North cooperation between individuals and centres of scholarship
- Encourage scientific research on major Third World problems.

Box 2. Core programmes.

Capacity Building for Research
- Grants for Scientific Research
- Spare Parts for Scientific Equipment
- ICTP/TWAS Donation programme

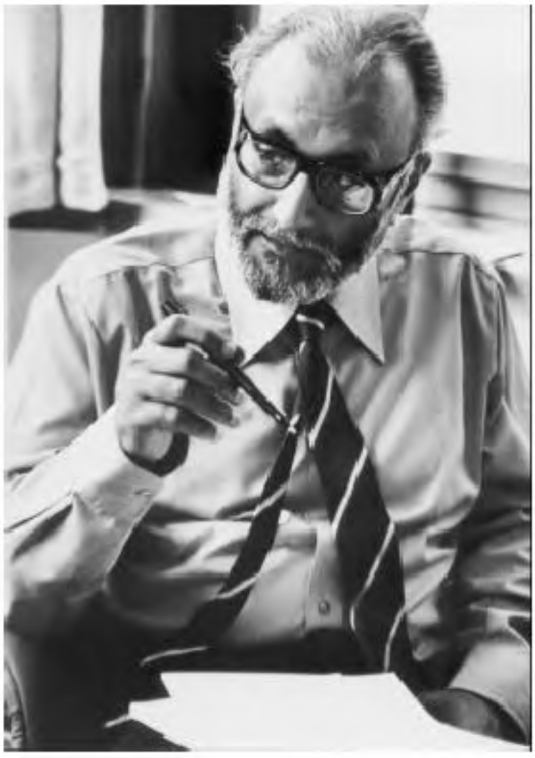
Awards and Prizes
- TWAS Awards in Basic Sciences
- TWNSO Prizes in Applied Sciences
- TWAS Medals and Lectures
- Prizes for Young Scientists

TWAS Core Programmes

Fellowships and Associateships
- South–South Fellowships
- Associate Membership Scheme
- CSIR/TWAS Fellowships

Meetings/Lectureships/Professorships
- International Scientific Meetings in the South
- Joint Lectureship/Professorship Programme
- General Conferences

Information Services
- Quarterly Newsletter
- TWAS and TWNSO Directories
- Proceedings
- Internet Website



Abdus Salam, founding President of the Third World Academy of Sciences (TWAS).

Abdus Salam and Javier Pérez de Cuellar, Secretary General of the United Nations, at the official opening ceremony of the Third World Academy of Sciences (TWAS), 5 July 1985, Trieste, Italy.

seeks to link scientific research to public policy by bringing scientists and public officials together in efforts designed to forge sustainable science-based development strategies. TWNSO's membership now totals 155 leading policymaking institutions, including 34 ministries of science and technology and 45 research councils and academies.

Similarly, in the early 1990s, when TWAS officials and members recognized the paltry number of women in scientific research and administration throughout the developing world, the Academy pushed for the creation of the Third World Organization for Women in Science (TWOWS). This initiative was based on the compelling realization that for science to be fully integrated into the larger society, questions of gender imbalance would have to be addressed and that the scientific community would never receive the broad public support it needed if it was viewed solely as a fraternity of men. Today TWOWS has more than 2200 members and is recognized as the leading voice for women scientists in the South.

View of the Enrico Fermi Building on the campus of the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, site of the secretariat of the Third World Academy of Sciences (TWAS).

More recently, TWAS officials and members have concluded that global scientific issues require a global response and therefore Academy officials have worked hard to build strong partnerships with scientific organizations in the North. This explains TWAS's active role in the World Conference on Science in June 1999 in Budapest – sponsored by the United Nations Educational, Cultural and Scientific Organization (UNESCO) and the International Council for Science Union (ICSU) – and the increasing number of activities that TWAS has developed jointly with UNESCO's Special Unit for Technical Cooperation among Developing Countries (TCDC), the World Meteorological Organization (WMO), the Global Environment Facility (GEF), and other international organizations.

Such efforts promise to become even more prominent in the years ahead. For example, at a May 2000 meeting in Tokyo, the InterAcademy Panel on International Issues (IAP), a group of approximately 80 science academies worldwide, voted to set up the headquarters of the IAP in Trieste under the administrative umbrella of TWAS. IAP's primary goal is to build the capacities of member academies – particularly younger, underfunded academies – to help them better inform citizens and advise decision-makers on the scientific aspects of critical global issues. More generally, TWAS's central role in the future development of IAP will seek to promote increased interaction among scientific institutions and individual scientists in the North and South to address issues of common concern both to their disciplines and societies. IAP has decided to frame its initial agenda around the following thematic issues: capacity-building for young academies, health of mother and children in developing countries, science and education, and science and the media.

TWAS receives funding from the Italian government; the Swedish Agency for Research Cooperation with Developing Countries (Sida-SAREC); UNESCO; the Kuwait Foundation for the Advancement of Sciences (KFAS); and the OPEC Fund for International Development. The Academy's annual budget totals about US$ 2 million. In addition, it has launched a US$ 10-million endowment fund campaign that is now halfway towards its goal. Funds for the endowment have come from one-time contributions from 14 developing countries, including contributions of US$ 500,000 from Brazil, China, India, Kuwait and Nigeria.

Broad policy and programmatic direction for TWAS is provided by a 14-person council consisting of renowned scientists from around the world (Box 4).

Academy programmes

TWAS is responsible for a host of activities that are designed to help build scientific capacity and promote science-based development throughout the South.

TWAS Research Grants Programme provides up to US$ 10,000 to scientists from the developing world to support research projects in basic sciences – biology, chemistry, mathematics and physics. To date, the TWAS grants programme has assisted more than 1400 scientists in 75 countries.

TWAS South–South Fellowship Programme offers support for scientists from the South to visit scientific institutions of excellence in the South for minimum stays of one month. To date, governments and scientific organizations in more than 20 developing countries have agreed to provide local hospitality for the approximately 50 visits that take place each year. In total, 554 fellowships have been granted to scientists in 51 developing countries since 1986.

TWAS Associate Membership Scheme enables researchers from the South to visit centres of excellence in the South on a regular basis. An associate is appointed for three years during which time he or she can visit a centre twice for the purposes of research collaboration. To date, 88 centres in 21 developing countries have been selected to participate, and 199 researchers from 41 countries in the South have enjoyed opportunities to advance their research agendas with colleagues who share their interests and expertise.

TWAS Awards in Basic Science provide US$ 10,000 each to individual scientists from developing countries who have made outstanding contributions to the advancement of basic sciences (the categories are biology, chemistry, mathematics, physics and basic medical sciences). To date, 82 scientists in 14 developing countries have been honoured. The Academy also co-sponsors *Prize Programmes for Young Scientists* that are organized in cooperation with science academies and research councils in developing countries. To date, organizations in 31 developing countries have participated and a total of 205 young scientists have been honoured.

Box 3. TWAS support by area of activity (1986–2000).

Programme	Latin America and Caribbean	Africa and Arab countries	Asia and Pacific	Total
Awards and Prizes	99	63	125	287
Research Grants	593	357	484	1434
Spare Parts	88	152	167	407
Fellowships and Associateships	306	297	442	1045
Co-sponsored Meetings	226	142	212	580
Lectureships and Professorships	75	71	101	247

Box 4. TWAS Council 2001–2003.

President
C. N. R. Rao, India

Immediate Past President
J. I. Vargas, Brazil

Vice-Presidents
M. Akhtar, Pakistan
A. Badran, Jordan
Lu Yongxiang, China
G. O. P. Obasi, Nigeria
M. Peimbert, Mexico

Secretary General
J. Palis, Brazil

Treasurer
A. A. Al-Shamlan, Kuwait

Council Members
A. Ashour, Egypt
F. I. B. Kayanja, Uganda
G. C. Lalor, Jamaica
M. A. Virasoro, Argentina
A. H. Zakri, Malaysia

The Academy convenes a *General Meeting* of its membership every year and a joint *General Conference/ Membership Meeting* every other year. The latter, which is hosted by a government in a developing country and draws several hundred scientists from the South and North, is designed to review the status and future prospects of science and technology in various regions of the South. To date, conferences have been held in China, Venezuela, Kuwait, Nigeria, Brazil and Senegal.

The TWAS 8th General Conference, held jointly with the TWNSO 7th General Meeting, will be hosted by the Government of India and will take place in New Delhi, from 27–31 October 2001. More than 400 scientists are expected to attend. TWAS's 9th General Conference is scheduled to take place in China in 2003.

In addition, TWAS encourages the organization of international scientific meetings in developing countries by providing up to US$ 3000 in *Travel Grants* for speakers from abroad and/or participants from the region. To date, 589 events have benefited from the programme. And the Academy, in cooperation with ICSU and UNESCO, sponsors a joint *Lectureship/Professorship Programme* that provides scientists with opportunities for discussion and collaboration with colleagues from other countries. To date, 184 visits to 60 countries have been supported through this programme.

In collaboration with the Abdus Salam International Centre for Theoretical Physics (ICTP), TWAS supports a *Donations Programme* in which publishing companies, institutions and individuals donate publications for free distribution to needy libraries in developing countries. On an average, 40,000 items are shipped each year to some 500 institutions in 85 developing countries. The Academy also oversees a *Spare Parts Programme* designed to cover the cost of acquiring and distributing spare parts for scientific equipment in laboratories in developing countries. To date, 407 grants have been awarded to laboratories in 50 countries in the South. To document its activities and reach a broader public, the Academy publishes a membership yearbook, quarterly newsletter, annual report, yearly statistic digest and conference proceedings.

In partnership

TWAS, in cooperation with TWNSO and UNDP/TCDC, has produced a monograph consisting of some 30 case studies of successful applications of science and technology to address critical everyday problems in the developing world. The monograph, *Sharing Innovative Experiences*, has been distributed to 5000 individuals and institutions in an effort to share experiences and boost South-South cooperation on development-oriented issues of common concern. Another UNDP/TCDC project, exploring the conservation and wise use of indigenous and medicinal plants, is intended to spark the creation of a network of scientific institutions of excellence focusing on a science-based issue of prime importance to economic development and ecological well-being in many nations throughout the South. TWAS, in cooperation with TWNSO, is also engaged in a GEF project designed to explore the conservation and wise use of biodiversity in arid and semi-arid zones in the South. The creation of an interactive website and a

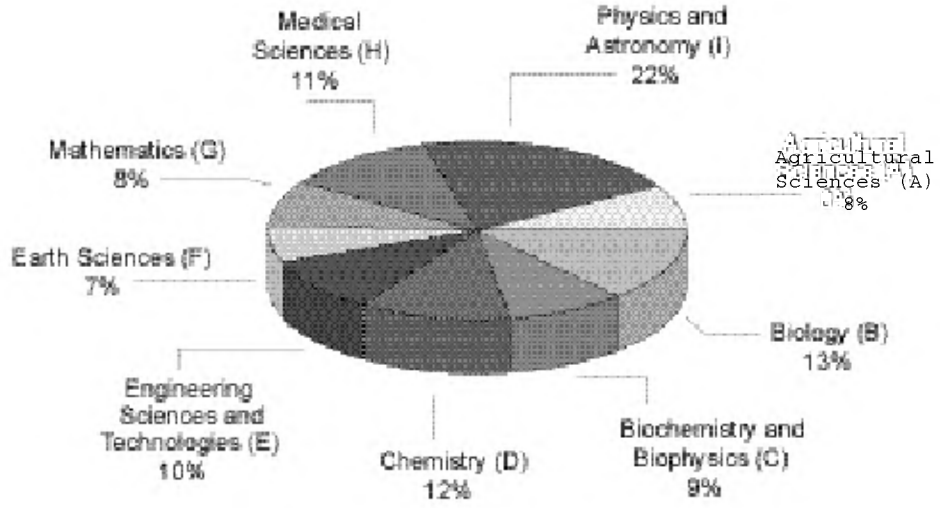


Figure 1. TWAS membership distribution by scientific field.

Box 5. Voices of support.

Brazil
'As a long-time member of TWAS, I have seen first-hand the Academy's contribution to science and technology throughout the world. Nations, like my home country Brazil, which now boast an increasing number of world-class scientists and technologists, owe a great deal of their recent success to organizations like TWAS.'

– Fernando H. Cardoso, President of Brazil

China
'Since its establishment, the Third World Academy of Sciences has made great contributions in promoting the development of science and technology in the Third World. I am fully convinced that in the new century, TWAS will make even greater contributions to boosting the development of scientific undertaking of the Third World countries, fostering young scientists and promoting South–South and even global collaboration and exchange in science and technology.'

– Jiang Zemin, President of China

Italy
'Italy is proud of the contribution it has made to the success of TWAS and is delighted to serve as the host country for this institution. Our investment in the Academy has paid off constructively throughout the world.'

– Carlo Azegffo Ciampl, President of Italy

Kuwait
'Kuwait has been a strong supporter of TWAS since the Academy's earliest days. The reason is simple. We believe that TWAS has been instrumental in advancing science and technology in our region and throughout the rest of the entire world.'

– Jaber Al Ahmed Al Jaber Al Sabah, The Amir of Kuwait

Tanzania
'TWAS has proven instrumental in efforts to stabilize sub-Saharan Africa's science and technology base. The Academy has served as a beacon of hope in this troubled region for researchers who too often suffer from professional isolation and minuscule budgets.'

– Benjamin W. Mkapa, President of Tanzania

UNESCO
'TWAS has been a driving force behind global efforts to build scientific and technological know-how in the developing world. UNESCO is honoured to have helped guide the academy's administration over the past 10 years. We look forward to continuing our close relationship with TWAS as together we seek to improve the prospects for growth and development in the South.'

– Koichiro Matsuura, Director-General, UNESCO

series of workshops scheduled for Mongolia, Namibia, Mexico and Egypt are intended to help forge an enduring network of South–South cooperation evolving around an issue of critical concern to many developing countries that has yet to receive the attention it deserves. Another, like-minded project sponsored by the World Meteorological Organization, will focus on still another critical issue in the developing world: the wise use and management of drinking water supplies in the developing world.

In cooperation with TWNSO and the South Centre, TWAS is currently preparing the third edition of a monograph profiling the capabilities of centres of scientific excellence in the developing world. The monograph is scheduled for publication in 2002 (the first edition, published in 1994, included 208 institutions; the second, which appeared in 1998, included 431 institutions). Titled *Profiles of Institutions for Scientific Exchange and Training in the South*, the goal of this monograph is to increase awareness and cooperation among scientific institutions in the South. Each of the editions has become a valuable resource document detailing the current state of scientific capacity among leading universities and research institutions in the developing world.

Progress through science

Since its very inception in 1983, the Third World Academy of Sciences (TWAS) has been at the forefront of efforts to provide broad recognition for individual scientific excellence, build institutional scientific capacity and promote science-based sustainable development in the developing world.

Few organizations can match the Academy's uniquely integrated strengths in the promotion of scientific research and science-based development policies in the South. Indeed TWAS has become one of the most prominent voices for linking science, technology and development in the developing world.

Through its membership, TWAS provides a comprehensive storehouse of scientific knowledge in a broad range of basic and applied disciplines. Due to its long and successful track record in the organization of conferences and workshops, it is recognized worldwide as an open and balanced forum for the exchange of scientific ideas among scientists in the South and North; as a close associate of the United Nations (administrative responsibility for TWAS falls under the auspices of UNESCO), the Academy has forged strong and lasting ties with international scientific and technological organizations worldwide; as the driving force behind the creation of TWNSO, the Academy, which currently serves as the headquarters for the TWNSO secretariat, enjoys ready access to ministries of science and technology throughout the South; as the guiding light and secretariat of TWOWS, the Academy works closely with women scientists throughout the developing world; as the implementing agency in a host of projects funded by such international organizations as UNDP/TCDC, GEF and WMO, TWAS is a major player in efforts to promote South-South cooperation on critical science-based development issues in the developing world; and as the new home for IAP, TWAS has also become well positioned to serve as a crucial link between scientific organizations and research activities in the South and North, promising to fulfil Abdus Salam's lifelong dream to transform TWAS into an international force for the promotion of science-based development on a global scale.

Future past

The cornerstone of the Academy's track record of success has been its uncompromising dedication to the nurturing and promotion of scientific excellence in the South. The Academy's founding president, the late Abdus Salam (the first and only Pakistani scientist to win the Nobel Prize), believed that the path to progress in the developing world lay first in building and then maintaining its scientific capacity. Salam often observed that at the beginning of the second millennium, Asian and African regions led the world in scientific and technical know-how. Europe's leadership in such endeavours took hold only after the dawn of the Renaissance in the 15th century. Thus the science and technology gap between the North and South is a phenomenon whose history dates back 500 years. Salam's goal was to reinvigorate the South's long dormant dedication to science and technology as a primary means of reviving the social and economic well-being of two-thirds of the world's population.

During its brief history (TWAS has been in existence for less than two decades), the Academy has developed a sterling reputation among countries in the South for its contributions both to scientific research excellence and science-based development in the developing world. Academy-sponsored grants, conferences, prizes and publications have been instrumental both in promoting scientific capacity-building and raising public awareness about the important role that science must play in the South's efforts to overcome centuries of poverty. In recent years, moreover, the Academy has become a key player in South–North efforts to address a host of global scientific issues ranging from intellectual property rights to global warming. And with the arrival of the IAP, the Academy is likely to play an increasingly important role as a facilitator between the South and North on scientific issues of common concern, including efforts to combat global warming, secure adequate supplies of safe drinking water and conserve biodiversity.

Overall, the Academy is poised to play a major role in two of the most critical issues facing our global community in the years ahead: the need to build scientific and technical capacities in nations and regions that have not fully benefitted from the unprecedented scientific and technical advances that have taken place over the past few decades, and the increasing necessity to

address the world's economic and environmental problems from a global perspective that nurtures close cooperation among scientists from the South and North. To fulfil these roles, TWAS has recently discussed the need to address key shortcomings by devising strategies that (1) welcome scientists from countries that are not well represented in the Academy, including scientists from least developed countries, without compromising the traditional high-quality of TWAS's membership, and (2) create a mechanism for increasing the number of social scientists in the Academy.

Based on a strong foundation of success in the past, TWAS and its members look forward to meeting these challenges with the same determination and skill that have marked the Academy's efforts over the past two decades and earned it such high marks in the international scientific community.

For additional information about the Academy, please contact the TWAS Secretariat, c/o the Abdus Salam Centre for Theoretical Physics (ICTP), 34014 Trieste, Italy, phone: +39 040 2240 327; fax: +39 040 224 559; or e-mail: info@twas.org; website: www.twas.org.