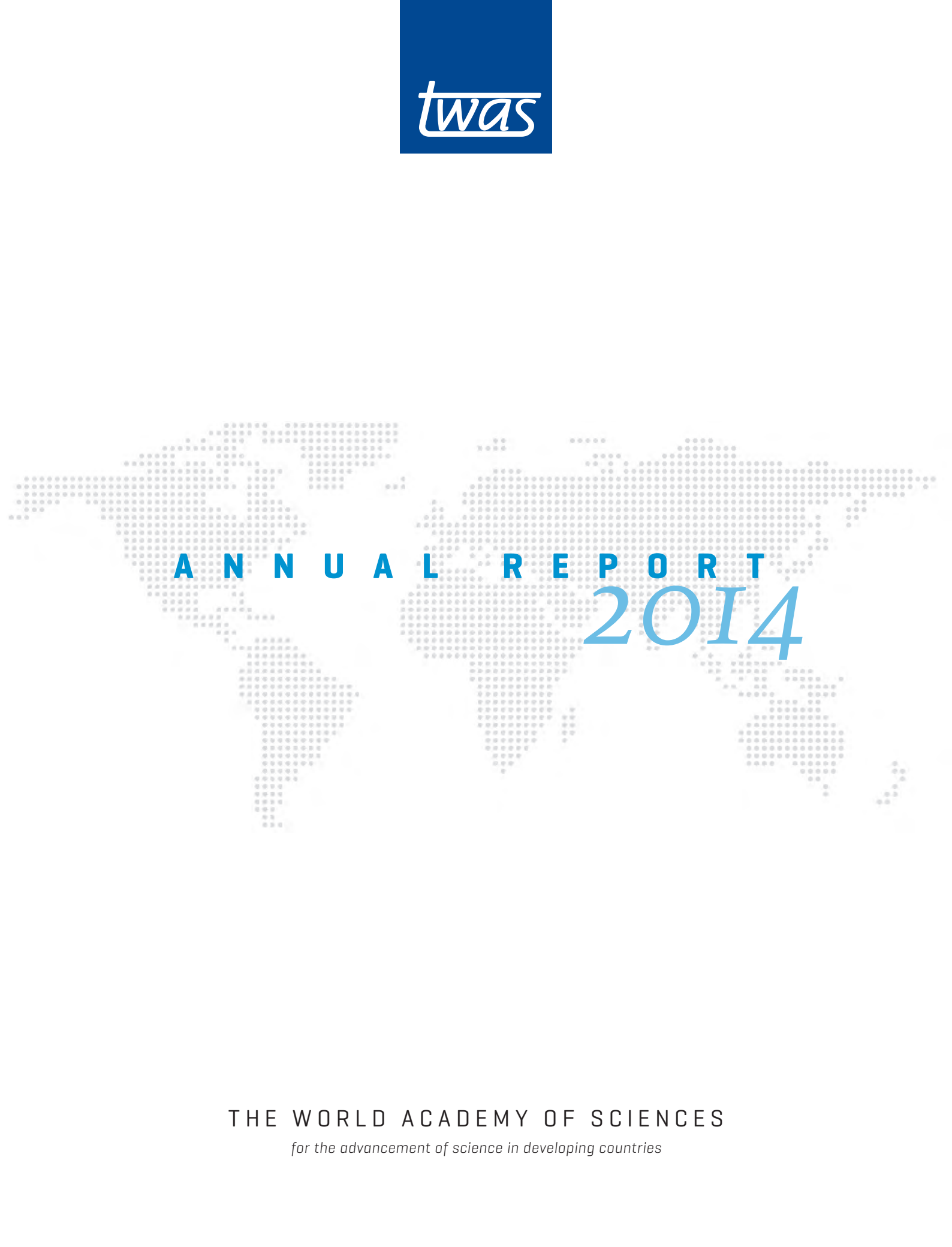
twas

ANNUAL REPORT 2014

THE WORLD ACADEMY OF SCIENCES

for the advancement of science in developing countries



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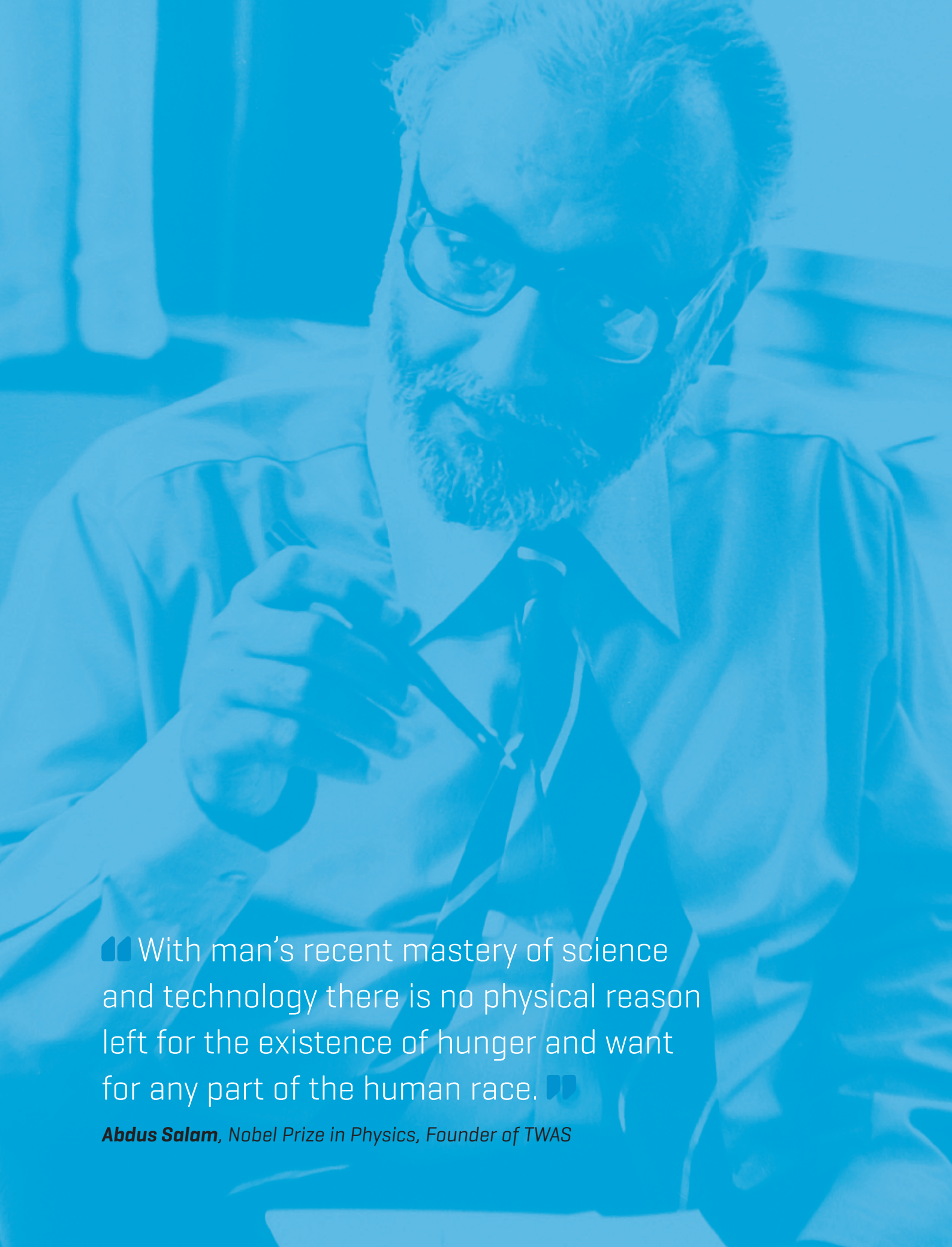

“With man’s recent mastery of science and technology there is no physical reason left for the existence of hunger and want for any part of the human race.”

***Abdus Salam**, Nobel Prize in Physics, Founder of TWAS*

CONTENTS

▲ The inside of a dome in Matrah in Muscat, Oman. (Photo: Andrew Moore/flickr)

Cover picture: Oriola Olasunkanmi Bukola of Nigeria working in a lab at the CAS-TWAS Centre of Excellence for Biotechnology in Beijing, China.

COUNCIL

The TWAS Council, elected by members every three years, is responsible for supervising all Academy affairs.

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[Director, ICTP]

IN MEMORIAM
Farida Shah, a leading figure in both TWAS and the Organization for Women in Science for the Developing World (OWSD), passed away on 1 November 2014 at the age of 66. She will be remembered worldwide for her clear vision of the importance of science and her hard work in bringing the vision to life. Shah was a molecular biologist whose work had a deep impact in her home country of Malaysia. In 2002, she was elected to the ranks of TWAS Fellows; in 2012, she was elected to a three-year term on the TWAS Council. At OWSD, she served two terms at the Asia-Pacific representative on the Executive Board, from 1999 to 2010, and then was elected vice president for the region. She also was a member of the scientific board for the UNESCO International Basic Sciences Programme.
For more:
www.twas.org/node/8542

THE TWAS MISSION

TWAS – The World Academy of Sciences for the advancement of science in developing countries – works to advance sustainable prosperity through research, education, policy and diplomacy.

TWAS was founded in 1983 by a distinguished group of scientists from the developing world, under the leadership of Abdus Salam, the Pakistani physicist and Nobel Prize winner. Today, TWAS has some 1,150 elected Fellows from more than 90 countries; 15 of them are Nobel laureates. The Academy is based in Trieste, Italy, on the campus of the Abdus Salam International Centre for Theoretical Physics (ICTP). It receives core funding from the government of Italy. The United Nations Educational, Scientific and Cultural Organization (UNESCO) administers TWAS funds and personnel.

Through more than three decades, TWAS's mission has remained consistent:

- Recognize, support and promote excellence in scientific research in the developing world;
- Respond to the needs of young scientists in countries that are lagging in science and technology;
- Promote South-South and South-North cooperation in science, technology and innovation;
- Encourage scientific research and sharing of experiences in solving major problems facing developing countries.

2014: AN EYE ON THE HORIZON

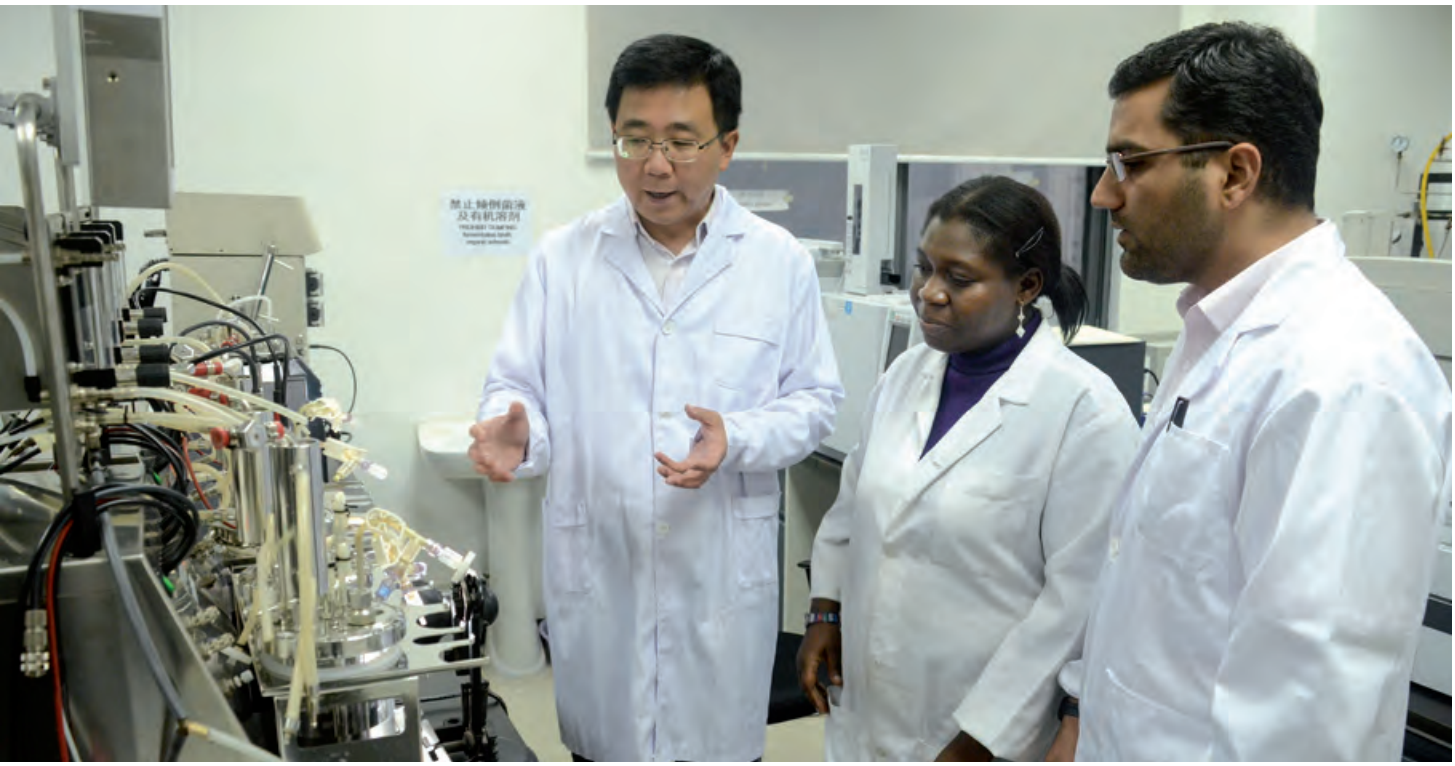
by **Bai Chunli**,
TWAS President

From its earliest days, TWAS has had one overarching mission: to advance scientific excellence in developing countries. We have done this by electing elite researchers to our Academy, by giving awards and prizes for high-impact science, by giving grants and fellowships to promising early-career researchers, and through engagement with policymakers and educators.

Today, we can say that with clear vision and hard work, and with many partners around the world, we have contributed to a historic global shift. We see the progress in countries that are becoming stronger through investments in research and science education – countries as diverse as Malaysia and Mexico, Rwanda and Brazil, India, South Africa and my own country, China. But because this success is uneven, many countries still lag behind.

To close this gap, and to build the strength needed to address regional and global challenges, we must do more to help less developed countries build strength in science and engineering. While we continue our core initiatives to support scientific excellence, we must also seek scientists from new nations to join our Academy and increase our efforts to support young scientists and women scientists.

Throughout 2014, we made important progress. Our General Meeting in Muscat, Oman, was a signature success. Working with our hosts and partners in Oman, we showed our commitment to scientific progress and the value of our partner networks. Omani science leaders, along with partners from the government of Italy, UNESCO and the Swedish International Development Cooperation Agency (SIDA), expressed a shared commitment to cultivating a strong new generation of researchers.



▲ CAS-TWAS Centre of Excellence for Biotechnology Director Lin Yee, with Oriola Olasunkanmi Bukola of Nigeria and Qari Muhammad Kaleem of Pakistan.

Across a number of sectors, the evidence shows TWAS's growing impact:

- For the first time, TWAS Fellows were elected from the Central African Republic, Hungary and Austria. Fellows also were elected from Ecuador, Oman, Trinidad and Tobago, Uruguay, Uzbekistan and Zimbabwe, which previously had few members.
- Of 46 Fellows elected this year, 10 were women. Of 143 PhD fellowships awarded by TWAS, 38 went to women. The Organization for Women in Science for the Developing World awarded 52 PhD fellowships to women, and over half went to scientists from least developed countries.
- At year's end, TWAS offers 353 PhD fellowships, more than double the number at the end of 2012. The CAS-TWAS President's PhD Fellowships increased the slots offered to young scholars, and we expect new fellowships soon from India and South Africa.
- And through the year, TWAS emerged as a key voice in discussion of the post-2015 Sustainable Development Goals and built its reputation as an advocate for education and international science cooperation.

In these ways, TWAS is fulfilling its mission. And the effort is amplified and enhanced by our work in communication. Over the past year, TWAS launched a state-of-the-art website and redesigned the TWAS Newsletter. TWAS and the Chinese Academy of Sciences produced an inspiring film about young scientists at the CAS-TWAS Centres of Excellence. These initiatives and others dramatically increase TWAS's global reach.

The TWAS Council, Executive Director Romain Murenzi, the five Regional Offices and the secretariat, working together, are making contributions that produce remarkable benefits. But while success brings influence, it also brings higher expectations. I am confident that we will rise to these challenges in the months and years ahead.

A YEAR O

With TWAS moving confidently into its fourth decade, 2014 was a year of exciting initiatives and accomplishment. The Academy's membership is reaching into new nations. Its programmes are strong. TWAS is doing more for young scientists and women researchers in the developing world than ever before. And it is building a growing global audience for its communication. A few successes merit particular mention:

1 Oman hosts 25th General Meeting

The Sultanate of Oman stands out in the developing world as a nation that has built a strong reputation in engineering, health care, telecommunication and science education. In 2014, Oman hosted the General Meeting for the first time, drawing over 300 scientists, policymakers, educators and others from 56 countries to Muscat from 26-29 October. Ministers and other top-level science and education leaders from nearly a dozen nations also attended. (For more on the meeting, see page 14)


1

Andres Dudshoorn/Wikimedia Commons

2 Life-saving African researcher wins TWAS-Lenovo Prize

Quarraisha Abdool Karim, a South African HIV-AIDS researcher, won the 2014 TWAS-Lenovo Prize. Research by Abdool Karim is focused on giving women practical tools for protecting themselves from AIDS, and it has been credited for saving thoudands of lives. Her work also could provide valuable contributions toward an HIV vaccine. (For more on Academy prizes, see page 24)


2

CAPRISA


3


4

F IMPACT

3 India, TWAS sign major agreement

TWAS and India's top science agency, the Department of Science and Technology (DST), signed a major agreement designed to advance science in the developing world. DST will provide funding for and work with TWAS on a Pan-Africa Doctoral Fellowship programme for about 100 fellows over five years. They will also embark on an ambitious new programme on science diplomacy training with events both in India and Trieste, Italy. (For more on education and training programmes, see page 16)

4 Science diplomacy programme advances

The Academy works with the American Association for the Advancement of Science (AAAS) to lead a programme on science diplomacy. One workshop convened representatives from four former Soviet states in Central Asia that compete for water resources; their goal was to find ways to work together to address climate change's threat to regional water sources. AAAS and TWAS also co-sponsored their first summer course in science diplomacy, during which representatives of 32 nations learned how joint research can help countries in times of political tension. (For more on science diplomacy, see page 22)

5 TWAS debuts new website

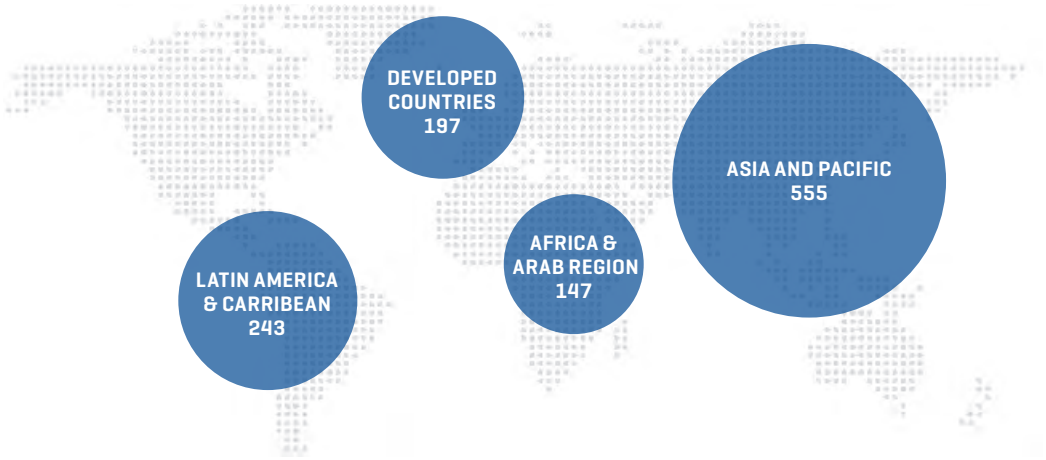
For many people worldwide, the TWAS website provides a first glimpse into the Academy, and it is the main gateway for researchers into our programmes. In February 2014, www.twas.org underwent a comprehsive redesign, with an upbeat new look, a strong emphasis on opportunities, and improved navigation features. The website also has new versions for smart phones and tablets and for low-bandwidth users. After the debut, visits to the site jumped. (For more on TWAS outreach efforts, see page 34)

5

WHO W

TWAS is a global, merit-based science academy, representing the elite of scientific accomplishment in or related to the developing world. The main criterion for election as a TWAS Fellow is scientific excellence. Only those scientists who have attained the highest international standards and have made significant contributions to the advancement of science can be elected as Fellows. Membership is for life.

Fellows from developing countries, by region



Fellows by country of residence (1% or higher)

India
18.1% — 207

Taiwan, China
4.4% — 50

Argentina
2% — 23

Venezuela
1.1% — 13

China
17.3% — 198

Mexico
2.8% — 32

Chile
1.7% — 20

France
1% — 11

Brazil
11.1% — 127

Pakistan
2.6% — 30

South Africa
1.7% — 19

Nigeria
1% — 11

USA
8.5% — 97

UK
2.1% — 24

Iran
1.2% — 13

Other
23.4% — 267

More info: www.twas.org/membership-overview

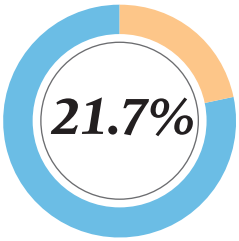
Fellows

1,142
TOTAL FELLOWS

83%
LIVE AND WORK IN DEVELOPING COUNTRIES

15
NOBEL PRIZE LAUREATES

New fellows



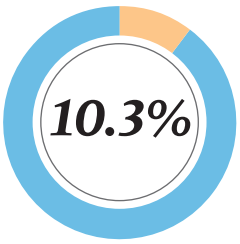
10 OUT OF **46**
TWAS FELLOWS ELECTED IN 2014 WERE WOMEN

E ARE

FELLOWS AND YOUNG AFFILIATES

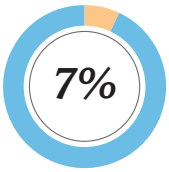
Women fellows

2014



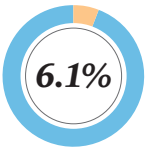
118 WOMEN FELLOWS OUT OF 1,142 TOTAL FELLOWS

2004



45 WOMEN FELLOWS OUT OF 641 TOTAL FELLOWS

1994



18 WOMEN FELLOWS OUT OF 295 TOTAL FELLOWS

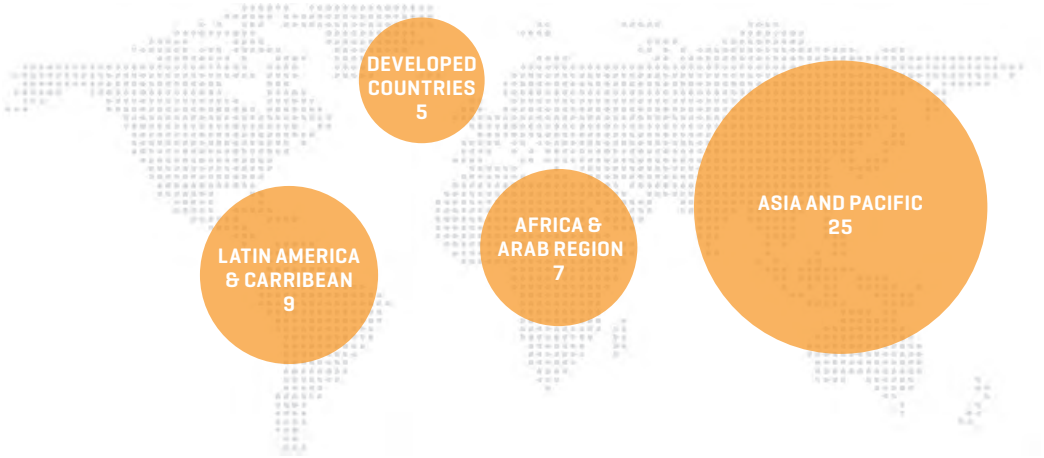
1984

2 WOMEN FELLOWS OUT OF 55 TOTAL FELLOWS

Three long-time allies provide indispensible support that makes the work of TWAS possible:

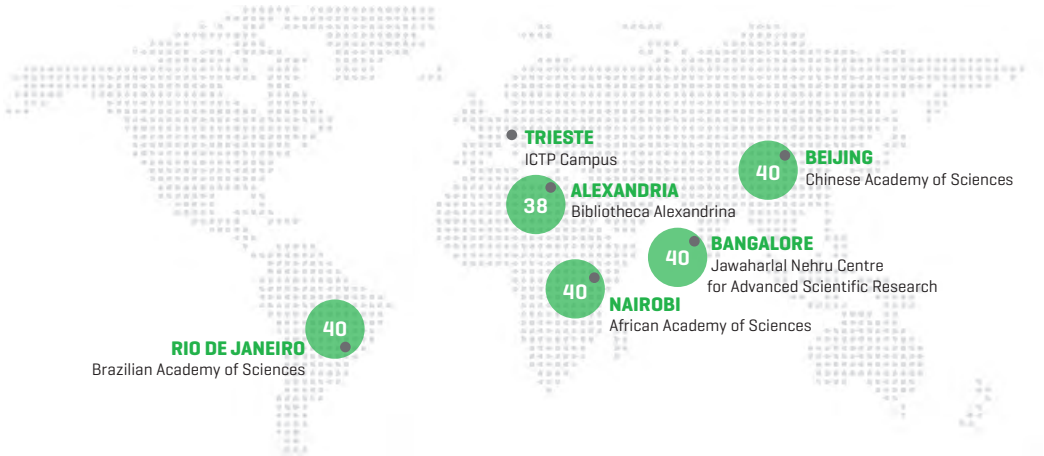
- **The Government of Italy** provides core funding.
- **The United Nations Educational, Scientific and Cultural Organization (UNESCO)** administers TWAS funds and personnel.
- **The Abdus Salam International Centre for Theoretical Physics (ICTP)** hosts TWAS on its campus in Trieste, Italy, and provides valuable administrative support.

TWAS Fellows elected in 2014, by region



For a full list of fellows inducted in 2014, please see page 38.

Current Young Affiliates



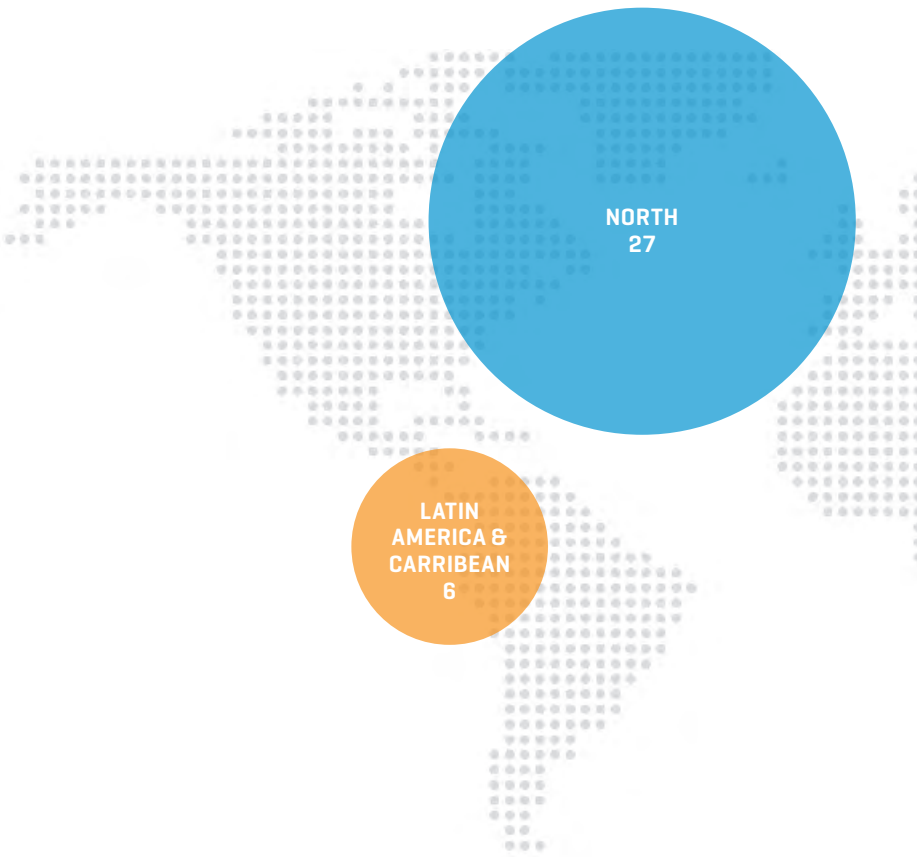
TWAS PA

NORTH

- Abdus Salam International Centre for Theoretical Physics (ICTP)
- Alexander von Humboldt Foundation (AvH), Germany
- American Association for the Advancement of Science (AAAS)
- Biovision, France
- Elsevier Foundation
- Environmental Defense Fund (EDF)
- Fondazione Internazionale Trieste (FIT)
- French Foundation for Rare Diseases
- GenderInSITE
- German Research Foundation (DFG)
- Global Research Council (GRC)
- Global Virus Network (GVN)
- Global Young Academy (GYA)
- IAP, the global network of science academies
- International Council for Science (ICSU)
- Italian Ministry of Foreign Affairs (MAE)
- Japan Science and Technology Agency (JST)
- Lindau Nobel Laureate Meetings, Germany
- New York Academy of Sciences (NYAS)
- Organization for Women in Science for the Developing World (OWSD)
- SciDev.Net
- Science Initiative Group (SIG)
- Swedish International Development Cooperation Agency (Sida)
- The InterAcademy Medical Panel (IAMP)
- The Royal Society
- The Solar Radiation Management Governance Initiative
- World Meteorological Organization (WMO)

"TWAS's work reflects the commitment of our partners, a network that spans the globe. Together, we work to advance science and benefit humanity."

TWAS Executive Director ***Romain Murenzi***

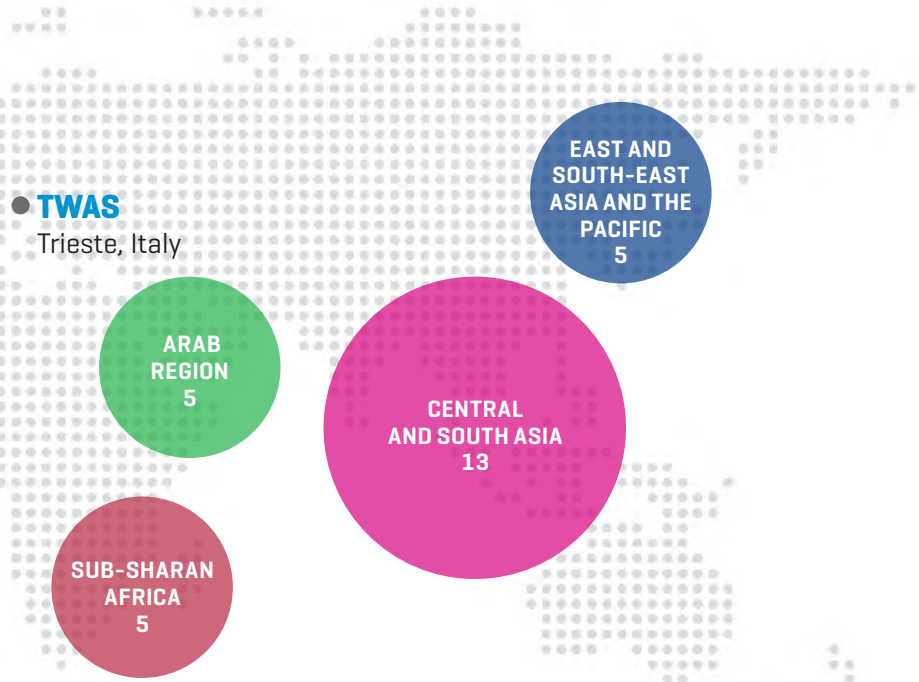


LATIN AMERICA & THE CARIBBEAN

- Brazilian Academy of Sciences (ABC)
- Brazilian Council for Scientific and Technological Development (CNPq)
- Mexican National Council for Science and Technology (CONACYT)
- Ministry of Science and Technology of Argentina
- National Council for S&T Research, Argentina (CONICET)
- National Council on Science and Technology, Mexico (CONACYT)

RTNERS

ARAB REGION
- Bibliotheca Alexandrina
- Kuwait Foundation for the Advancement of Sciences (KFAS)
- Sultan Qaboos University (SQU), Oman
- Sultanate of Oman Ministry of Higher Education (MoHE)
- The Research Council (TRC), Oman



SUB-SAHARAN AFRICA
- Academy of Science of South Africa (ASSAf)
- African Academy of Sciences (AAS)
- African Union (AU)
- International Centre of Insect Physiology and Ecology (icipe)
- National Research Foundation (NRF) of South Africa

EAST AND SOUTH-EAST ASIA AND THE PACIFIC
- Center for Genetic Engineering and Biotechnology (BIOTEC), Thailand
- Chinese Academy of Sciences (CAS)
- International Science, Technology and Innovation Centre for South-South Cooperation (ISTIC), Malaysia
- Universiti Putra Malaysia (UPM)
- Universiti Sains Malaysia (USM)

CENTRAL AND SOUTH ASIA
- Centre of Excellence in Molecular Biology, Pakistan (CEMB)
- COMSATS, Pakistan
- COMSATS Institute of Information Technology (CIIT), Pakistan
- COMSTECH, Pakistan
- Council of Scientific and Industrial Research (CSIR), India
- Department of Biotechnology (DBT), India
- Department of Science and Technology (DST), India
- Indian Association for the Cultivation of Science (IACS)
- International Center for Chemical and Biological Sciences (ICCBS), Pakistan
- Iranian Research Organization for Science and Technology (IROST)
- Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)
- National Centre for Physics (NCP), Pakistan
- S.N. Bose National Centre for Basic Sciences (SNBNCBS)

25TH GENERAL MEETING
OMAN

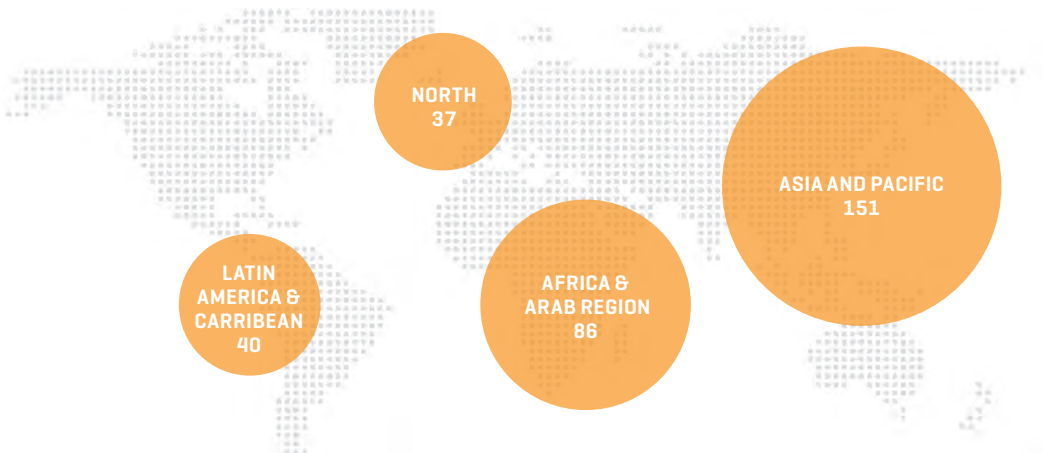
With an agenda that explored cutting-edge science and recognized some of the year's top scientific accomplishments in the developing world, the 25th General Meeting of TWAS convened in Muscat, Oman, from 26-29 October. The meeting, held every year in a different country, brings together scientists from across the globe to showcase the best of science in the South.

The 2014 event was hosted and co-organized by three leading Omani science and education institutions: the Ministry of Higher Education, The Research Council and Sultan Qaboos University. Forty-six new TWAS Fellows were elected during the meeting, raising the total membership to 1,148.

Who came: Attendees ranged from TWAS Fellows and Young Affiliates to government science ministers and presidents of universities and science academies. They came from 56 countries in all.

▶ Clockwise from top left: The audience during the opening ceremonies; 2014 TWAS Medalists, from left, are Jane Lubchenco, Salma Muhammed Zahran Al-Kindy and Chen Sai-Juan; Azerbaijani Minister of Communications and High Technologies Ali M. Abbasov, left, and an Omani journalist; TWAS President Bai Chunli and Omani Minister of Higher Education Rawya Al Busaidi.

Attendees by region



Number of Attendees

314 ATTENDEES

56 REPRESENTED COUNTRIES

187 TWAS FELLOWS

45 YOUNG AFFILIATES

News from the 25th General Meeting: www.twas.org/meeting/twass-25th-general-meeting

Policy highlights: A high-level panel of science leaders from the developing world, including several science ministers, pledged to make a high priority of training a new generation of young scientists, with a special focus on women.

Also, India and TWAS signed a major five-year agreement to cooperate on PhD education, postdoctoral training and science diplomacy.

Science showcase: TWAS Medal winners discussed major developments in science: Salma Al-Kindy, a researcher at the Sultan Qaboos University College of Science in Oman, spoke on how nanotechnology has affected pharmaceuticals. Chen Sai-Juan, of the State Key Laboratory of Medical Genomics and Shanghai Institute of Hematology, discussed a therapy that can disrupt the development of leukemia. And marine ecologist Jane Lubchenco, who served as a science adviser under U.S. President Barack Obama, explained how policy affects ocean health. TWAS Prize winners also discussed their research, such as work that investigated arsenic pollution in rice crops and work that improved doctors' understanding of migraines and brain damage.

"Every year, we come together to renew our commitment to excellence in science for the developing world. We reaffirm longstanding partnerships and make new friendships. For me, this meeting always renews the inspiration that drives us to pursue our essential mission."

*TWAS President **Bai Chunli** during the opening address to the 25th TWAS General Meeting*

EDUCATION & TRAINING

TWAS manages the world's largest South-South PhD and post-doctoral research fellowship programme. Through the Academy, its associated organizations and their partners, early-career researchers can gain education and experience at world-class science institutions in Brazil, China, India, Iran, Kenya, Malaysia, Mexico, Pakistan, Thailand and South Africa.

TWAS also enables experienced researchers to travel to other developing nations to help that country build expertise in a given field, or to collaborate on new projects and build international partnerships.

◀ Biotechnologist Almas Taj Awan of Pakistan in her lab at University of Campinas in Brazil, where her PhD fellowship work focused on using waste from orange products as a bioethanol source. (Photo provided)

PhD fellowships

350+ OFFERED

12 PARTNERS

7 COUNTRIES

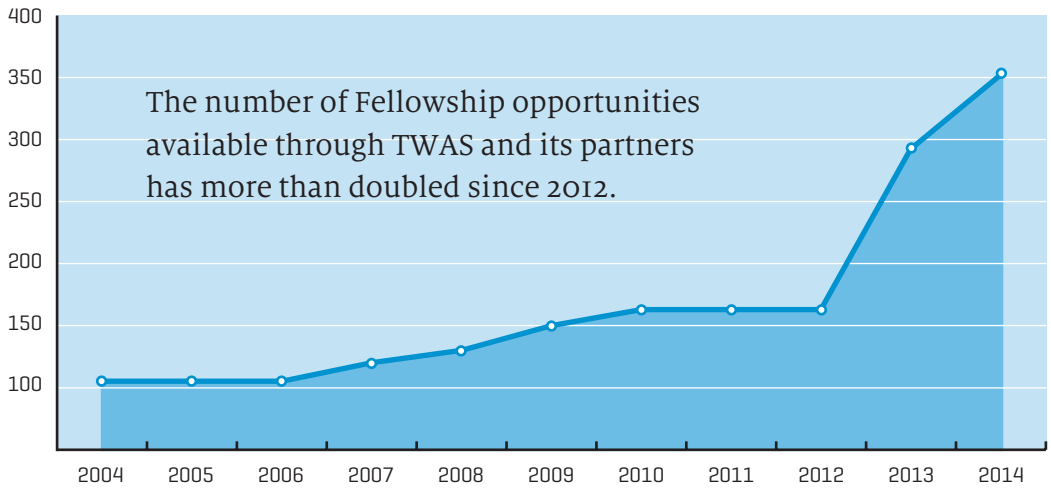
Postdoctoral fellowships

150+ OFFERED

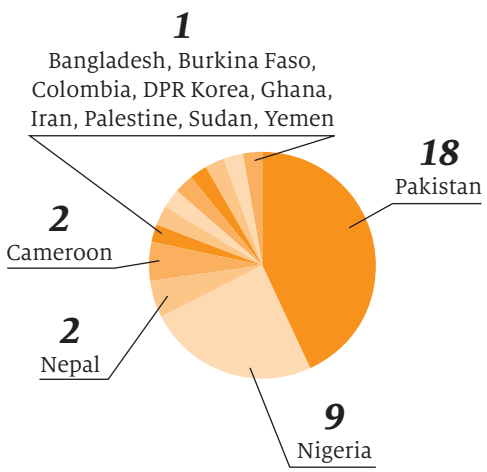
15 PARTNERS

8 COUNTRIES

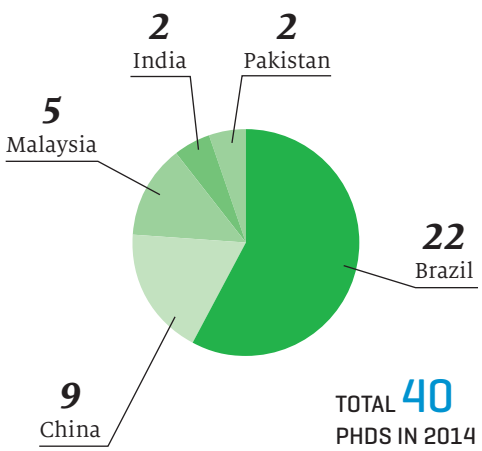
TWAS PhD fellowships



Where are new 2014 PhDs from?



Where did new PhDs get their training?



VISITING RESEARCHERS

TWAS also provides opportunities to established researchers from the South to pursue collaborative research and education in a country other than their own. In 2014, the programmes include:

- **TWAS-UNESCO Associateship scheme**: 18 developing-world scientists from 10 countries
- **TWAS Research and Advanced Training Fellowship Programme**: 10 new fellowships
- **TWAS Research Professors in Least Developed Countries**: 4 professors aiding scientific development in host countries
- **Visiting Expert Programme**: 4 experts aiding scientific development in host countries
- **TWAS-DFG Cooperation Visits Programme**: 31 young African scientists doing postdoctoral research in Germany under the guidance of Deutsche Forschungsgemeinschaft (DFG, or German Research Foundation)

> “CAS-TWAS fellowships programmes are wonderful. They have given scientists from developing countries opportunities to be integrated into the research world and have sound experiences of what it takes to do cutting-edge research.”

Martins Omorogie *of Nigeria, 2014 PhD recipient for work at the National Center for Nanoscience and Technology in Beijing.*

PROGRESS THROUGH RESEARCH

TWAS provides grants to researchers in some developing countries for specialized equipment, consumable supplies and scientific publications. These grants help to lay a foundation for research in countries with scarce resources. A total USD2.97 million in research grants was distributed in 2014.

TWAS grants are split into three categories. TWAS Research Grants for Individuals provide up to USD15,000 to young researchers in 81 countries where resources are scarce. TWAS Research Grants for Groups provide up to USD30,000 to small research groups in those same countries. TWAS awarded

TWAS Grants

87 GRANTS WENT TO MEN (75.7%)

28 GRANTS WENT TO WOMEN (24.3%)

◀ Scientist Tahiana Ramananantoandro of Madagascar used a TWAS grant to better understand the wood density of understudied Malagasy plants. (Photo provided)

TWAS research grant awardee Alain Dikande , left, of Cameroon works with his team to study nerve-related diseases that occur in his home country. The grant allowed Dikande to buy equipment and laboratory materials, like a new server, eight desktop PCs, one printer and a number of accessories. This equipment was useful for complex computer simulations to predict cell behavior.

> Cameroon is a scientifically growing country and this project is the very first of its kind.
>
> ***Alain Dikande***

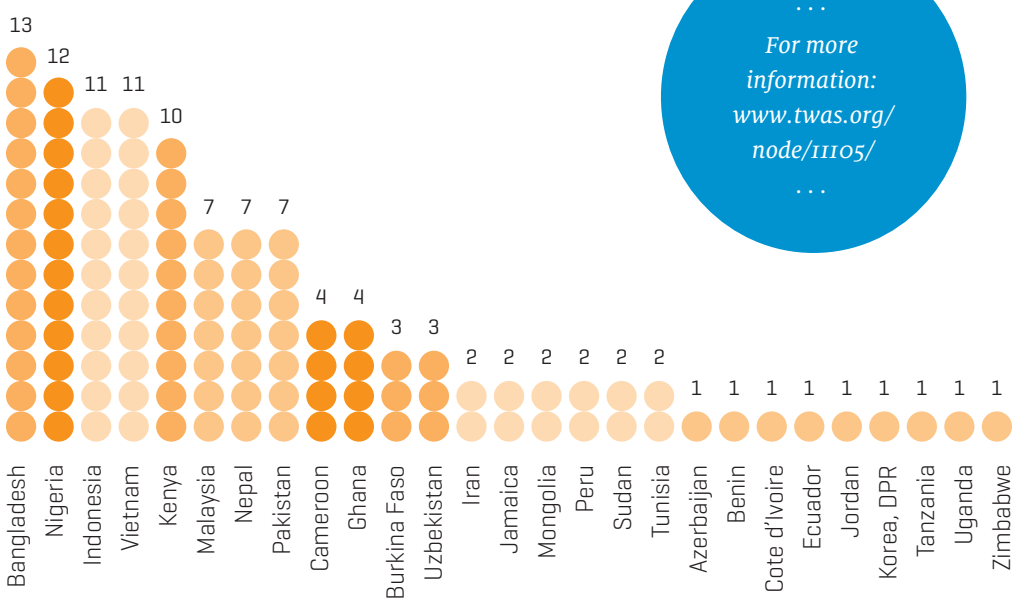
63 individual grants and 31 group grants in 2014. The Swedish International Development Cooperation Agency (SIDA) supports both grant programmes.

TWAS also manages the TWAS-COMSTECH Joint Research Grants programmes, which awarded 21 grants of up to USD15,000 to scientists in member states of the Organisation of Islamic Cooperation (OIC). The programme is supported by the Organisation of Islamic Cooperation's Standing Committee on Scientific and Technological Cooperation (COMSTECH).

Field of use

37 BIOLOGY
35 CHEMISTRY
16 PHYSICS
6 MATHS
5 ENGINEERING, MATERIALS SCIENCE/ NANOTECH, PHARMACEUTICAL SCIENCES
3 INFORMATION TECHNOLOGY AND COMPUTER SCIENCES
2 RENEWABLE ENERGY
1 EARTH SCIENCE

Where did TWAS research grants go in 2014?



For more information: www.twas.org/node/11105/

SUPPORTING SCIENCE POLICY

With an elite network of more than 1,100 scientists from 90-plus countries and 30 years' experience in the global science community, TWAS is ideally positioned to provide advice and support on science policy for the developing world.

In 2014, TWAS was a key participant in several panels and events at which policymakers explored new avenues for using science to build a better world.

The UN Secretary-General's Scientific Advisory Board: Four TWAS Fellows were named to the new Scientific Advisory Board, assigned

◀ TWAS Executive Director Romain Murenzi made frequent presentations before high-level policymaking bodies to support sustainable development in the developing world.

▲ Members of the Science Advisory Board joined UN Secretary-General Ban Ki-moon at the board's inauguration ceremony.

> We are given the opportunity to make a difference and we should not squander this opportunity.
>
> *TWAS Fellow **Zakri Abdul Hamid**, science adviser to the Prime Minister of Malaysia and a member of the UN Scientific Advisory Board*

to provide expertise on global challenges to Secretary-General Ban Ki-moon. The board will address global problems such as water, energy, health and agriculture.
Learn more: www.twas.org/node/6297

The post-2015 sustainable development agenda: TWAS was prominent in several high-level international meetings on how to shape the Sustainable Development Goals (SDGs). In May 2014, at the 17th session of the Commission on Science and Technology for Development in Geneva, Switzerland, Executive Director Romain Murenzi encouraged decision-makers to support an innovation ecosystem in which science can flourish and address local challenges. In July, Murenzi moderated a high-level UN panel on the costs of failing to create a sustainable future.

▼ The first edition of the 2014 TWAS Newsletter explores the importance of science to the Sustainable Development Goals.

'Why Science Matters': The TWAS Newsletter published a special issue on why science is important to the SDGs.
Learn more: http://bit.do/NL1-2014

Higher education in Africa: At a forum organized by Rwandan President Paul Kagame and the World Bank, TWAS joined African leaders to discuss how higher education can better support the continent's emerging strength in science and engineering. Representatives of five African nations ratified an ambitious call to improve university-level science and engineering education through new policies, investments and global partnerships. Murenzi attended, joined by Mohamed H.A. Hassan, co-chair of IAP, the global network of science academies, and treasurer of TWAS.
Learn more: www.twas.org/node/6260

SCIENCE DIPLOMACY

To address regional and global challenges, the world requires effective partnerships between scientists, policymakers and diplomats. With the American Association for the Advancement of Science (AAAS), TWAS is leading a programme that includes lectures, workshops, courses and prizes to build a bridge between the worlds of science and diplomacy.

In 2014, TWAS organized the following science diplomacy events:

Workshops: TWAS hosted three workshops bringing scientists, experts and government officials together on major development issues. The Academy worked with the U.S. National Academy of Sciences and Bibliotheca Alexandrina in Egypt on a workshop in Trieste, Italy, in which 40 scientists from five Middle Eastern and North African countries explored scientific responsibility in bioscience. Another workshop, supported by the Swedish International Development Cooperation Agency (SIDA) and the Environmental Defense Fund (EDF), hosted experts from Latin American countries on sustainable fisheries management in Merida, Mexico. The last brought experts from

▼ Left: Abdulazeez Atta of Nigeria, Lodoysamba Sereeter of Mongolia and Rachel Parker of the United States attend the AAAS-TWAS Science Diplomacy Summer Course. Right: Olubukola Oluranti Babalola of South Africa (centre) receives a certificate from AAAS Center for Science Diplomacy Director Vaughan Turekian (left) and Peter McGrath, TWAS's science diplomacy programmes coordinator.

▲ The third edition of the 2014 TWAS Newsletter explores how developing countries view science diplomacy.

▶ Epidemiologist François Nosten, winner of the TWAS Regional Prize for Science Diplomacy, treats a sick child on the Thai-Myanmar border. (Photo: Shoklo Malaria Research Unit)

Uzbekistan, Tajikistan, Kyrgyzstan, Kazakhstan and India together in Trieste to collaborate on how to mitigate threats to high-altitude agriculture caused by climate change.

Summer Course: AAAS and TWAS brought representatives of 32 nations to Trieste at the first-ever Science Diplomacy Summer Course to explore how science diplomacy may be the key to solving critical global problems. Three dozen scientists, engineers and diplomats gathered for the course to help young scientists learn how to use science diplomacy to improve their country's ability to handle issues ranging from ocean health to infectious disease.
Learn more: www.twas.org/node/6378

Prizes: The Academy's Regional Offices (see page 30) in 2014 offered their annual USD3,000 regional prize to science diplomats who used science to bridge gaps between countries and factions. The prizes went to AIDS researcher Peter Mugyenyi in Uganda; tropical medicine researcher Francois Nosten in Thailand; medical researcher Dorairajan Balasubramanian in India; astroparticle physicist Alberto Etchegoyen of Argentina; and plant biotechnologist Mohamed Farag of Egypt.

> "Scientists can talk in spite of differences between nations, in spite of political tensions."
>
> ***Sergio Jorge Pastrana**, foreign secretary of the Academy of Sciences of Cuba*

Paolo Budinich Science Diplomacy Lectures: TWAS hosted two lectures by prominent scientists. Manju Sharma, former secretary of India's Department of Biotechnology, discussed how biotechnology helps developing countries. Paul van Gardingen, director of the Ecosystem Services for Poverty Alleviation Programme at the University of Edinburgh, UK, discussed how science diplomacy can lead to greater well-being worldwide.
Learn more: www.twas.org/science-diplomacy

The Power of Science Diplomacy: The TWAS Newsletter published a special issue on science diplomacy in the developing world.
Learn more: www.bit.do/NL32014

HONOURING SCIENTIFIC EXCELLENCE

TWAS has long recognized that prizes and awards provide an incentive for scientists to do their best work, while bringing global recognition to advances driven by researchers in the developing world.

The TWAS-Lenovo Prize went to Quarraisha Abdool Karim, a South African epidemiologist and a pioneer of life-saving research that helps protect African women from HIV/AIDS and tuberculosis.

Abdool Karim's discoveries have shaped life-saving clinical guidelines for patients infected with a combination of HIV and tuberculosis in countries across the world. It has also found the potential basis for an HIV vaccine. But her

▼ Prizewinners honoured at the 25th TWAS General Meeting in Muscat, Oman, are among the best scientists in the South.





▲ 2014 prizewinners, from left: Mohamed Fawzy Ramadan; Muntaser Ibrahim; Daniel de Florian; Rajah Rasiah; Quarraisha Abdool Karim.

> South Africa is an important and key population in terms of AIDS research. With our contributions to this field, I think it adds an advantage to have this kind of acclamation. I feel very privileged and honoured to be the recipient of this award.
>
> ***Quarraisha Abdool Karim**, South African AIDS researcher and winner of the 2014 TWAS-Lenovo Prize*

Winners of Young Scientist and AU Prizes

BANGLADESH
UZBEKISTAN
(4 winners each)

SUDAN

CUBA
MONGOLIA
NEPAL
PHILIPPINES
NIGERIA
SOUTH AFRICA

BURKINA FASO
CAMEROON
COLOMBIA
EGYPT
GUATEMALA
IRAN
MALAWI
PAKISTAN
PANAMA
PERU
THAILAND
TRINIDAD AND TOBAGO

most celebrated work is for a finding that could save millions of lives: a study demonstrating the effectiveness of tenofovir gel, a substance that women can use to protect themselves from HIV infection with no cooperation necessary from men.

The prize, worth USD100,000, is one of the most prestigious honours given to scientists from the developing world.
Learn more: www.twas.org/node/8474

Daniel de Florian of the University of Buenos Aires, Argentina, a physicist whose work was used at the Large Hadron Collider to help observe the Higgs boson, was among the 10 winners of the **2014 TWAS Prizes**. Each year the Academy awards eight prizes to individual scientists who have been working and living in a developing country for at least 10 years, celebrating the best of research across the developing world. [For a list of all those who won 2014 TWAS prizes and awards, see the chart on appendix page 39]

Rajah Rasiah of the University of Malaya in Malaysia won the **2014 TWAS-Celso Furtado Prize in Social Sciences** for pioneering research into the relationship between technological capability and economic development. The prize, supported with funding from the Brazilian government, recognizes social scientists in developing countries.

The 2014 C.N.R. Rao Prize went to molecular biologist Muntaser Ibrahim from Sudan for genetics studies on malaria, cancer and other diseases that help scientists understand those diseases and possibly lead to new vaccines. The prize honours distinguished scientists from the developing world's least developed countries, for significant contributions to global science.
Learn more: www.twas.org/node/8479

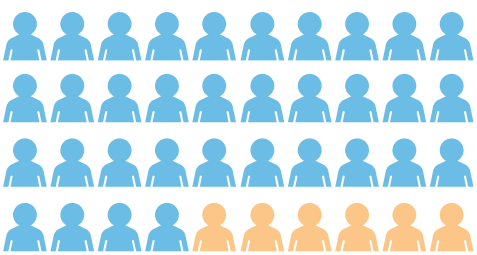
The 2014 Atta-ur-Rahman Prize went to Egyptian biochemist Mohamed Fawzy Ramadan for discovering new chemical compounds that may help develop more nutritious foods. This annual award is given to a chemist under the age of 40 who lives and works in a scientifically lagging country.
Learn more: www.twas.org/node/8483

ADVANCING WOMEN

Supporting women in research across the developing world is a central part of TWAS's mission. The Academy presents numerous opportunities to women, and helps institutions learn how to support women researchers. This can be valuable for the careers of each individual researcher, but it also can play a critical role in activating the full scientific potential of the developing world.

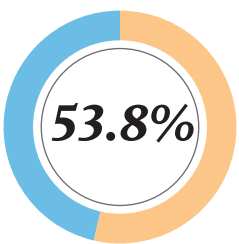
OWSD: The Organization for Women in Science for the Developing World emerged from a conference organized by TWAS in 1988. OWSD is the first international forum to unite eminent women scientists from the developing and developed worlds to strengthen their role in global research and science leadership. It has over 4,000 members, more than 90% of them women scientists in developing countries.

PhDs created by TWAS



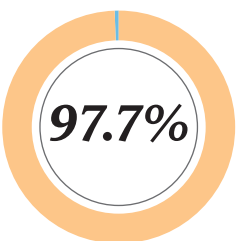
6 OUT OF 40 PHDS CREATED BY TWAS IN 2014 ARE WOMEN (4 FROM PAKISTAN, 1 FROM COLOMBIA, 1 FROM NEPAL)

OWSD fellowships



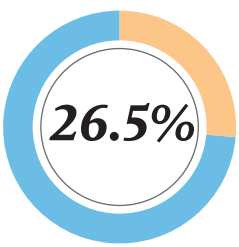
28 OUT OF 52 PHD FELLOWSHIPS WERE AWARDED FROM OWSD TO WOMEN FROM LDCS.

OWSD members



4,289 OUT OF 4,390 MEMBERS OF OWSD WERE WOMEN IN 2014.

TWAS fellowships



38 OUT OF 143 FELLOWSHIP SPOTS AWARDED BY TWAS IN 2014 WENT TO WOMEN.

▲ Winners of the 2014 Elsevier Foundation Awards for Early Career Women Scientists in the Developing World, from left: Eqbal Mohammed Abdu Dauqan (Yemen); Simone Ann Marie Badal McCreath (Jamaica); Taiwo Olayemi (Nigeria); Leni Ritmaleni (Indonesia); and Nilufar Mamadalieva (Uzbekistan). (Photo credit: Alison Bert)

> These five women, like all women undertaking scientific research in developing countries, will certainly have faced challenges on the road to this award. But their determination, commitment and enthusiasm have paid off.

*OWSD President **Fang Xin** of China on the importance of the Elsevier Awards*

Since 1998, OWSD has awarded over 340 PhD fellowships to women from sub-Saharan Arica and Least Developed Countries, of which over 160 have graduated, over 40 are awaiting the awards ceremony and over 100 are onsite. OWSD receives support from the Swedish International Development Cooperation Agency (SIDA).
Learn more: www.owsd.net

GenderInSITE: A new project hosted by OWSD and TWAS, GenderInSITE works to inform policymakers and other decisionmakers about the importance of gender issues in science and science policy. The main message of the initiative is that science, innovation, technology and engineering (SITE) policies for development policy and programmes will be more effective, equitable and sustainable when they reflect the vision, aims, concerns, perspective, knowledge and abilities of both women and men, particularly in the context of development. GenderInSITE is supported by SIDA.
Learn more: www.genderinsite.net

Elsevier Foundation Awards: One of the Academy's key partnerships is with the Elsevier Foundation, funded by the academic publishing company Elsevier. Together with OWSD and TWAS, it organizes the annual Elsevier Foundation Awards for Early Career Women Scientists in the Developing World. Each year five outstanding winners from scientifically lagging countries are selected. Awardees present their research at the AAAS Annual Meeting where international networking opportunities include interviews with local news media and visits to research institutes.

In 2014, the winning women were chemists Leni Ritmaleni of Indonesia; Simone Ann Marie Badal McCreath of Jamaica; Taiwo Olayemi Elufioye of Nigeria; Nilufar Mamadalieva of Uzbekistan; and Eqbal Mohammed Abdu Dauqan of Yemen. They were honoured for research in the biological sciences addressing cancer, malaria and other medical problems.
Learn more: www.twas.org/node/6119

GenderInSITE

GLOBAL ACADEMY NETWORKS

TWAS works in close association with several international science academies dedicated to serving the needs of science and scientists in the developing world and promoting sustainable development. This includes two international networks of academies – IAP, the global network of science academies, and the InterAcademy Medical Panel (IAMP) – headquartered in TWAS's offices in Trieste.

IAP provides a voice for 107 national and regional academies around the world. It helps member academies collaborate to advise policymakers and the public on scientific aspects of critical global issues. In 2014, IAP released a statement on synthetic biology's potential and a call to improve science education across the world. It also worked through its academies' networks to support activities on issues such as women in science and sustainable water management.

iap
iamp

▲ Left: The Inter-American Network of Academies of Sciences Water Program Focal Points Meeting in Panama received funding through IAP. Right: The founding members and board of directors of Academia de Ciencias del Ecuador with TWAS President Bai Chunli. From left: Carlos Soria, TWAS Fellow Santiago Ron, Katya Romoleroux, Bai Chunli, TWAS Fellow Eugenia del Pino, Tjitte de Vries. (Photo: Diego Quirola)

◀ IAP participated in the 2014 International African European Mediterranean Academies for Science Education Conference on Science Education in Rome, Italy.

IAMP, a network of the world's medical academies and academies of science and engineering with active medical sections, is committed to improving global health. Among those efforts in 2014 were a conference in Trieste that brought together academicians and national healthcare policymakers to learn more about the reasons behind health inequalities and policies that can provide more equitable health. IAMP also provided leadership training to 20 Young Physician Leaders at a workshop at the World Health Summit in Berlin, Germany.

The Chinese Academy of Sciences (CAS) historically has had close ties with TWAS, and eminent researcher Bai Chunli serves as president of both. CAS is the highest academic institution and research and development centre in China. It has 100 branch institutes and two universities, and has created numerous commercial enterprises, including Lenovo, the leading global computer company. It collaborates with TWAS on the CAS-TWAS President's PhD Fellowship Programme and the CAS-TWAS Centres of Excellence. In addition, CAS hosts the TWAS Regional Office for East and South-East Asia and the Pacific.

The African Academy of Sciences (AAS) encourages the development of the research and technology base throughout Africa. AAS was founded with the help of TWAS in 1985 in Trieste, Italy. In 2014, AAS served as host of TWAS's Regional Office for sub-Saharan Africa.

The Global Young Academy (GYA) sent representatives to a meeting of major science organizations at TWAS headquarters in February. Also, GYA's co-chair, Sameh H. Soror of Helwan University Cairo in Egypt, participated in 2014's inaugural AAAS-TWAS summer course in science diplomacy.

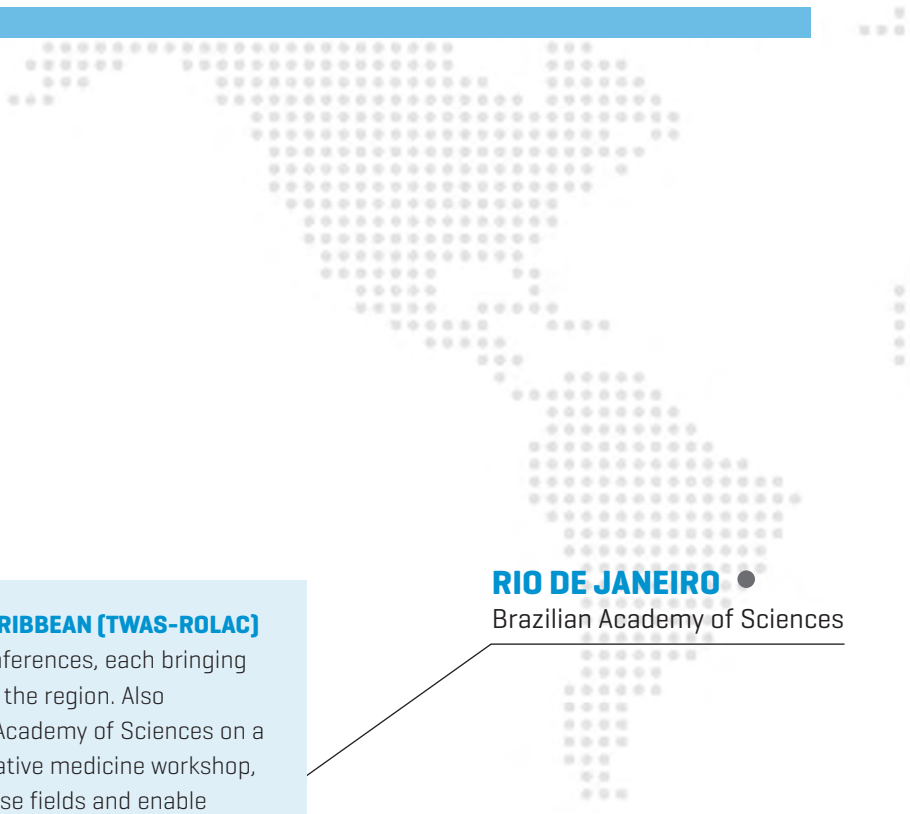
Academy of Sciences of Ecuador (ACE) has received ongoing encouragement from TWAS and IAP. TWAS Fellows were among the leaders who organized the new academy following a visit from TWAS President Bai Chunli in 2013.

> "What's the vision or goal of our Centres? That everything and everyone gets benefits from the cooperation."

***Zeng Qing-Cun**, TWAS Fellow and founder of the CAS-TWAS Centre of Excellence for Climate and Environment Sciences*

REGIONAL OFFICES

TWAS offices in five major regions perform vital functions for the Academy: They nominate scientists for membership and prizes and select Young Affiliates. They organize conferences, and in the process they raise awareness of TWAS and its programmes among scientists in each region. And they help to advance support for science among policymakers and the public throughout the developing world.



RIO DE JANEIRO
Brazilian Academy of Sciences

LATIN AMERICAN AND THE CARIBBEAN (TWAS-ROLAC)
Held two young scientists' conferences, each bringing together 20 participants from the region. Also collaborated with the African Academy of Sciences on a stem cell biology and regenerative medicine workshop, helping to develop skills in these fields and enable networking between African scientists and those from emerging countries.

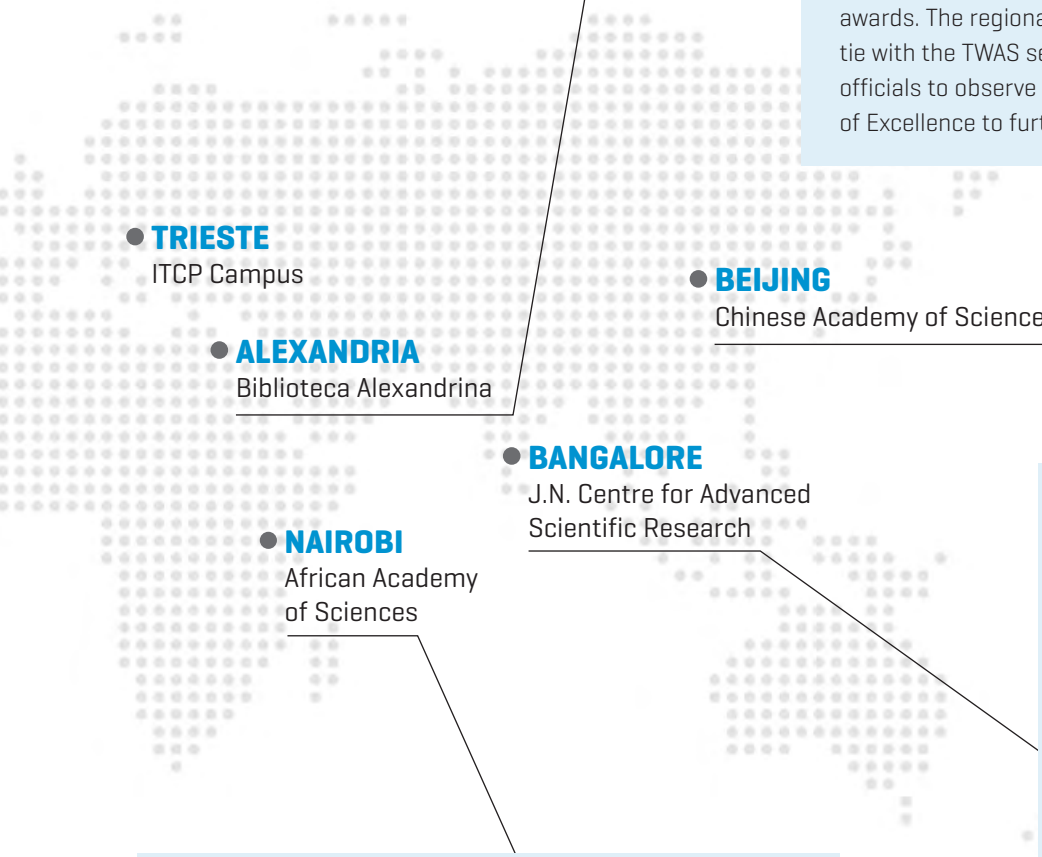
. . .

Learn about the TWAS Science Diplomacy Prize winners, nominated by the Academy's five regional offices: www.twas.org/node/8605

. . .

ARAB REGION (TWAS-ARO)
Held its 10th annual meeting in December on research and innovation for sustainable development in the Arab Region, bringing together TWAS Fellows and Young Affiliates from the Arab Region, along with other distinguished speakers, to share their career experience.

EAST AND SOUTH-EAST ASIA AND THE PACIFIC (TWAS-ROESEAP)
Nominated 47 scientists from countries of the region for TWAS membership, as well as several more for TWAS awards. The regional office also maintained its close tie with the TWAS secretariat, inviting two Academy officials to observe the work of the CAS-TWAS Centres of Excellence to further enhance their cooperation.



CENTRAL AND SOUTH ASIA (TWAS-ROCASA)
Organized a conference attended by over 80 young scientists that focused on research trends in both physical and biological sciences. The office also provided partial travel funding for six young scientists to train at centres of excellence in India and provided travel support to six others to participate in the life sciences forum BioVision.NXT 2014 in France.

SUB-SAHARAN AFRICA (TWAS-ROSSA)
Held a workshop designed to help young scientists further their careers by collaborating with and learning from experts in their fields from India, Brazil and China. One workshop focused on stem cell and regenerative medicine research, the other on a broader scope of biology specialties.

TWAS & ITALY

For over 30 years, TWAS has had a strong, productive relationship with the Italian government. Italy provides core funding to the Academy and makes possible its work to advance science in the developing world. Together, Italy and TWAS have helped developing countries build important skills from the inside, creating an environment in which innovation can thrive.

Here are 2014 highlights of the TWAS and Italian partnership:

Africa Day: High-ranking scientists and diplomats from Africa and Italy met in Rome on 27 May, with TWAS as a featured guest. The event celebrated the strengthening of African research and assessed important challenges that lie ahead. Organized by the Italian Ministry of Foreign Affairs, it confirmed a shared goal of cooperating to build science, good governance and economic development in Africa to achieve stability and prosperity.
Learn more: www.twas.org/node/6342

Trieste Next: For the annual science showcase in Trieste, Italy, TWAS hosted a panel of experts on renewable energy sources in developing countries. The Trieste Next panel included environmental engineer Myriam Amezcua Allieri of the Mexican Petroleum Institute; nanotechnologist Bao Xinhe of the Chinese Academy of Science; and electrical engineer Carlos Meza-Benavides of the Costa Rica Institute of Technology. Allieri and Bao's participation was conducted via satellite

▼ Participants in the Africa Day celebration, from left: Minister Roberto Cantone; Italian Ministry of Foreign Affairs Undersecretary Mario Giro; Italian Embassy Counselor Pier Attinio Forlano; and Marièm Aouffa, Mauritania's interim ambassador to Italy.

▲ TWAS worked with ICTP and the government of Rwanda to bring Rwandan President Paul Kagame to Trieste for ICTP's 50th Anniversary celebration. [Photo: ICTP]

link-up to save energy costs and reduce carbon emissions.

OrvietoScienza: TWAS and "Seeds of Science", a documentary about the Academy's work in Kenya, were honoured at OrvietoScienza, a science festival in the Umbrian city of Orvieto. The event convened Italian scientists, journalists and high school students to debate a range of modern challenges. The festival focused on science and law and gave students the opportunity to screen their own documentaries while discussing issues with experts from the region.
Learn more: www.twas.org/node/6320

> The Trieste System and TWAS itself have had a role in shaping many new generations of young scientists, and this gives Italy and our language an international weight, weaving links that involve diplomacy as well.

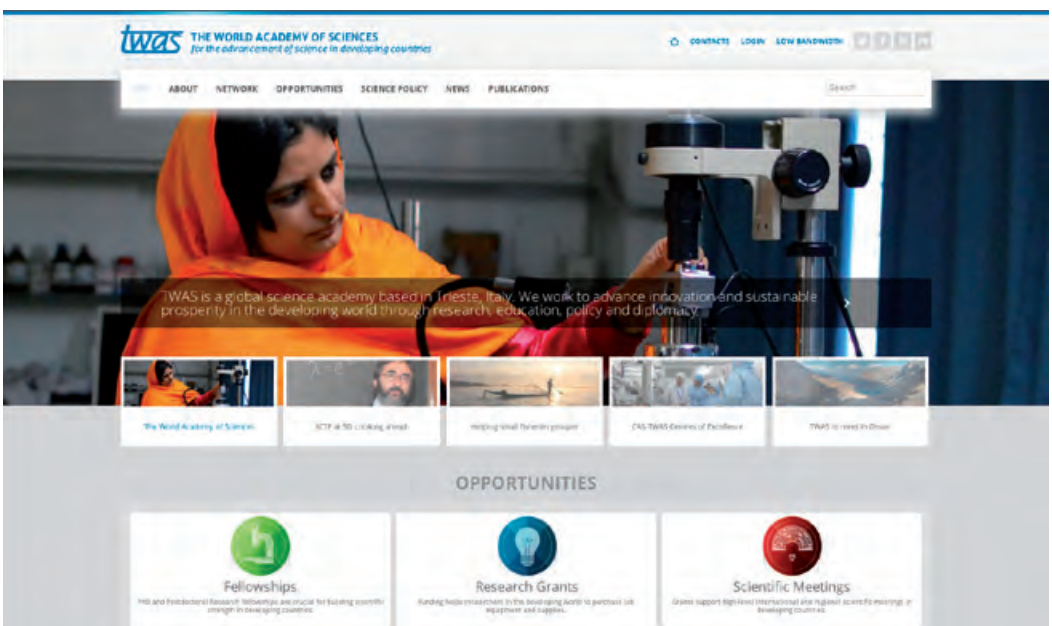
***Mario Giro**, undersecretary of the Italian Ministry of Foreign Affairs*

A STORY TO COMMUNICATE

To influence global science and science policy most effectively, TWAS must convey its ideas and work to an international audience that includes not just scientists, but policymakers, journalists, educators, students and the public. For the TWAS Public Information Office (PIO), 2014 was a year of transformation.

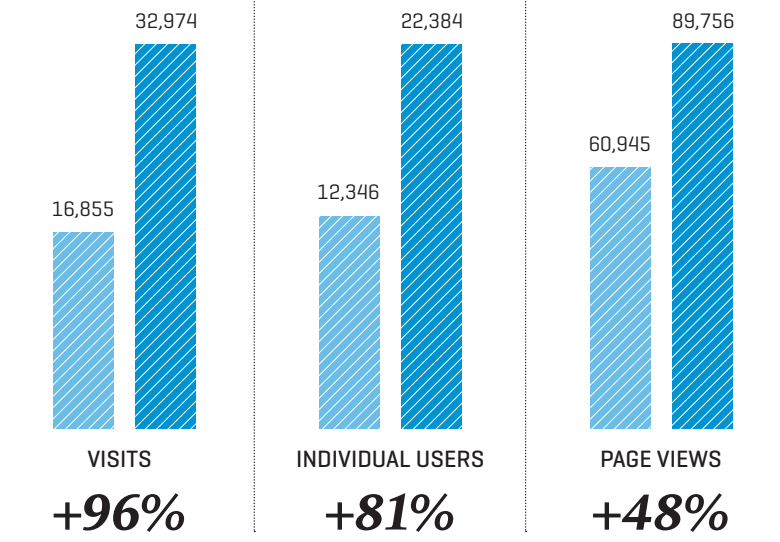
www.twas.org: TWAS launched its new website, with a fresh new look and improved navigation. The Academy also offered new versions of the website for smartphones and tablets and for low-bandwidth users. The response has been positive. From the period of 11 February 2014 to 11 March 2014 to the same period in 2015, the site's Web traffic has seen significant growth.

▶ The TWAS Newsletter reported special features on Oman's rapid development in science and technology and on how developing nations are making an impressive impact in the space sciences.

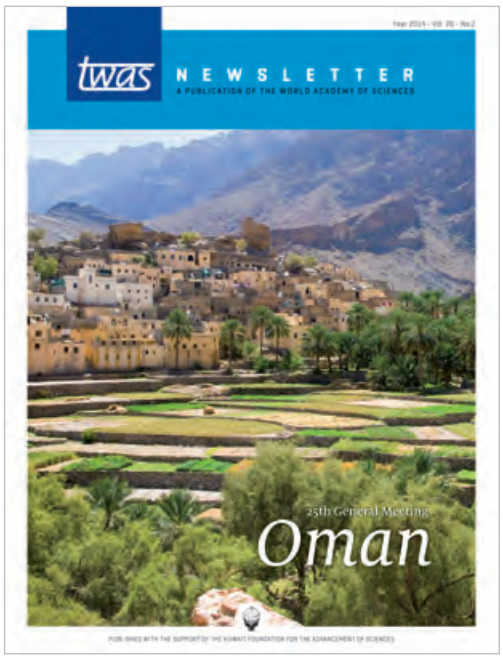


◀ TWAS launched its new website, twas.org, in 2014.

www.twas.org

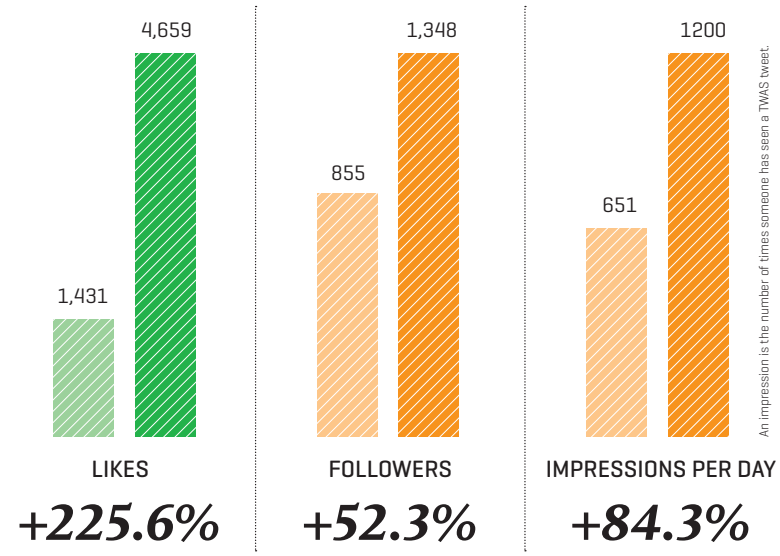


Comparing the period of 11 February 2014 to 11 March 2014 to the same period in 2015. Source: Google Analytics



Facebook

Twitter



From January to December 2014.

Social Media: 2014 was the first full year of an ambitious commitment to social media. The Public Information Office used Facebook and Twitter to disseminate TWAS news and other news about science and engineering in the developing world, and to draw readers to the TWAS website and Newsletter.

TWAS Newsletter: The quarterly publication, supported by the Kuwait Foundation for the Advancement of Sciences (KFAS), was redesigned to achieve a contemporary magazine style. It has been re-oriented toward in-depth special reports that tap the expertise of the TWAS community for insight on high-priority issues related to science in the developing world. And for the first time, the Newsletter is printed on sustainably produced paper.

FINANCIAL REPORT 2014

TWAS received a total of USD6,274,722 in funding for 2014, including USD26,967 in individual contributions. We are grateful for the generous contributions from our numerous supporters, some of them who have aided our work for many years, and others who have joined our team more recently. Their investments make our challenging and critical work in the developing world possible.

INDIVIDUAL CONTRIBUTIONS (IN USD)

TWAS Regular Fund	
Rao, C.N.R. India	5,000.00
Atta Ur Rahman, Pakistan	4,978.00
Abbasov, Ali M., Azerbaijan	3,000.00
Lee, Shih-Chang, Taiwan, China	3,000.00
Mohan, Viswanathan, India	1,000.00
Wong, Henry Nai Ching, China	1,000.00
El-Ashry, Mohamed Taha, USA	100.00
Total	**18,078.00**

TWAS Endowment Fund	
Katiyar, Sarvagya Singh, India	4,100.00
Palis, Jacob, Brazil	2,141.59
McGrath, Peter, UK	2,046.29
Cerda, Arcadio Alberto, Chile	300.00
Crewe, Robin, South Africa	100.00
Upreti, Bishal Nath, Nepal	100.00
de la Peña, José Antonio, Mexico	50.83
Cetto Kramis, Ana Maria, Mexico	50.82
Total	**8,889.53**

Grand Total	**26,967.53**

FINANCIAL REPORT 2014 (IN USD)

INCOME[1] 2014	
Balance	1,748,947
1] Ministry of Foreign Affairs, Italy	2,132,056
2] Swedish International Development Cooperation (Sida)	1,845,193
3] Government of Sultanate of Oman Through the Ministry of Higher Education, the Research Council and Sultan Qaboos University	200,000
4] COMSTECH, Pakistan	100,000
5] Lenovo Group Limited, China	100,000
6] AAAS, USA	78,500
7] Kuwait Foundation for the Advancement of Sciences (KFAS)	50,000
8] Elsevier Foundation, USA	50,000
9] Ministry of Research, Science and Technology, Iran I.R.	46,475
10] The French Foundation for Rare Diseases	20,408
11] African Union, Ethiopia	20,000
12] US NAS, USA	133,255
13] Academia Sinica, China (Taiwan)	24,783
14] CNR Rao, India	5,000
15] Atta-Ur-Rahman, Pakistan	4,978
16] Academia Chilena de Ciencias, Chile	5,948
17] Other small contributions	8,100
18] Interest income	16,865
19] Exchange difference	-1,554
20] Transfer to TWAS Endowment Fund (Interest)	-314,232
	6,274,722

EXPENDITURE 2014	Budget	Spent
1) Prizes		
1.1) Trieste Science Prize/TWAS Lenovo Science Prize	105,000	101,986
1.2) TWAS Prizes and Medals	145,000	140,011
1.3) Prizes for Young Scientists	30,000	27,000
1.4) CNR Rao and Atta-Ur-Rahman Prize	10,000	10,000
Sub-Total for (1)	290,000	278,997
2) Research Grants	3,050,000	2,973,165
3) Fellowships, Associateships and Professorships		
3.1) Fellowship Programmes	600,000	473,873
3.2) Associateship, Professorship & Visiting Programmes	250,000	244,611
Sub-Total for (3)	850,000	718,484
4) Meetings		
4.1) Council and General Meetings	50,000	196,169
4.2) Officers and Steering Committee Meetings and Meetings in Trieste	40,000	47,254
4.3) Scientific Meetings in the South	70,000	89,906
Sub-Total for (4)	160,000	333,329
5) Publications	100,000	104,701
6) Joint Projects		
6.1) TWAS Regional Offices	450,000	360,276
6.2) TWAS/COMSTECH Research Grant	200,000	200,000
6.3) Elsevier Women Prizes	50,000	59,071
6.4) TWAS – ICTP Projects	50,000	50,000
6.5) AU – TWAS Young Scientists National Award	100,000	55,000
6.6) ISTIC – TWAS Project	17,000	
6.7) International Science Diplomacy Programme	50,000	92,188
6.8) MENA		115,255
6.9) TWAS - AAAS Central Asian Workshop		43,000
Sub-Total for (6)	917,000	974,790
7) Operational Expenses		
7.1) Staff Costs	1,300,000	1,299,959
7.2) ICTP Services	75,000	75,000
7.3) Communications	40,000	38,641
7.4) Travels	30,000	32,366
7.5) Library, office and other supplies	35,000	39,520
7.6) Other general operating expenses	35,000	39,258
Sub-Total for (7)	1,515,000	1,524,744
Total Expenditure	6,882,000	6,908,210
Savings on prioy years' obligations		649,300
Excess (shortfall) of income over expenditure		**15,812**

Reserve Fund[2]	
Amount available at the beginning of period	**2,790,816**
End of service entitlements	-3,057
Reserve Fund balance end of period	**2,787,759**
Reserve and Regular Fund balances, end of period	**2,803,571**

[1] All contributions are expressed in US dollars and have been converted using the UN official rate of exchange in effect at the time the contributions were received.

[2] The purpose of the Reserve Fund is to cover the end-of-service entitlements of TWAS Staff.

Even small donations directly support the advancement of science, engineering and technology in developing nations and demonstrate commitment to the Academy's vital mission. To make a donation, please visit **www.twas.org/support-twas**

TWAS FELLOWS ELECTED IN 2014

Agricultural Sciences
ABDURAKHMONOV, Ibrokhim (Uzbekistan)
DATTA, Swapan (India)
GROSSI DE SA, Maria Fatima (Brazil)
HAN Bin (China)
MUNNS, Rana (Australia)
OMAR ASEM, Samira (Kuwait)

Structural, Cell and Molecular Biology
CHARY, Venkata Ramana Kandala (India)
SALUNKE, Dinakar (India)
SHAHA, Chandrima (India)
TSAI Ming-Daw (Taiwan, China)

Biological Systems and Organisms
ALLEYNE, Trevor (Barbados/Trinidad & Tobago)
BRAHMACHARI Samir Kumar (India)
MAJUMDER, Hemanta K. (India)
MGAYA, Yunus (Tanzania)
RON, Santiago (Ecuador)

Medical and Health Sciences incl. Neurosciences
CORREA-OLIVEIRA, Rodrigo (Brazil)
CUNHA, Fernando Q. (Brazil)
ELGOYHEN, Ana Belén (Argentina)
GAO, George Fu (China)
MUTABINGWA, Theonest Kahangwa (Tanzania)
SALOTRA, Poonam (India)

Chemical Sciences
ALVES, Oswaldo Luiz (Brazil)
KURODA, Reiko (Japan)
LI Yadong (China)
PATI, Swapan Kumar (India)
TIAN Zhong-Qun (China)
ZHAO Jincai (China)

Engineering Sciences
AL-SULAIMAN, Sabah Ahmed Abdul-Wahab (Oman)
CHEBIYYAM, Siva Ram Murthy (India)
CHENG Hui-Ming (China)
TAN Tieniu (China)

Astronomy, Space and Earth Sciences
FERESU, Sarah (Zimbabwe)
JIAO Nianzhi (China)
MIRABEL, Igor-Feliz (Uruguay)
ZHAI, Mingguo (China)

Mathematical Sciences
LI Ker-Chau (Taiwan, China)
N'GUEREKATA, Gaston Mandata (Central African Republic)
SRINIVAS, Vasudevan (India)

Physics
MUKHI, Sunil (India)
PÁLINKÁS, József (Hungary)
PIMENTA, Marcos (Brazil)
WU Yueliang (China)
ZEILINGER, Anton (Austria)

Social and Economic Sciences
KUAN Chung-Ming (Taiwan, China)
LUTZ, Wolfgang (Austria)
ZHANG Linxiu (China)

PRIZES AWARDED IN 2014

TWAS-Lenovo Prize
- Quarraisha Abdool Karim (South Africa)

TWAS Medal Lectures
- Chen Sai Juan (China)
- Salma M.Z. Al-Kindy (Oman)
- Jane Lubchenco (United States)

TWAS Prizes
- Fusuo Zhang (China) won the agricultural sciences prize for his work to improve food production and efficient usage of nutrients in Chinese agriculture.
- Marcelo Rubinstein (Argentina) won the biology prize for his work on the genetics of appetite, addiction and obesity.
- Yi Xie (China) won the chemistry prize for her work in nanoscale chemistry that has the potential to improve waste conversion and solar energy technology.
- Sun-Lin Chung (Taiwan, China) won the earth sciences prize for his work on Tibetan tectonic history, shedding light on how mountains of the region were formed.
- Viswanathan Kumaran (India) shared the engineering prize for work improving the understanding of the flow of fluids through soft-walled tubes and channels.
- Chih-Yuan (C.Y.) Lu (Taiwan, China) shared the engineering prize for work contributing to the advancement of the semiconductor industry in Taiwan.
- Ya-xiang Yuan (China) won the mathematics prize, for his use of algorithms for problem-solving programmes useful to economics, management, industry, and other areas.
- Tse Wen Chang (Taiwan, China) shared the medical sciences prize for his development of a new therapy used globally for treating severe persistent asthma.
- Irene Oi Lin Ng (China) shared the medical sciences prize for her contributions to understanding how liver cancer emerges.
- Daniel de Florian (Argentina) won the physics prize for his work helping to enable the discovery of the Higgs boson at the Large Hadron Collider.

TWAS-Celso Furtado Prize in Social Sciences
- Rajah Rasiah (Malaysia)

C.N.R. Rao Prize for scientific research
- Muntaser Eltayeb Ibrahim (Sudan)

Atta-ur-Rahman Prize in Chemistry
- Mohamed Fawzy Ramadan Hassanien (Egypt)

TWAS Regional Prizes for science diplomacy
- Alberto Etchegoyen (Argentina)
- Mohamed Farag (Egypt)
- Dorairajan Balasubramanian (India)
- Francois Nosten (Thailand)
- Peter Mugyenyi (Uganda)

Elsevier Foundation Awards for Early-Career Women Scientists in the Developing World
- Leni Ritmaleni (Indonesia)
- Simone Ann Marie Badal McCreath (Jamaica)
- Taiwo Olayemi Elufioye (Nigeria)
- Nilufar Mamdalieva (Uzbekistan)
- Eqbal Mohammed Abdu Dauqan (Yemen)

TWAS Prizes for Young Scientists in Developing Countries
- Mohammad Amir Hossan (Bangladesh) environmental sciences
- Shaikh Anowarul Fattah (Bangladesh) electrical and computer engineering
- Mirza Hasanuzzaman (Bangladesh) agronomy
- Md. Faruk Hossain (Bangladesh) engineering
- Rafael Julián González Hernández (Colombia) physics
- Tania Farías Piñeira (Cuba) chemistry
- Andrés Gago Alonso (Cuba) computer sciences
- Alex Guerra Noriega (Guatemala) climate change, geography and environment
- Ahmad Sheykhi (Iran) physics
- Tsernchunt Gansukh (Mongolia) biochemistry
- Byambajav Munkhbat (Mongolia) physics
- Hemu Kharel Kafle (Nepal) physics
- Ram Chandra Poudel (Nepal) biology
- Arif-ullah Khan (Pakistan) pharmacology
- Sandra López Vergés (Panama) medical sciences
- Rudy Jose Rosas Bazan (Peru) mathematics
- Thomas Edison dela Crus (Philippines) biology
- Ian Kendrich C. Fontanilla (Philippines) biology
- Narattaphol Charoenphandhu (Thailand) biology
- Llinersy Uranga Pina (Trinidad and Tobago) physics
- Ahmadjon Abdujabbarov (Uzbekistan) physics
- Khayrulla Bobakulov (Uzbekistan) chemistry
- Tatyana Hegay (Uzbekistan) biology
- Yusofjon Tillayev (Uzbekistan) astronomy

African-Union-TWAS Awards
- Drissa Sereme (Burkina Faso) life and Earth sciences
- Felix Kembe Assah (Cameroon) life and Earth sciences
- Ahmed Mahmoud Abd El-Wahab Youssef (Egypt) Basic Sciences, Technology and Innovation
- Maurice Monjerezi (Malawi) life and Earth sciences
- Adewale Adewuyi (Nigeria) Basic Sciences, Technology and Innovation
- Festus Basden Chiedu Okoye (Nigeria) life and Earth sciences
- Keren Middelkoop (South Africa) life and Earth sciences
- Daniël Christiaan de Wet Swanepoel (South Africa) Basic Sciences, Technology and Innovation
- Mohammed Sulieman Ali Eltoum (Sudan) Basic Sciences, Technology and Innovation
- Gamar Eldeen Osman Magdoleen (Sudan) life and Earth sciences
- Nashwa Abbas Farah Ibrahim Mohamed (Sudan) Basic Sciences, Technology and Innovation

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