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NEWSLETTER

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UN Scientific Advisory Board





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▲ Four international science organisations and the government of Italy hosted the UN Secretary-General's Scientific Advisory Board in Trieste, Italy. [Photo: ICTP photo archives]; Microbiologist and conference attendee Flor Pujol. [Photo: Demis Albertacci]

Cover picture: The Prefecture building of Trieste, Italy, in Piazza dell'Unità d'Italia. [Photo: Paola Di Bella]

▼ Princess Sumaya bint El Hassan of Jordan, a globally respected science advocate, emphasized the importance of science cooperation among Arab states during an interview with TWAS. [Photo: Demis Albertacci]



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EDITORIAL

SCIENCE AND POLICY – A MODEL OF COOPERATION



▲ Mohamed H.A. Hassan,
TWAS executive director
[interim]

When United Nations Secretary-General Ban Ki-moon convened the first meeting of the Scientific Advisory Board in 2014, he set an important mission: to strengthen the dialogue between scientists and policymakers, so that the science could make a robust contribution to deliberations on sustainable development and other issues.

The secretary-general assembled an extraordinary team of international scientists, and in September, they delivered a final report that assessed issues ranging from food security and climate change to the value of indigenous knowledge and the power of the data revolution. All of these topics are central to the pursuit and achievement of the UN's Sustainable Development Goals (SDGs).

But Secretary-General Ban and the Board achieved another success, less noticed, yet worthy of close attention: They sent a signal to the world about the central role of science in policy – not just at the United Nations, but at every level, and in every nation.

The mission to achieve the SDGs by 2030 makes the scientist-policymaker relationship more salient, and more urgent. Among the 17 goals and 169 targets, many have a strong component of science or social science.

TWAS and our associated organisations have long worked to connect scientists and policymakers. For many years, the annual TWAS General Meeting has featured a session that brings together top researchers with science ministers and other high-level government officials; we will hold that session again this year at our meeting in Kigali, Rwanda. The Organization for Women in Science for the Developing World (OWSD) and GenderInSITE, a project hosted by TWAS, both have worked to bring issues about gender in science to the attention of policymakers.

Another associated organisation, the InterAcademy Partnership (IAP), regularly

issues reports and statements on science policy, reflecting the collective expertise of world's science academies. IAP's annual conference in South Africa last March focused on providing science advice to governments.

Perhaps this record helped to persuade the Scientific Advisory Board to hold its final meeting in Trieste. The event was organised and hosted by UNESCO, in cooperation with four international organisations based in Trieste: the Abdus Salam International Centre for Theoretical Physics; the International Centre for Genetic Engineering and Biotechnology, IAP; and TWAS.

Each of the organisations made presentations to the board, both in business meetings and in a public session. The two-day meeting also featured presentations by a wide range of TWAS allies and partners, including the Italian Ministry of Foreign Affairs and International Cooperation and the Italian National Research Council. Debora Serracchiani, president of the Italian region of Friuli-Venezia Giulia, made an inspiring speech.

During the Trieste meeting, board members worked intensively to refine and finalise many of the papers that were included in the final report to the Secretary-General. At TWAS, we are proud that five of our Fellows have served on the panel: Abdallah Daar of Oman; Reiko Kuroda of Japan; Carlos Nobre of Brazil; Zakri Abdul Hamid of Malaysia; and Nobel laureate Ahmed Zewail of Egypt.

Sadly, Prof. Zewail passed away in August, before the final report was complete. But we are confident that the work done by him and his Board colleagues will have a valuable influence long into the future.

Mohamed H.A. Hassan,
TWAS Executive Director [interim]
President, InterAcademy Partnership (IAP)

TWAS NEWSLETTER

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IN THE NEWS

UNESCO warns of “massive” teacher shortage

Almost 69 million teachers need to be recruited around the world by 2030 if international pledges on education are to be kept, warns UNESCO.

The United Nations agency’s estimate is for the number of teachers required to meet the promise of primary and secondary places for all children. The biggest gaps in staffing are in sub-Saharan Africa and southern Asia. The UNESCO report says there needs to be a “seismic shift” in recruitment to overcome “massive shortages”.

BBC:

www.bit.do/BCCTeachers



India joins Paris climate pact

India formally joined the Paris Climate Change Agreement by submitting its instrument of ratification at UN headquarters in New York on 2 October.

By putting its seal on the climate deal, the country will now urge the global community to adopt the ‘Gandhian way of life’ and shun extravagant lifestyles to reduce carbon footprints and protect the Earth from adverse impact of climate change. India will articulate its point vigorously during the next climate conference at Marrakech in Morocco, beginning 7 November.

Times of India:

www.bit.do/IndiaAccord

Sri Lanka eliminates malaria

The WHO formally declared Sri Lanka malaria-free in September. Experts attribute the victory to a concerted effort by multiple programmes acting in concert with a robust national healthcare system.

The number of Sri Lankan malaria cases was drastically reduced through focused fighting for a quarter-century, said Hemantha Herath, deputy director of Sri Lanka’s anti-malaria campaign. From 264,549 reported cases in 1999, Sri Lanka saw its last locally reported case in October 2012.

SciDevNet:

www.bit.do/SciDevMalaria

Local languages for Africa's internet?

Promoting local languages and providing relevant, homegrown content could increase internet adoption across the African continent, a new report finds.

The report, published by the non-profit Internet Society, finds that despite increased access to mobile and telecom infrastructure in Africa, internet adoption is still lagging. The continent’s full connectivity is being hampered by the lack of pertinent programmes targeting its mobile users, and the availability of those programmes in their own languages, says the report.

Quartz:

www.bit.do/LocalLanguages

More Vietnamese research urged

At an international workshop in Quy Nhon City, Vietnam, foreign and Vietnamese scientists agreed that Vietnam needs more international institutes where young scientists can do research.

Binh Dinh province has introduced a number of incentives to encourage scientific research. The province has hired foreign architects to develop a 130-hectare scientific urban area in Quy Hoa. Additionally, two American Physics Nobel Prize winners, David Gross and Jerome Friedman, have pledged to support the establishment of scientific research institutes in Vietnam.

Vietnam.net:

www.bit.do/VietnamSci



UN SCIENTIFIC ADVISORY BOARD

PEOPLE-CENTERED, PLANET-FRIENDLY

Board member Tanya Abrahamse, a South African biodiversity expert, speaks during the public session of the UN Scientific Advisory Board in Trieste, Italy. [Photo: ICTP photo archives]



At a meeting in Italy co-hosted by TWAS and IAP, the United Nations Scientific Advisory Board advanced proposals for sustainable development in climate, food and health.

 by Sean Treacy

Humanity is at a pivotal juncture. Medical and agricultural sciences have saved countless lives while also supporting stunning population growth. Energy technology has provided power and transportation to people on an unprecedented scale while also driving the climate change that endangers habitats worldwide. How do we preserve these advances while at the same time managing their unintended consequences?

This tension is a core challenge of sustainable development, and it's a test that cannot be passed without the help of science. That challenge took centre stage in Trieste, Italy, as some of the world's sharpest minds on science, policy and development issues gathered for the fifth meeting of the United Nations Scientific Advisory Board appointed by Secretary-General Ban Ki-moon.

The board, which has included five TWAS Fellows, convened to form recommendations on how to maximize science's contribution to achieving the Sustainable Development Goals, an historic effort to eliminate human poverty and protect the planet's environmental health by meeting 17 goals and 169 targets, all by 2030.

"The 2030 Agenda is a people-centred, planet-friendly framework to build a life of dignity for all and leave no one behind," Ban said in a video message that opened the meeting. "Science is essential to moving this ambitious agenda forward. We need to help ensure that decisions are informed by the best available knowledge. That means integrating cutting-edge science into policy."

"The world is calling out for science," added Irina Bokova, UNESCO's director-general, in a message read by UNESCO Assistant Director-

General for Natural Sciences Flavia Schlegel. "We need a new focus on the sciences, to promote equitable and inclusive growth, to eradicate poverty, to bolster energy, water and food security, to control disease, to mitigate disasters, and to build sustainable cities."

The meeting convened on 24-25 May in Trieste, and it provided the last discussion forum on the Board's recommendations before presenting its final summary report to Ban in September. [For more on the final report, see page 14.] The board plans to release more detailed policy briefs on the issues of climate change and food security before the end of 2016.

The event put Trieste on an international stage, highlighting the presence of numerous world-class science institutions in the city while attracting local journalists and others from Rome, London, Turin and Slovenia. It was hosted by UNESCO, in cooperation with four Trieste-based international scientific institutions: the Abdus Salam International Centre for Theoretical Physics [ICTP]; the InterAcademy Partnership [IAP]; the International Centre for Genetic Engineering and Biotechnology [ICGEB]; and TWAS. Three other partners provided key support: the Italian Ministry of Foreign Affairs and International Cooperation; the Autonomous Region of Friuli Venezia Giulia; and Italy's National Research Council.

SHAPING THE FUTURE

The Scientific Advisory Board was formed in 2014 to provide the UN Secretary-General with a direct link to scientific advice. Through it, researchers can present key advice on a range of issues that dominate the global agenda.

The board brought together eminent



scientists from all regions of the world to devise a plan for how science can help resolve global challenges, taking into consideration natural and social sciences as well as local and indigenous knowledge systems. Twenty-six scientists from 25 nations sat on the board, including leading experts in nature conservation, public health, engineering, energy, agronomy and other fields. Together, the board members develop strategies to shape international policies and provide scientific data on global issues. UNESCO hosts the Board's secretariat.

In Trieste, board members intensively discussed the issues in business meetings. Ultimately, they decided to keep working to improve policy briefs on science for sustainable development; on how to recognize local and indigenous knowledge as a crucial component for sustainability and resilience; on climate change as an issue of resilience and risk management; and on how to accomplish worldwide food security. The first two of

“ The Board’s work is giving science a voice worldwide, as well as recognition of the importance of science for the future of our world. ”

Fernando Quevedo

those briefs – on sustainable development and indigenous knowledge – have since been released.

The board’s membership has included five TWAS fellows: Abdallah Daar from Tanzania, professor of public health at the University of Toronto, Canada; Reiko Kuroda, a Japanese chemist with the Tokyo University of Science who formerly served on the Japanese prime minister’s science and technology policy advisory board; Brazilian climate expert Carlos Nobre, a key member of the Nobel Peace Prize-winning Intergovernmental Panel on Climate Change; Malaysian scientist Zakri Abdul Hamid,

the science adviser to the prime minister of Malaysia and the founding chair of the UN Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services; and Ahmed Zewail, an Egyptian Nobel laureate in chemistry [who passed away in August]. Daar, Kuroda, Nobre and Zakri were present for the May meeting.

“The scientific community had been asking to be heard by policymakers and political leaders as early as the issue of sustainable development had been brought up-front in global debates,” said Zakri, a genetics and biodiversity conservation expert, when the board was first formed. “The establishment of the UN scientific board is essentially a response to this incessant request.”



▲ Flavia Schlegel, UNESCO assistant director-general for natural sciences



▲ An audience member listens during the UN Scientific Advisory Board’s open session. (Photo: ICTP photo archives)

Other members of the prestigious panel include Italian physicist Fabiola Gianotti, director of the European Organization for Nuclear Research (CERN), one of the discoverers of the Higgs boson; Princeton University materials scientist Wole Soboyejo, originally from Nigeria and former president of the African University of Science and Technology; and Saudi biotechnologist Hayat Sindi, founder and president of the Institute for Imagination and Ingenuity in Saudi Arabia. Gebisa Ejeta of Ethiopia, the winner of the 2009 World Food Prize, led efforts on the policy brief for food and health. Joji Cariño of the

Find a video recording of the UN Scientific Advisory Board press conference: www.bit.do/SciBoardPressConf

Find a video recording of the Board’s high-level open session: www.bit.do/SciBoardOpenSession



▲ The UN Secretary-General's Scientific Advisory Board focused on a range of issues during its discussions. [Photo: ICTP photo archives]

Philippines, the former director of the Forest Peoples Programme, led work on the policy brief on indigenous knowledge.

In their reflections on harnessing the potential of science for sustainable development, the board stressed the need to recognize science as a universal public good that empowers people to find the solutions they need. Member Jörg Hacker, president of the German National Academy of Sciences-Leopoldina, led efforts to define core principles that underpin science's role in development, such as enhancing diversity, strengthening science education and promoting interdisciplinary cooperation.

The board also heard from high-level observers attending the meeting, including Romain Murenzi, then-executive director of TWAS; Mohamed Hassan, president of the InterAcademy Partnership (IAP); Gordon McBean, president of the International Council

for Science (ICSU); Alberto Martinelli, president of the International Social Science Council (ISSC), and Elena Manaenkova, assistant secretary-general of the World Meteorological Organization (WMO).

A CITY FOCUSED ON GLOBAL SCIENCE

Given the status of the scientists and the high profile of their priority issues, the meeting drew close interest from local students, the public and journalists.

The event included a press conference attended by Italian media organizations. It was immediately followed by a High-Level Open Session, in which leaders of the Trieste-based host institutions stressed the importance of the board's work. Luigi Amodio, director general of the City of Science interactive science centre in Naples, served as master of ceremonies, underscoring the breadth of the international science networks in Italy.

► From left: InterAcademy Partnership President Mohamed H.A. Hassan; Friuli Venezia Giulia President Debora Serracchiani; then-TWAS Executive Director Romain Murenzi; Abdus Salam International Centre for Theoretical Physics Director Fernando Quevedo.





Debora Serracchiani, the president of the Friuli Venezia Giulia region in northeastern Italy, said the region is distinguished by the presence of prestigious scientific institutions such as those that hosted the board. “Over time,” she said, “Friuli Venezia Giulia has become renowned for its international receptiveness and for being a pole of attraction for highly qualified human capital in the field of research.”

In an address at the open session, Murenzi stressed the extraordinary progress achieved by some developing nations that have invested in research and science education. “We also see, however, that the progress has been uneven,” Murenzi said. “Especially among the 48 Least Developed Countries, profound human challenges remain in food production, clean water, health care, energy, climate change and urbanisation.”

It was an honour for ICTP to host the meeting, said the centre’s director Fernando Quevedo, who added that the subject of building science

“Basic and applied science are basically two sides of the same coin. They’re both important.” *Wale Soboyejo*

in the developing world is the core of work at ICTP and Trieste’s other science institutions. “ICTP has been hosting scientific visitors from 188 countries over the past 50 years and we have been working together with them to create a community of science in developing countries,” said Quevedo. “The Board’s work is giving science a voice worldwide, as well as recognition of the importance of science for the future of our world.”

Mauro Giacca, the director-general of ICGEB, said in a video message from Cape Town, South Africa, that the Scientific Advisory Board is deliberating on issues of major importance to his institute, such as medicine and agriculture. “There is, probably, no other field in science that can contribute to global development so effectively as biotechnology,” Giacca said. “The

possibility to modify genetic information and take advantage of natural organisms for the benefit of humanity offers immense possibilities in medicine, agriculture and industry.”

The InterAcademy Partnership [IAP], a TWAS-associated organisation, has long been active in science policy at the highest levels, said co-chair Volker ter Meulen. Science academies provide an independent and highly credible voice for scientists in the policy realm. “For example,” he explained, when then-UN Secretary-General Kofi Annan was struggling with the governance structure of the Intergovernmental Panel on Climate Change, “we were asked to analyse the governance structure and we did it – and, ever since, nobody has complained about the governance structure of IPCC.”

SCIENTISTS AS AGENTS OF CHANGE

How does science shape world policies? And how can policymakers in turn support science?



▲ InterAcademy Partnership Co-Chair Volker ter Meulen.

▼ Members of the UN Secretary-General’s Scientific Advisory Board present in Trieste, Italy. [Photo: ICTP photo archives]



► UN Secretary-General's Scientific Advisory Board members Hayat Sindi and Wale Soboyejo.



The open session also provided an opportunity for board members to take questions directly from the Trieste scientific community.

Part of the conversation was about the nature of science itself. Does it have an obligation to focus on its applications for resolving global issues, or is the pursuit of answers to fundamental questions enough on its own?

Sindi made a case that the scientific endeavour is bigger than simple personal curiosity, and that the world is in urgent need of science that will benefit people. She said

that her institute in Saudi Arabia explores how to commercialize innovative ideas, but a major obstacle is how the culture of science inadvertently nurtures a fear of failure. That's where centres such as ICTP can come into play, she said, encouraging new students to become agents of change who aren't afraid to fail on the path to finding important new ideas.

"It's great to have another scientist like Einstein and Newton," she said. "But for me, as I'm running this institute, it's important for there to be somebody who is going to clean water for children who are really dying from polluted water.

"So," Sindi added, "we need to really encourage the change-agent type of concept – for our students to link science and society from the beginning, so the end goal is to have an impact."

Kuroda said that, while it's tempting to see researchers who do basic science as removed from society; the truth is that they aren't. Even fundamental science has impacts that can reach deep into applications that affect daily lives.

"Basic scientists also have to think, 'What I'm doing may have a consequence, may tap into some commercially important findings'," Kuroda said. "So that sort of way of thinking in the culture of science is important. That is also true for developed countries, but also in developing countries."

Soboyejo argued that the culture of science and technology needs to be complex, integrated and inclusive. There needs to be both basic and applied science, but also cooperation with industry, governments and development agencies, so that scientific findings and new technologies can become products that will have an impact on people. Otherwise, he said, there is science but no development.

"Basic and applied science are basically two sides of the same coin," said Soboyejo, addressing the students in the audience. "They're both important. In the absence of very strong basic science, it makes the application of science difficult. So what is done here and at the institutions across the world that truly value basic science is important – and your role is pivotal." ■

Read an interview with Board member Gebisa Ejeta on food security:
www.twas.org/node/11760

For a full list and biographies of Board members:
<http://en.unesco.org/un-sab/members>





VOICES OF GLOBAL SCIENCE

In a series of film interviews, members of the United Nations Scientific Advisory Board stressed the importance of dialogue with the policymakers and the public.

Photo provided



Abdallah Daar

Professor of Clinical Public Health and Global Health at the Dalla Lana School of Public Health in Toronto, Canada. TWAS Fellow since 2007.

CLIMATE CHANGE AND PUBLIC HEALTH

There is a huge number of ways in which climate change and big disasters – weather events – are going to impact on health. You always see refugees of climate change – to be a refugee means leaving your home, losing your income, not having health care facilities. And when you get sick, you die as a refugee in most cases, unless you’re lucky enough to be in a camp where somebody’s helping.

Another is the changing ecosystem for parasites like malaria ... Now, with global warming, you find malaria at higher level, and so more people are exposed to that. There is also environmental air pollution, which

gets worse with climate change, and that kills millions of people every year. Waterborne diseases are another category that is going to get worse. But there is also an indirect thing: There is going to be an impact on food production, because of droughts. When there is less food, there is less health.

The Secretary-General [Ban Ki-moon] obviously is very aware of the link between health, climate change and the environment, which is affected by climate change. But the value of the kind of report we are producing is that this report is not necessarily for reading only by technical experts. At the same time that we’re giving high-level advice, it’s also readable by the public.

Photo provided



Joji Cariño

Senior policy adviser and former director of the Forest Peoples Programme in the Philippines, her native country.

INDIGENOUS KNOWLEDGE FOR SCIENCE AND POLICY

Historically science and indigenous knowledge have worked together, for example, in early taxonomies and understanding about variety of plants. But in more recent times... there was a separation between what is called scientific knowledge and being contrasted with traditional knowledge. But of course today we understand that modern science needs to take into account and go back to its linkages with traditional knowledge. We now have a strong base for community-based monitoring of what is actually happening on sustainable development or climate.

I have to say it’s sad that

governments have not yet fully given attention to indigenous and local knowledge.... Understanding [whether] are we really making progress in terms of sustainable development, are we really leaving no one behind – we cannot know that, and that’s the communities themselves that are part of the process and part of the decision-making.

Therefore this is also a message for those in cities: modern life continues to need the interrelations and understanding that are expressed into indigenous and local knowledge.... This is an enrichment for all people. They need to renew this relationship with the Earth if they are going to address the current crisis of modernization.

It is a remarkable assembly of elite science talent: 26 researchers from 25 countries, leaders in fields such as agriculture, biodiversity, climate change and indigenous knowledge. And for the past three years, as members of the United Nations Scientific Advisory Board (UNSAB), they have met and worked together to understand how scientists and policymakers can cooperate to find a strong response to these and other challenges.

The Board, appointed by United Nations Secretary-General Ban Ki-moon, met for the fifth time from 24–25 May 2016 in Trieste, Italy, the headquarters city of TWAS and several other international and Italian science bodies. During the meeting, Italian filmmaker Nicole Leghissa interviewed a number of scientists who serve on the panel. These excerpts were assembled by TWAS staff writer Cristina Serra.

Photo: Luiz Roberto Moreira



Carlos Nobre

National secretary for R&D policies at the ministry of science, technology & innovation of Brazil. He was elected to TWAS in 2006 and was a member

of the Nobel Peace Prize-winning Intergovernmental Panel on Climate Change when it won the Nobel Peace Prize in 2007.

CLIMATE NEEDS TO TAKE CENTRE STAGE

Let's do the most to get it [the global increase in temperature] to 1.5 C°, because 1.5 degrees of global warming is the level of warming which would present the least risk and damage to people living in islands, to biodiversity, to food production, to health.

It's not that you can adapt to any level of global warming. For instance, for 2-3 degrees of global warming of the oceans, it's almost certain that ice sheets in Greenland and Western

Antarctica will collapse, will melt away. Over several hundreds of years, perhaps a thousand, but it will just lift the sea level by several meters – in 2,000 years, up to 10 metres.

We should avoid, should avert risks and there is only one way, which is reducing emissions to really zero within the next 20-30 years. If we do not reduce emissions significantly before the end of this century, then we are on a trajectory that's unstoppable. People say: "Well, don't worry, we're going to find a solution." So it's very interesting, different perspectives on risk: for human health, risk is a very serious issue.

Photo: © Kim Gordon EPA



Rosie Cooney

Born in Australia. Chair of the Sustainable Use and Livelihoods Specialist Group of the International Union for Conservation of Nature (IUCN).

HOLISTIC POLICIES FOR BIODIVERSITY

Biodiversity means diversity of life, diversity within species – genetic diversity – diversity between species, like all the different species of fungi or moth, and diversity among ecosystems: from forests, to marine and aquatic ecosystems....

What we're seeing at the moment globally is a huge reduction in biodiversity. Just during my lifetime, for instance, since the 1970s, global wildlife populations have been cut in half.

Human enterprise, human endeavours, human life depend on biodiversity. Either directly – it's what we eat, it helps create clean air,

clean water – or indirectly though supporting, for instance, pollination, a key agricultural service. If we lose biodiversity, we lose the repositories of knowledge for our future...

A lot of countries are struggling with basic governance approaches to conserving biodiversity, ensuring that using and managing this resource actually conserves it, while at the same time supplying the goods and services that people depend upon. So...we need to strengthen science for sustainable development, but it needs necessarily to be a kind of integrated, joined-up science that looks at sustainable development challenges in an integrated fashion.



Photo: Roberto Barmaba - ICTP



Gebisa Ejeta

Born in Ethiopia. Distinguished Professor of Agronomy at Purdue University. Winner of the 2009 World Food Prize.

EVIDENCE-BASED POLICY FOR FOOD SYSTEMS

Evidence-based policy-making is essential for governance and development. For example, in my field, in global food security, food is very foundational, very fundamental for development. Unfortunately, we still have some 800 million people going hungry and a lot of children threatened with stunting and developmental problems. Therefore, if we expand that to the various issues of food security that are emerging, meaning over-nutrition and under-nutrition and micronutrient deficiency...that expands it to a larger agenda of food security called food systems.

We have been producing food to keep pace with population development in the last several decades. In developing countries, we have tried to keep pace with population growth by bringing more land to agriculture. Both of these practices have had significant footprint in the GHG [greenhouse gas] emissions and contributing to climate change.

If we really want to continue to feed humanity sustainably in perpetuity, we need to increase our efficiencies and our protection of the environment so that moving forward we have an opportunity of feeding a growing world population without wasting and losing more natural resources.

“ We need to strengthen science for sustainable development, but it needs necessarily to be a kind of integrated, joined-up science that looks at sustainable development challenges in an integrated fashion. ” Rosie Cooney

Photo: David Ausserhofer for the Leopoldina



Jörg Hacker

President of the German National Academy of Sciences Leopoldina – National Academy of Sciences, Germany.

BRING CAPACITIES TOGETHER

Before the final report, we worked on a more specific report on the sustainability goals [UN Sustainable Development Goals] and how science can help to make these goals a success. On the one hand, it is important to gain scientific information: many of the goals and the targets are related to science and that is what we also felt, especially necessary measurements indicators, and here not only natural sciences but also social sciences can play an important role.

The important point is also to bring scientific excellence and also capacities into the respective developing countries.... There are institutes

worldwide, also in Africa, and they played a big role in the fight against Ebola. So there are capacities worldwide and it is necessary to bring them together and to act globally together....

The European Commission and the European Parliament also have realized that there is the need for scientific advice...in the context of the European Union. We have to react globally, on different issues, and infectious diseases are a very good example, because microbes, they do not know any borders.... Therefore they have to act together, therefore the microbes act globally, they are clever. And we are human beings and we have to do the same.

To view each interview in full on film, plus a film report on the UN Scientific Advisory Board meeting, visit: www.bit.do/UNSABFilms.

#UNSCIBOARD

The conversation about science and global challenges wasn't just at the meeting in Trieste – it was on social media, too. Twitter users in particular were invited to follow the discussion using the hashtag #UNSciBoard. Here are some top tweets:

Sandro Scandolo @SandroScandolo

"We need more and better [#science](#), and more science cooperation" says Ban Ki-Moon in his message to the [#UNSciBoard](#)



RETWEETS 28 LIKES 13

4:30 PM - 24 May 2016

Debora Serracchiani @serracchiani

A [#Trieste](#) focus su crescita economica e sviluppo sostenibile a supporto dei Paesi in via di sviluppo [#UNSciBoard](#)

View translation



RETWEETS 15 LIKES 30

2:31 PM - 25 May 2016

▲ English translation: In [#Trieste](#), focus on economic growth and sustainable development to support developing countries. [#UNSciBoard](#)

twas TWAS @TWASnews

Joji Cariño: We need [#IndigenousKnowledge](#) to compliment other knowledge systems twas.org/node/11720/ [#UNSciBoard](#)



RETWEETS 4 LIKES 3

10:09 AM - 25 May 2016

iap IAPartnership @IAPartnership

IAP president, Mohamed Hassan, asks [#UNSciBoard](#) if they have looked into entrepreneurship, research innovation and social innovation.

RETWEETS 2 LIKES 3

12:55 PM - 25 May 2016

ICTP @ictpnews

[#ICTP's](#) own Diploma student Kenneth Muhumuza asks [#UNSciBoard](#) about reforming science systems to include younger scientists [#sciencepolicy](#)

RETWEETS 2 LIKES 4

2:13 PM - 25 May 2016



ELEVATING THE ROLE OF SCIENCE

The final report by the UN Scientific Advisory Board calls for a stronger place for science in international decision-making.

Science is a public good and deserves to be valued more highly and used effectively by decision-makers at all levels, but it requires more resources to become a true game-changer, says the final report of the UN Scientific Advisory Board.

To address global challenges, all nations must invest more in science, technology and innovation (STI), argues *The Future of Scientific Advice to the United Nations, A Summary Report to the Secretary-General of the United Nations from the Scientific Advisory Board*. The report was presented to Secretary-General Ban Ki-moon by Irina Bokova, director-general of UNESCO, on 18 September.

The summary report makes pointed recommendations on some of the most pressing global issues of our time. They include:

- Science should receive a more elevated role in policymakers' processes for making decisions.
- As the volumes of available data become greater, there must be intense work to ensure the quality of data, as well accessibility to it by women and the poor.
- To alleviate inequalities, policymakers and scientists must take an inclusive approach, reserving seats at the table for both men and women, as well as the rich and the poor so they can share their knowledge.

- Science should not be categorized as its own interest or a tool, but as an integral part of solving challenges faced by the entire world community.

The Scientific Advisory Board seeks to inform the UN's work by providing advice on science, technology and innovation for sustainable development, and brings together 26 eminent scientists from all regions of the world. The board produces policy briefs and other documents on subjects such as the data revolution, the role of the sciences in meeting sustainable development goals and the Delphi Study, which identifies major scientific concerns for the future of the planet.

In developing the report, the board met five times, most recently in Trieste, Italy, on 24-25 May, when they were hosted by the Italian government and four international scientific institutions based in Trieste: the Abdus Salam International Centre for Theoretical Physics (ICTP); the InterAcademy Partnership (IAP); and the International Centre for Genetic Engineering and Biotechnology (ICGEB) and TWAS. UNESCO serves as the secretariat of the Board.

"STI can be a game-changer in dealing with nearly all the most pressing global challenges," said the Board, arguing that STI also has a key role in accomplishing the 2030 Sustainable Development Goals approved last year by the United Nations. As an example, the report notes that scientists and engineers improved the efficiency of solar panels and wind turbines faster than had been expected, raising the hope of reducing dependency on fossil fuels.

Yet only 12 countries – Austria, Denmark, Finland, Germany, Israel, Japan, Republic of Korea, Qatar, Singapore, Sweden, Switzerland and United States of America – dedicate more than 2.5% of their Gross Domestic Product (GDP) to research and development (R&D).

This is far from enough considering what is at stake, say the authors. They call on all countries, including the poorest, to invest at least 1% of their GDP on research, and urge the most advanced countries to spend at least



The Future of SCIENTIFIC ADVICE TO THE UNITED NATIONS

A Summary Report to the Secretary-General
of the United Nations from the
SCIENTIFIC ADVISORY BOARD

September 2016

3% of GDP on R&D. This effort must also focus on reinforcing science education, notably in developing countries, and on improving girls' access to science courses.

Bokova, in a message published in the report, says: "It is a powerful resource for the Secretary-General and the UN System as a whole, so as to reinforce its role as an interlocutor of world leaders and as a central actor in defining solutions to global problems and the way these manifest themselves at multiple levels, from global to local."

The members of the Scientific Advisory Board contend that science should carry more weight with the decisions of political leaders. They note that almost 25 years passed between the scientific community's first warnings about climate change and the adoption, in December 2015, of the Paris Agreement on that urgent issue.

"Decisions are often taken in response to short-term economic and political interests, rather than the long-term interests of people and the planet," they note.

Though the United Nations cannot provide solutions to all the world's great challenges

▲ The UN Scientific Advisory Board's summary report makes recommendations on some of the most pressing global issues of our time.

This article was largely reproduced from a media advisory by UNESCO.

*Read the Board's report to UN Secretary-General Ban Ki-moon:
www.bit.do/UNSAReport*

alone, it is best placed to set international objectives for doing so.

"Science is critical to discovering the detailed nature of multifaceted challenges, and to formulating the policies that will respond to them most powerfully," the board reported. "Science is also fundamental to measuring outcomes, establishing causality and encouraging the deployment of the most effective possible strategies. In a word,

“Decisions are often taken in response to short-term economic and political interests, rather than the long-term interests of people and the planet.”

UN Scientific Advisory Board

implementation of those strategies is crucial, and the implementers must work hand-in-hand with the scientists."

The report adds: "The world surely has a right to expect and even demand that the United Nations deliver what no other institution can: setting global priorities, promoting and coordinating research and action to address the most challenging problems, enabling the effective worldwide use of all data – in effect, building policies with bricks."


Big data exchanges around the world offer an illustration of the role the United Nations could play to favour fair access. The report notes that the United Nations and its agencies can facilitate the gathering of all types of data while overseeing both quality and access. It also calls for international collaborative projects in this area.

"Above all, this should be a revolution for equity in access and use of data," urges the report. "But when it comes to equity, good intentions are only a start. To actually achieve a reduction in the data divide, the commitment will have to be unwavering, the efforts relentless." ■



TWAS GRANTS: THAT FIRST SPARK

TWAS research grants are building careers, advancing science and influencing policy and industry. Grantees came to Trieste to share their stories and insights about building science in the developing world.

 by Sean Treacy

Nearly two decades ago, physicist Denise Zezell of Brazil received a grant from TWAS to pay for some simple equipment that measures the energy from lasers. The device was the first of its kind in her laboratory, but in time, it started a cascade of events that nobody had anticipated.

The School of Dentistry at the University of Sao Paulo became interested. They and physicists at Brazil's Nuclear and Energy Research Institute began to collaborate on research exploring how lasers could be useful to dentists. As the field grew, more funding for the field began to pour in. "We began to offer classes for clinicians," Zezell said. "From those students, a research line for lasers in dentistry grew."

Zezell was one of over 40 outstanding scientists from developing countries who came to Trieste from 18-22 April for an event on TWAS grants called "TWAS Research Grants Conference – Shaping Careers in Science". All of them were past recipients of a TWAS research grant, which are awarded to scientists in developing countries for the purchase of indispensable lab equipment and supplies.

The grant amounts may be small, ranging from just a few thousand dollars when the programme began in 1986 to up to USD30,000 today. But they help early-career scientists in resource-scarce countries establish laboratories that go on to conduct important research, attract more funding and train more scientists. This makes a difference in developing

countries by boosting careers and contributing to economic growth.

Brazil's industry in low-intensity lasers for dentistry are just one instance of the effectiveness of TWAS research grants. Research on the lasers, which can for example excite tissues in gums and teeth so that they heal more quickly after surgery, helped to build new expertise in the field; that, in turn, created a demand for laser equipment in Brazil. The materials industry responded by beginning to

▼ Conference participants included (from left): medical physicist Denise Zezell, Brazil; chemist Teketel Yohannes Anshebo, Ethiopia; immunologist Claudia Mongini, Argentina; chemist Myrtha Karina Santjojo Rini, Indonesia; biotechnologist Sushila Maharjan, Nepal; parasitologist Suliman Hamid, Sudan; microbiologist Luis Larrondo, Chile. (Photo: Paola Di Bella)





▲ Balakrishna Pisupati, head of the United Nations Environment Programme biodiversity and multilateral environmental agreements programme, based in Kenya. [Photo: Paola Di Bella]

Learn more:
www.twas.org/node/11712/

See a film on the impact of TWAS grants: <https://youtu.be/-OPZuDO5QJc>

See a film about the conference: https://youtu.be/hYeysoTr0_k



build their own lasers. And now, Brazil is one of the global leaders, with about 100 researchers working on how lasers can be useful to dentists and at least 10 companies manufacturing medical and dental lasers.

Since the programme's start, TWAS has awarded more than 2,370 grants totaling over USD17 million, with core funding provided by the Swedish International Development Cooperation Agency (Sida). A separate grant programme, funded by COMSTEC and TWAS, is open to young scientists from member countries of the Organization of Islamic Cooperation (OIC).

Scientists at the conference came from 26 nations in the global South – including Sudan, Mali, Senegal, Nigeria, Chile, Argentina, Sri Lanka, Uzbekistan and Nepal – spanning fields ranging from biology to mathematics. They discussed their career challenges and the role the TWAS grants played in shaping their professional lives, enabling their discoveries and building new collaborations. Women accounted for 52% of the conference participants.

Participant Balakrishna Pisupati began his career over 25 years ago as a geneticist with an interest in biodiversity, particularly in agricultural biodiversity to help crops handle high levels of salt in the environment. He returned to India from the United Kingdom, suspending his work at Cambridge for a job in India developing a research facility for a non-governmental organisation (NGO). Then everything changed.

Pisupati was successful in starting the facility after receiving a TWAS research grant for a USD5,000 device that replicates DNA for studying genetic diversity. This crucial equipment had been unavailable elsewhere in India, and it enabled work from his lab that inspired more researchers in India to look into how genetic diversity can affect the salt tolerance of different rice strains, and thus contribute to food security.

His work began to shift more toward how to bring biodiversity science into policy so that the Indian government can come up with stronger legal and policy measures to protect native biodiversity. Currently, he heads the United Nations Environment Programme (UNEP)

biodiversity and multilateral environmental agreements programme, based in Kenya.

Getting that first grant, Pisupati said, as well as working for an NGO, can not only mean a lot for advancement of scientific careers, but show researchers how organizations use science. He said that the key challenge is that the weak link between science and policy needs to be strengthened by scientists who actively participate in shaping policy.

"Science should inform policymaking and policy should support science," Pisupati said. "The absence of a dialogue hurts both sides."

The grants have the potential not only to nurture careers that might move into policy, but to help scientists across disciplines. Developmental biologist and TWAS Fellow Eugenia del Pino Veintimilla received her first grant from the Academy in 1998 for

■ The TWAS grant helped me to be one of the pioneers in establishing biology research in Ecuador. ■

Eugenia del Pino Veintimilla

USD2,000. She bought a fibre optic lamp for her microscope so that she could study frog embryos. She received a second TWAS grant years later that invested in even more advanced microscope technology.

She said training of further biologists turned out to be an important impact of the grants. Her university, Pontificia Universidad Católica del Ecuador, now has at least 42 biology professors, many of them with PhDs. One of her students, Fabian Saenz, is already an accomplished early-career malaria researcher who recently received his own first TWAS grant. Saenz also attended the TWAS conference in Trieste.

"Through both grants," said del Pino, "I was able to attract very capable students and thus was able to advance the research projects that I have. The TWAS grant helped me to be one of the pioneers in establishing biology research in Ecuador." ■



◀ Microbiologist Flor Pujol works at her desk at the Venezuelan Institute for Scientific Research in Caracas, Venezuela. [Photo provided]

THE RESOURCES FOR IMPROVING HEALTH

by Sean Treacy

TWAS research grants are supporting scientists like Flor Pujol, who heads a Venezuelan virology lab, and Joseph Mwangangi of Kenya, who studies mosquitos and malaria.

If you want to fight mosquitoes that spread malaria, you have to understand the mosquito lifestyle. Where do they go to breed? Where do their young flourish and grow strong? How do these habitats come to exist?

These are questions that Kenyan entomologist Joseph Mwangangi of the Wellcome Trust Research Programme in Kilifi, Kenya, seeks to answer with

his research. "Life in water determines the body size of a mosquito," said Mwangangi. "This is important, in that bigger mosquitoes are more healthy. They can survive and transmit the disease more."

To understand which pools of water create the healthiest mosquitoes, Mwangangi needed mosquito-rearing chambers – cases in which he could simulate environments where mosquitoes breed. But he needed financial help to get the chambers. He got it in 2010, through a research grant from TWAS.

Across the regions of the world where people are most vulnerable to devastating diseases, local research is an essential part of the battle. TWAS grants have been an important part of this effort, helping scientists throughout the developing world acquire the funding they need to

establish labs, invigorate research careers and make key discoveries. Much of this work in epidemiology and medicine was on display at the TWAS Research Grants Conference held in Trieste, Italy, from 18-22 April.

Among Mwangangi's findings was that 90% of the malaria mosquitoes in Kenya breed in still pools created by human beings, such as unfilled holes left behind from construction and abandoned swimming pools. This is indispensable information, because it helps the government prioritize measures to keep the insects under control.

"TWAS, to me, was like a seed grant, which enabled us to build a fundamental group in vector biology," he said. "The Ministry of Health looks to us for information now on adult mosquitoes."


Microbiologist Flor Pujol of the Venezuelan Institute for Scientific Research in Caracas, is the head of a virology lab. She got her first TWAS grant in the late 1990s, which gave her career a boost and helped her create a new molecular virology lab in 2002.

Thanks to that support over 15 years ago, she was able to train local scientists in virology in her home country. Now there is a stronger corps of virologists that can respond to outbreaks, all of whom are needed at the moment to diagnose the Zika virus and determine ways to slow its spread.

"It helped me to get more confident in applying for international grants. It helped me to acquire graduate students," said Pujol. "We now have more minds working on the Zika problem." ■

[Learn more: www.twas.org/node/11719](http://www.twas.org/node/11719)

'INNOVATION AND ITS ENEMIES'

 by Sean Treacy

A new book by TWAS Fellow Calestous Juma explores the societal forces that stall problem-solving technologies.

Many scientists have seen the story first-hand: After working for years on a problem such as hunger, energy or climate change, they produce a new technology that can help to answer the challenge. But once that new technology is available, it meets intense opposition from interest groups and the public.

It's an old pattern. Mechanical refrigeration in the mid-19th century alarmed the ice industry and triggered debates over the new technology's safety. More recently, renewable energy technologies, urgently needed to counter climate change, face opposition from the fossil fuel industry and political factions that deny the reality of warming.

TWAS Fellow Calestous Juma explores this dynamic in a new book, "Innovation and Its Enemies: Why People Resist New Technologies" (Oxford University Press, July 2016). People don't fear emerging technologies because they are new, Juma says. Rather, the resistance typically comes from established industries and social orders that worry about being displaced.

In this way, new technologies generate uncertainty about the future – and when making decisions under uncertainty, potential losses loom larger in people's minds than potential

gains. "So the rate at which we apply new technologies tends to be glacial," says Juma.

Juma is professor of the practice of international development at the Harvard Kennedy School in the United States. He is a leading voice on issues of biotechnology and science and innovation policy. This is his second book, following "The New Harvest: Agricultural Innovation in Africa".

In an interview, Juma said he wrote 'Innovation and its Enemies' because very few new technologies generated today are ever actually put to use. Each chapter in the new book serves as a case study of resistance to a new technology.

Coffee, for example, is among the oldest transformative innovations. At the time of its emergence around the 15th century, it started to get consumed at mosques to keep imams awake. But coffee spread to the general public and coffee houses surpassed mosques as the main social centre where people met and exchanged ideas. So political forces rose attempting to suppress it.

Coffee won out in the end. But the pattern repeats itself throughout history. Margarine faced challenges from the dairy lobby. Musicians secured bans on recorded sound.

Such useful technologies run into a wall again and again. And though, from asbestos to cigarettes, there are numerous innovations that have legitimately had tragic ends, Juma argues that the stories of those harmful technologies become the



▲ Top: Calestous Juma. Above: The book "Innovation and Its Enemies".

reference points by which all new technologies tend to be judged, even if they're proven safe.


Innovation and its advocates have to emphasize how the technologies can improve people's lives and address unmet needs. "In an increasingly complex and uncertain world," Juma writes, "the risks of doing nothing may outweigh the risks of innovating." ■

Learn more: www.twas.org/node/11842



SCIENCE DIPLOMACY: A DELICATE DRAMA

The third AAAS-TWAS Summer Course in Science Diplomacy placed future science diplomats into a complex, high-stakes simulated negotiation.

 by Sean Treacy

The story went like this: Two neighboring developing countries, both rich with a diversity of species, were divided by a deep difference in cultural values. One country, Industria, favored taking advantage of their species for rapid economic growth; the other, Pacifica, prioritized cautious environmental conservation.

Over the decades, the squabbling over their chaotic border grew so intense that the World Bank decided to intervene. It brought both countries to the negotiating table and offered them an opportunity to apply for a USD2 billion grant, if they could come to agreement on how to manage their biodiversity.

But part-way through the process, a surprising rumour about a secret meeting put the entire effort in jeopardy.

This was just one turning point in a high-stakes role-playing exercise that was central to the annual science diplomacy course organized by the American Association for the Advancement of Science [AAAS] and TWAS in Trieste, Italy. The course, held from 11-15 July, brought together about 30 participants from 22 nations and used the simulation, along with presentations and discussions, to explore the complex workings and potential value of science diplomacy.

In addition to the simulation, participants in the summer course heard from scientists and others directly engaged in real-life science diplomacy, who explained how it can build stronger science and better relationships between nations. Among the science leaders at

the course were Princess Sumaya bint El Hassan, the president of the Royal Scientific Society of Jordan, and Vaughan Turekian, science and technology adviser to U.S. Secretary of State John Kerry.

In the simulation, participants were given roles such as high-level ministers, national parks directors and indigenous community representatives working together to solidify the deal. They played out private caucuses, negotiating strategies and responses to unforeseen disruptions. Each disruption was designed to teach important skills through hands-on experience in science diplomacy.

The rumour was one of the most dramatic disruptions – one that almost completely derailed the negotiations. Word spread that a World Bank delegation member with the International Chamber of Commerce [ICC] met privately with two Industria representatives, presenting an offer from pharmaceutical companies to use a plant grown in Pacifica to develop a skin cream. The news rattled the delicate trust between everyone involved.

At one point, Pacifica all but accused the World Bank delegation of collusion. Then the ICC representative, played by Ana Elorza Morena of the Spanish Embassy in Washington D.C., became incensed, denying the accusations and pointedly reminding the national delegations that they had come to them for funding.

“Excuse me,” interrupted Pacifica’s increasingly irritated Foreign Affairs Minister, played by Mounir Ghribi, who is actually from the National Institute



▲ Mounir Ghribi, playing the foreign minister for a country that favors environmental conservation over economic development, speaks at the negotiating table during a science diplomacy simulation game at this year's AAAS-TWAS Science Diplomacy Summer Course.



of Oceanography and Applied Geophysics in Italy. “I understand that money is important, but we are not here begging. We are from the developing world, but we still have dignity.”

A SAFE PLACE FOR DIFFICULT LESSONS

The simulation gave students the difficult challenge of reconciling environmental concerns, indigenous rights and commercial development interests all at once – both within their individual nations, and between nations. The simulation’s organizers planned several disruptions to the process, such as breaking news of a massive poaching crime near the border of Industria and Pacifica. One disruption took a humorous turn, after it was revealed that an outside foundation offering alternative funding was run by a politically embarrassing cult that believes humanity descended from aliens.

But surprise is part of diplomacy in real life, too, and the occasional humour of the simulation helped the group to bond.

“Simulations enable experiential learning in a fun and safe-to-fail environment – without the burden of decision,” said Marga Gual Soler, the project director at the AAAS Center for Science

Diplomacy, who organized the course. “That empowers scientists and diplomats to jointly explore their creative side and flexibly adapt to unpredictable negotiation situations.”

The goal of the exercise was to allow students to learn from their own and each other’s mistakes, said David Schindel of the Smithsonian Institution’s U.S. National Museum of Natural History, who ran the simulation. “It’s all about acquiring skills of negotiation and diplomacy through some funny and sometimes painful lessons.”

When the participants failed to react diplomatically to news of the secret-meeting rumour during act two, it was a valuable teaching moment. “What’s wrong with this?” Schindel asked the participants. “It’s unsubstantiated. It’s anonymous. It may not be accurate.”

He explained that in such situations, diplomats may prepare for the worst but should assume the best about their negotiating partners, at least in public. “Even if you don’t trust the other side, you’re here to explore a trusting relationship.”

Students in the summer course said that the simulation helped them better understand the perspective of diplomats and appreciate the different skills necessary to make diplomatic progress.

“Even if you don’t trust the other side, you’re here to explore a trusting relationship.”

David Schindel

Each participant was given a role somewhat different from their normal occupation, forcing them to assume a view of international politics from an unfamiliar perspective. For example, Leandra Gonçalves, a marine biologist studying international relations of Universidade do Estado de São Paulo in Brazil, was placed in the role of a ritual healer advising the Pacifica delegation.

“It was very interesting to see how, in real life, traditional communities need to make a huge effort to be heard in these kinds of negotiations,” Gonçalves said. ■

Learn more:
www.twas.org/node/11822



◀ Princess Sumaya bint El Hassan of Jordan, a globally respected science advocate, spoke with top-level science diplomacy leaders and others participating in the AAAS-TWAS Summer Course in Science Diplomacy in Trieste, Italy. [Photo: Demis Albertacci]

PRINCESS SUMAYA: SCIENCE FOR HOPE

by Edward W. Lempinen

Despite the historic challenges confronting much of the Arab region, science can provide a path to progress, Jordan's Princess Sumaya told TWAS.

Regional tensions, armed conflict, the flight of desperate refugees – the Arab world is confronting an historic crisis. For Princess Sumaya bint El Hassan, president of Royal Scientific Society of Jordan, a sustained commitment to science and education can provide a path to progress and perhaps even peace.

Even in difficult times, science gives people a way to talk about such shared values as clean water, public

health, environmental protection and sustainable economic growth. These discussions can lead to a shared vision for the future.

Science gives people “that proverbial light at the end of the tunnel.” Princess Sumaya said in a recent interview with TWAS. “In a region that’s going through so many troubles at the moment, I think that ultimately what we’re talking about is science for hope.”

Princess Sumaya is an influential advocate for research and science education in the Arab region, and she has earned global respect. She visited TWAS in Trieste, Italy, for the third Summer Course in Science Diplomacy, organized with the American Association for the Advancement of Science [AAAS]. The course was held 11-15 July.

Princess Sumaya was appointed president of the Royal Scientific Society

of Jordan in 2006. She also chairs the Board of Trustees of the Princess Sumaya University for Technology. She has been instrumental in bringing the 2017 World Scientific Forum to Jordan, and she’s a passionate advocate of archaeology and the conservation of historic sites in her country.

During the interview, she described her own path to scientific leadership, the value of science and engineering in addressing the refugee crisis, and the importance of good relations between scientists and policymakers.

In particular, she cited the potential positive impact of regional science cooperation.

“It’s very clear in the Arab world that we’re good at talking to international organisations, but we’re not so good at talking to one another,” Princess Sumaya said. But “if you look at the investments that have been made into science centres, or to universities that have large scientific research areas, I think we could be a very strong force to be reckoned with – if we would start talking to one another.

“When we talk about issues like seismic mitigation,” she added, “we really can’t start looking at countries around the fault line which might not have a peace agreement with one another. At the end of the day, we’re talking about lives and we’re talking about protecting and safeguarding people. That’s the most important thing that science can do.” ◼

[Read the full TWAS interview with Princess Sumaya: www.twas.org/node/11864](http://www.twas.org/node/11864)

[At the same site, view a film of the interview and a film of her keynote address to the TWAS-AAAS Summer Course in Science Diplomacy.](#)

WHY ARE WOMEN SO RARE IN ACADEMIES?

A first-of-its-kind survey of 69 science academies across the world found that women make up only 12% of their membership on average.

A report launched by the Academy of Science of South Africa has found that across 69 national science academies, women make up just 12% of academy members on average. In 30 of those academies, the share of women members was 10% or less.

The report, “Women for Science: Inclusion and Participation in Academies of Science” was supported by IAP – the global network of science academies, which is now a part of The InterAcademy Partnership under the name “IAP For Science”.

It documents the results of two surveys undertaken by the Inter-American Network of Academies of Sciences (IANAS) and the Academy of Science of South Africa (ASSAf) targeting member countries of the IAP. The work was conducted with input from the Organization for Women in Science for the Developing World (OWSD), and the report was launched at the annual IAP Conference on 29 February 2016 in South Africa.

As the first comprehensive survey of its kind – and representing 63% of national science academies globally – the report investigates women’s representation in membership, governance and academy activities.

Among its findings are that the Cuban Academy of Sciences has the largest share of women: 27%. The national science academies of Mexico, Nicaragua, Peru, Uruguay and Honduras are also among the list of the top 10 academies with the largest percentages of women members.

The push to make science more inclusive to women is a broad effort that stretches from the very top tier, such as science academies and the prestige they carry, to the education of young scientists in the earliest stages of their careers. IAP has been promoting the role of women in science

for years, and although great strides have been made in enrolling more women in undergraduate courses, especially in the biological and chemical sciences, success has been more limited in the areas of physics, mathematics and engineering.

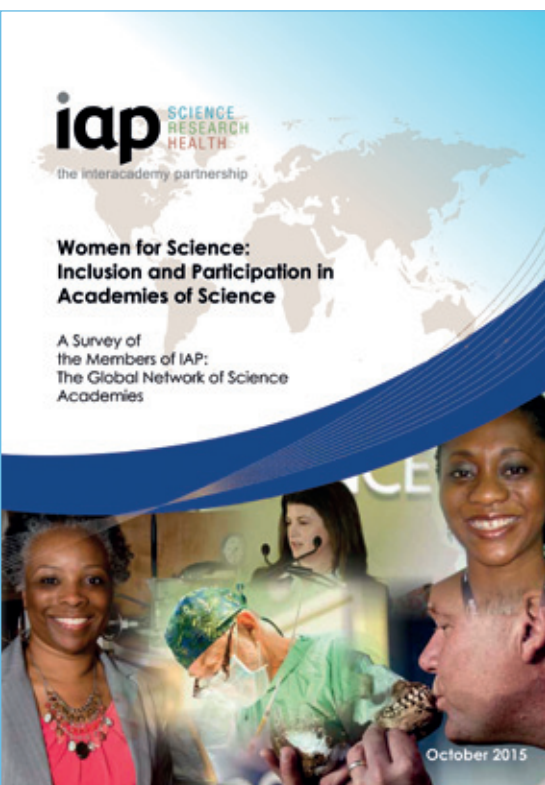
“Among [the survey’s] findings are that the Cuban Academy of Sciences has the largest share of women: 27%.”

Significant challenges remain in ensuring that the best women scientists are able to have fulfilling careers with increasing levels of responsibility, eventually taking up leadership and decision-making positions as well as membership in national and regional academies.

IAP and TWAS have a close affiliation, and TWAS hosts IAP offices on the campus of the International Centre for Theoretical Physics (ICTP) in Trieste, Italy. TWAS also hosts the offices of OWSD. ■

For a full copy of the report:
www.bit.do/WomenInAcademies


Learn more: www.twas.org/node/11597





FOR HIV PATIENTS, A LESSON IN RESILIENCE

Ethel Nakimuli-Mpungu's psychiatric research is helping Ugandans with HIV adopt effective mental health practices in the face of depression.

 by Sean Treacy

An older woman often spent her group therapy sessions in tears. All her children were far away, she had no money, and on top of all that she had HIV. But over time, regular meetings with her fellow HIV patients changed everything for her.

The group provided the woman with a constant reminder that she wasn't alone in her struggles, recalls psychiatric epidemiologist Ethel Nakimuli-Mpungu, a senior lecturer at Makerere University in Kampala, Uganda. It gave her strategies to combat her depression and the strength to engage people in her community every day.

"She went from being sad and crying all the time to being active and participating with others in small projects," said Nakimuli-Mpungu.

Nakimuli-Mpungu was one of five recipients of 2016 Elsevier Foundation Awards for Early Career Women Scientists in the Developing World, which are given through a partnership between The Elsevier Foundation, the Organization for Women in Science for the Developing World (OWSD) and TWAS. Soon after, she was honoured by Ugandan President Yoweri Museveni with the Presidential National Independence Medal of Honor.

These support groups, the result of work by Nakimuli-Mpungu and her colleagues, are raising consciousness of mental illness in Uganda and beyond.

Her research has received such recognition partly because, in sub-Saharan African countries like Uganda, mental health is often ignored by doctors, nurses and other health

workers. Resources to find and help mentally ill patients are scarce, so many people in need of help never get any.

And her work has helped to reveal a central underlying problem: Uganda and many developing countries need to break down the stigmas associated with HIV and depression and save people from health care systems that fail to screen HIV patients' mental health.

AN UNCHECKED EPIDEMIC

A general lack of knowledge about depression creates a colossal obstacle, Nakimuli-Mpungu said in a recent interview with TWAS. People don't even know their emotions can get out of balance, and that clouds their ability to recognize depression symptoms.

Worse still, that lack of awareness extends to many health workers who for years have been denying that their HIV patients have mental health issues. Worried about losing credibility with their colleagues and communities, they don't even want to look for symptoms of depression.

"They say their patients don't have those issues and don't want you to screen them because they don't want it to be known that the patients they care for may have an alcohol problem or depression," Nakimuli-Mpungu said. "They'll tell us that to our faces."

This allows the problems to spiral out of control. Much of Nakimuli-Mpungu's work therefore entails teaching health workers to accept that mental illness is like any other health problem.

She and her colleagues train nurses in clinics

▼ Psychiatric epidemiologist Ethel Nakimuli-Mpungu of Uganda speaks to a group therapy session. (Photo provided)



to screen HIV patients for depression, anxiety and substance abuse as the patients wait to see the doctor by asking questions. Have they lost their appetite? Are they struggling to get a good night's sleep? If they're diagnosed with depression, they have the option of attending group therapy sessions.

LEARNING HOW TO COPE

Group therapy participants learn that they're not alone. They lean on one another as they struggle, and in time they form close friendships. They learn about depression and how it can move from mild symptoms such as lethargy to severe symptoms such as substance abuse and suicidal thoughts. They also learn coping skills for managing their depression.

"We teach positive ways of thinking," she said. "We teach them how to challenge negative thoughts.... We teach them to replace unhelpful ways of thinking with helpful ways of thinking."

The groups also discourage self-destructive coping behaviors, including the common problem of alcohol abuse. Depression also badly disrupts how well HIV patients adhere to their HIV medication. In a review of the research

on depression and HIV published in *AIDS and Behavior*, Nakimuli-Mpungu and her colleagues looked for studies in Africa tracking depression and adherence to antiretroviral therapy. They found that depressed patients were 56% less likely to stick to their treatment regimen.

"These symptoms can become severe," she explained. "If someone feels useless and hopeless, they feel they don't need to take care of their families or their children. They don't need to take the medication. They have no

🗨️ We teach positive ways of thinking. We teach them how to challenge negative thoughts.... We teach them to replace unhelpful ways of thinking with helpful ways of thinking. 🗨️ *Ethel Nakimuli-Mpungu*

motivation. That's what the depression does. They couldn't take care of themselves and could not go to work."

Therapy groups provide real hope. Last year, Nakimuli-Mpungu and her colleagues published a study in *Lancet HIV* finding that those who took part in the groups were less depressed and better able to function in day-to-day life than those who received only HIV education.

One group participant, initially skeptical, reported a dramatic shift. "After sharing my personal painful experiences, I really feel something in my life has changed," the patient said. "I used to lock myself in my room when I am annoyed and unhappy. Now I find myself sharing my meals with other people, something I used not to do." 🗨️





PEOPLE, PLACES & EVENTS

IN MEMORIAM: AHMED ZEWAIL

Ahmed Hassan Zewail, a 1999 Nobel laureate in chemistry and a 1989 TWAS Fellow, passed away on 2 August 2016 at the age of 70. He was the first scientist of Egyptian and Arab origin to receive the Nobel Prize.

An accomplished scholar and a man of profound humanity, Zewail was a naturalized American citizen. Yet he never forgot Egypt and the Arab world. "Egypt lost one of its loyal citizens and a genius scientist who spared no effort to serve his country," said Egyptian President Abdel Fattah el-Sisi. "In the US, Professor Zewail was an American of Egyptian origin, in Egypt he was an Egyptian who went to the US and made an outstanding scientific breakthrough, but elsewhere he is a universal citizen who subscribes to science," recalled Mohamed M. El-Faham, who manages the TWAS Arab Regional Office in Alexandria, on behalf of Coordinator Ismail Serageldin. Based at Caltech in Pasadena, California, Zewail was the Linus Pauling

professor of chemistry, professor of physics, and the director of the Moore Foundation's Center for Physical Biology.

He was renowned worldwide as the "father of femtochemistry", an area of physical chemistry that studies chemical reactions on the femtosecond [10^{-15} seconds] time scale. His discoveries were based on the use of laser light to capture molecular movements, which allowed the analysis of transition states in chemical reactions and opened new ways to manipulate chemical and biological reactions.

But Zewail continued to champion science in Egypt and developing countries, promoting scientific education as an opportunity to attain good work and a dignified life.

An example of his effort to ignite an Egyptian renaissance in education and research – and to reduce brain drain from his country – is the foundation of the Zewail City of Science and Technology.

"After the Arab spring, Professor Zewail had a vision that human capital is paramount," said El-Faham, who is also a professor of engineering at the Arab Academy for Science and Technology, and scientific advisor at the library of Alexandria. In establishing the City of Science, his dream was "for Egypt to have centres of excellence where potential researchers could find the right medium for their contributions." The project was proposed in 1999 and

inaugurated on 1 November 2011, after a decree from the Egyptian Cabinet of Ministers established it as the National Project for Scientific Renaissance. Zewail served as the first chair of its Board of Trustees.

Born in 1946 in the Nile Delta city of Damanhour, Zewail as a child developed an early interest in the physical sciences, spending hours in his bedroom working on home-devised experiments using his mother's oil burner.

He earned his bachelor's and master's degrees at Alexandria University. Then he moved to the United States to join the University of California at Berkeley (1974) and in 1976 the California Institute of Technology, in Pasadena, where he spent four decades.

Zewail's vision prompted President Barack Obama to appoint him to the Presidential Council of Advisors on Science and Technology (2009).

In the same year, he was named the first U.S. science envoy to the Middle East. In 2013, United Nations Secretary-General Ban Ki-moon named him to the United Nations Scientific Advisory Board.

Zewail was decorated with the Order of the Grand Collar of the Nile (1995), Egypt's highest honour. Through his career, he received more than 100 prestigious recognitions, including the Albert Einstein World Award, the Benjamin Franklin Medal, the Leonardo da Vinci Award, and the 2005 TWAS Medal Lecture Award.

He authored or co-authored 600 scientific papers and 16 books.

- Cristina Serra

▼ Ahmed Zewail, a 1989 TWAS Fellow



THOMSON NAMED OWSD PRESIDENT

Jennifer Thomson, emeritus professor in the department of molecular and cell biology at the University of Cape Town, South Africa, is the new president of the Organization for Women in Science for the Developing World (OWSD). Her mandate will cover the years 2016–2020.

She was elected 16 May 2016 at the 5th OWSD General Assembly and International Conference in Kuwait City, Kuwait.

Thomson is a former associate professor at the University of the Witwatersrand and director of the laboratory for molecular and cell biology for the South African Council for Scientific and Industrial Research.

She is a leading expert in the development of genetically modified maize, which her lab has developed to become drought-tolerant and resistant to the African endemic maize streak.



In her role as OWSD president, Thomson plans to pursue several goals, including making OWSD a leading example of an international organization strongly committed to promoting the participation of women in global science and decision-making processes; increasing fundraising efforts; and mentoring young women scientists.

Thomson also serves as chair of the OWSD South Africa national chapter. She has won numerous awards, including the L’Oréal-UNESCO for Women in Science Award for Africa in 2004 and an honorary doctorate from the Sorbonne University, Paris, in 2005. She serves on the South African Ministry of Science and Technology’s National Advisory Council on Innovation.

TEL AVIV UNIVERSITY HONOURS SEGENET KELEMU

Influential African scientist **Segenet Kelemu**, director general of the International Centre of Insect Physiology and Ecology (icipe), has earned an honorary doctorate from Tel Aviv University in Israel.

Kelemu, elected to TWAS in 2015, is a Fellow of the African Academy of Sciences and a leading plant pathologist, renowned not only in Kenya but also worldwide. Her work has been focusing on novel strategies and potential solutions to fight plant disease with sustainable methods that do not employ chemicals.

Tel Aviv University honoured Kelemu in recognition of her pioneering role for women scientists in Africa; her leadership in the fight for providing new solutions for ecologically responsible food crop production, especially by local, small-scale farmers in Africa; and her commitment in directing a major effort, through international collaboration, to make African agriculture self-sustaining and able to feed Africa’s billion-plus people. Kelemu is also the winner of the TWAS Prize for agricultural sciences (2011) and the L’Oréal-UNESCO Award for Women in Science for the Africa region (2014).



She has also been an active force in the establishment of the Biosciences eastern and central Africa (BecA) Hub in Nairobi, Kenya, and in support of the Manna Center Program in food safety and security at Tel Aviv University.

IN MEMORIAM: PHILIPPE RASOANAIVO

Philippe Rasoanaivo, a leading African scientist and a 2005 TWAS Fellow, died on 13 July 2016. A native of Madagascar, Rasoanaivo was research

director at the Malagasy Institute of Applied Research. In his investigations, he addressed a broad spectrum of topics, from natural product chemistry to bioprospecting (the discovery and commercialization of new products based on biological resources), ethnobotany (the scientific study of the traditional knowledge of plants and their medical, religious, and other uses) and drug discovery.



He also studied substances able to target malaria and brain diseases. A traditional Malagasy plant called hazolava, which showed promising therapeutic properties in the treatment of psychiatric and sleep disorders, convulsions and male sexual dysfunctions, was a recent focus of his research. He held several patents and manufactured eight phytomedicines. In 2015, Rasoanaivo was awarded the Olusegun Obasanjo Prize for his study of traditional medicine aimed at improving the efficacy of existing drugs for brain disorders and for treating male sexual problems.

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Do you have news for People, Places & Events?

Please send an email to Cristina Serra [cserra@twas.org] with a brief explanation, links to more details, and contact information.



LIZ NEELEY: STORIES OF DISCOVERY

Liz Neeley is the executive director at *The Story Collider*, a web platform that hosts “true, personal stories about science” to bring them to life. She is a marine biologist by training, and studied the evolution of the eyes and colour patterns of tropical reef fish. Her initial passion for marine biology, corals and tropical fish evolved, early in her career, into a passion for science communication and social media. Neeley was at the 2016 AAAS-TWAS Summer Course on Science Diplomacy, where she outlined the practices that turn an ordinary message into one that makes a deep connection with the audience. The following Q&A is drawn from TWAS staff writer Cristina Serra’s interview with Neeley on 15 July in Trieste, Italy.

When you teach scientists how to communicate, what is the first and most important recommendation that you offer?

- What I often tell them is that it is a myth that scientists are bad at communicating. This is a stereotype, and it’s damaging. I think the truth is that we have been trained to communicate with our peers in ways that are counterproductive when we are trying to talk to the public or to funders or other groups. So, first I remind researchers that they suffer from what we call “the curse of too much knowledge”. They have forgotten what it feels like not to be an expert. What I suggest is that they start with asking, “Why should people care about this? What’s important?” I tell them: it’s not only about reducing the jargon and technical language that you use, but also about learning to think about your audience, and understand that the questions they have are just as important as the things you want to say.

Quite often scientists avoid public communication, thinking that doing science is much better and important than talking to journalists. How do you persuade them about the importance of scientific outreach?

- In science, we often say “publish or perish”, and I think it’s true also in a broader sense: that if we don’t share our knowledge, it is as if we have never created it. So whether it’s basic science findings, or the latest medicine or environmental research, getting broader support from people who are funding your research is just as important as pushing forward the boundaries of that knowledge.

During interviews, scientists often tend to use jargon and explain technical details that are difficult to understand. What’s your advice on this tendency?

- I think it is always important to be transparent, and be willing to go as far down into data analysis as is appropriate. But I don’t think they should start with this, even with



▲ Liz Neeley in Trieste, at the AAAS-TWAS Summer Course on Science Diplomacy.

journalists who are very technical. This is where it is important to gain communication skills. In both scientific conversations and interviews, it may happen that people are unfamiliar with technical terms – and if you pay attention, you see that people send all sorts of verbal and nonverbal signals about their comprehension and interest levels in a conversation. This is why listening is perhaps the most important communication skill. In addition, even when they are talking to journalists, the final audience is who the journalists are writing for, and so if they can deliver a clear message in their own words, that’s still better than leaving it to someone else. ■

Read the full interview:
www.twas.org/node/11858



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The World Academy of Sciences for the advancement of science in developing countries – TWAS – works to support 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 over 1,170 elected Fellows from some 90 countries; 16 of them are Nobel laureates. It is based in Trieste, Italy, on the campus of the **Abdus Salam International Centre for Theoretical Physics (ICTP)**.

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 and engineering research and sharing of experiences in solving major problems facing developing countries.

TWAS and its partners offer over 600 fellowships per year to scientists in the developing world for PhD studies and post-doctoral research. TWAS prizes and awards are among the most prestigious given for scientific work in the developing world. The Academy distributes more than USD1 million in research grants every year to individual scientists and research groups. It supports

visiting scientists and provides funding for regional and international science meetings.

TWAS hosts and works in association with two allied organizations on the ICTP campus:

The Organization for Women in Science for the Developing World (OWSD). At its founding in 1989, OWSD was the first international forum uniting women scientists from the developing and developed worlds. Today, OWSD has nearly 4,800 members. Their objective is to strengthen the role of women in the development process and promote their representation in scientific and technological leadership.

The InterAcademy Partnership (IAP) brings together three renowned global networks of academies of science and medicine, representing some 130 academies worldwide. Two of these networks, 'IAP for Science' [formerly IAP - the global network of science academies] and 'IAP for Health' [formerly the InterAcademy Medical Panel] are hosted by TWAS in Trieste. IAP provides high-quality independent information and advice on science, health and development to national and international policymakers and the public; supports programmes on scientific capacity-building, education and communication; leads efforts to expand international science cooperation; and promotes the involvement of women and young scientists in all its activities.

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