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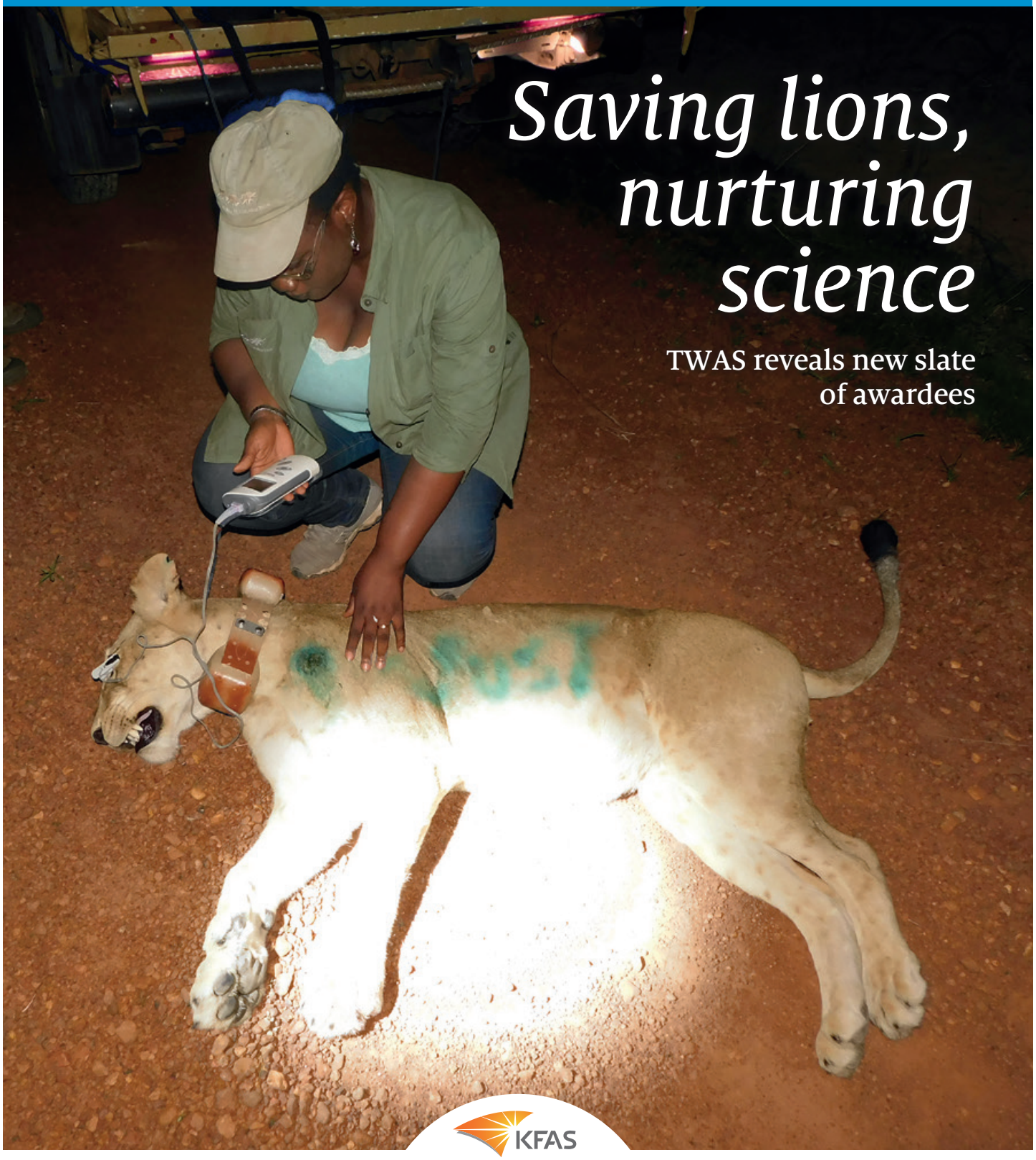

# *Saving lions, nurturing science*

## TWAS reveals new slate of awardees

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▲ Top: Antonethe Castaneda takes part in a tour of solar panels. Above: Fathiya M. Khamis at icipe instructs farmers on how to protect their yields. (Photos provided)

**Cover picture:** Beninese ecologist and TWAS-Samira Omar Award winner Etotépé A. Sogbohossou collars a lion while monitoring his wellbeing. (Photo provided)

▼ From left: Bolanle Ojokoh, Laura Margheri, Thsilidzi Marwala and Fernando Buarque, TWAS panelists at 2019 Trieste Next. (Photo: Edward W. Lempinen)


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EDITORIAL

# A CLEAR VIEW OF THE FUTURE

▲ Romain Murenzi, TWAS Executive Director

In 36 years of work advancing science in the developing world, the accomplishments of TWAS are many. Our highly regarded awards, career-making fellowships and role in setting the global agenda for capacity building are respected the world over. Yet, as we approach a transformative new decade, so much remains to be done.

In this issue of the TWAS Newsletter, we feature an interview with TWAS President Mohamed H.A. Hassan. In it, Hassan details TWAS's role in the world and where the Academy can go from here. Hassan is an important figure not only today, but in the Academy's history, having provided vital leadership during a lengthy term as its first executive director and, after that, as treasurer.

Hassan details priorities for 2020 and onward, which include intensifying our training of young scientists and our expanding role in science policy. He also outlines numerous ideas for how TWAS can evolve to complement the digital revolution, such as prioritizing fellowships on the cutting edge of information technology. We can also continue to partner with the essential UN Technology Bank, with an eye toward guiding least-developed countries (LDCs) into the digital age.

All of this is in the important context of an important mission. The global scientific community must continue to come together to help all nations achieve the UN Sustainable Development Goals by 2030. TWAS has already had a key role in developing the science capacity of nations great and small, and this role will be even more important for resource-poor LDCs. They will need expertise, policy guidance, and access to vast knowledge networks – all of which the Academy is well-positioned to deploy.

Another important aspect of our contribution is our awards. Six prominent awards to scientists in the developed world were given this year – five of them to women.

Five of these awards are sponsored by generous TWAS Fellows across the world: C.N.R. Rao, Atta-ur-Rahman, Samira Omar, Quarraisha Abdool Karim and Fayzah M. Al-Kharafi. The sixth, the TWAS-Siwei Cheng Award, is funded by the Siwei Cheng Foundation of the Education Foundation of the University of Chinese Academy of Sciences. The exceptional winners of these honours are all featured in this edition of the Newsletter.

Meanwhile, the growth of TWAS's involvement in the field of science diplomacy provides hope for stronger global links that can shore up commitments to science. The programme began with only one annual summer course, co-organized with the American Association for the Advancement of Science. Now TWAS is working to organize numerous science diplomacy events all over the world, including one in partnership with the Islamic Development Bank.

As always, all of our programmes play a part in the indispensable project of finding and assisting the best young scientists in the Global South. Our friends at TYAN – the TWAS Young Affiliates Network – will no doubt play a central role in this work in the new decade, and TYAN has already taken on an active role in not only connecting but enriching young developing world scientists with knowledge and know-how.

This is how the Academy will proceed into the future – with a clear vision informed by the steady hand of experience. We welcome you to join us on this endeavor to build a world where science and its benefits are available to all.

**Romain Murenzi**,
*TWAS Executive Director*

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# IN THE NEWS

## Block on GM rice has had costs

Stifling international regulations have been blamed for delaying the approval of a food that could have helped save millions of lives this century.

The claim is made in a new investigation of the controversy surrounding the development of Golden Rice by a team of international scientists. Golden Rice is a form of normal white rice that has been genetically modified to provide vitamin A to counter blindness and other diseases in children in the developing world.

**The Guardian:**
*www.bit.do/GoldenRice*

## Arab Region researchers look into disease risk

Researchers already know that different social groups in the Arab region face unequal risks when it comes to non-contagious diseases, like cancer. But their understanding of exactly why is less clear.

That was the message delivered by statistician Hoda Rashad at a recent conference organized by New York University–Abu Dhabi. Rashad, director of the Social Research Center at the American University in Cairo, warned that this knowledge gap is a significant obstacle for anyone who wants to help solve the problem of disease inequality.

**Al-Fanar Media:**
*www.bit.do/DiseaseRisk*

## Lift-off for first African vulture safe zones

Africa's vulture populations face the prospect of collapsing in much the same way as vulture species in Asia, experts warn, having already declined by an average 62 percent over the past three decades.

Key threats include poisoning by ranchers and poachers, and accidental drowning. To address the threats, managers of conservation areas and private game reserves in South Africa have agreed to create "vulture safe zones" that will do away with these practices to provide safe havens for existing vulture populations.

**Mongabay:**
*www.bit.do/SafeVultures*

## Plan to wipe out malaria is costly

A global roadmap to eradicate malaria in the next 30 years has been welcomed with caution by scientists and practitioners because of the high extra costs proposed.

The Lancet Commission on malaria eradication used new modelling to predict that, with better malaria interventions and control programmes, the disease could be all but eradicated between 2030 and 2050. However, to achieve this, global expenditure on tackling malaria must rise by USD2 billion a year, the commission said, in a report published 8 September 2019 in The Lancet.

**SciDev.Net:**
*www.bit.do/CostlyMalaria*

## Radioactive chlorine from nuclear tests linger

Antarctica's ice sheets are still releasing radioactive chlorine from marine nuclear weapons tests in the 1950s, a study has found. This suggests regions in Antarctica store and vent the radioactive element differently than previously thought. The results also improve scientists' ability to use chlorine to learn more about Earth's atmosphere.

**AGU Blogosphere:**
*www.bit.do/NuclearChlorine*

# Q&A MEETING THE FUTURE'S CHALLENGES

by **Edward W. Lempinen**

*TWAS President Mohamed H.A. Hassan says the Academy must expand its programmes and its role in influencing science policy.*

Mohamed H.A. Hassan is a storied figure in the history of science in the Global South. A young mathematician from Sudan, he was drawn to his father's business at home but also recruited by TWAS Founder Abdus Salam to come to Trieste, and to help in the foundation of the world's first academy for scientists from the developing world.

First as Salam's protégé, and then as a visionary executive director, Hassan helped guide TWAS from its earliest days through Salam's death in 1996 and through perilous budget challenges. Along the way, he has built powerful global partnerships and networks to support the Academy and the advance of science in the developing world. Through negotiation and diplomacy, he built the TWAS Endowment Fund into a foundation for financial stability.

After more than a quarter-century, Hassan retired as executive director in 2011. He served until 2015 as TWAS treasurer, and later remained an informal adviser to TWAS leadership. He has served in leadership roles for many scientific and international organisations. Currently he is president of the Sudanese National Academy of Sciences. He is past president of the InterAcademy Partnership (IAP). He is also the former chairman of the Council of the United Nations University and former president of African Academy of Sciences.

At the 28th TWAS General Meeting in Trieste, Italy, Hassan was elected by acclamation to serve a four-year term as Academy president beginning 1 January 2019. He succeeds Bai Chunli, who also serves as the president of the Chinese Academy of Sciences.

In an interview with Edward Lempinen, then TWAS public information officer, Hassan detailed his vision for the future of TWAS. His top priorities: expand programmes to educate and train young scientists, give TWAS a greater role in influencing science policy, and continue the mission of fundraising that supports a growing academy.

**What do you see as three biggest challenges facing science and the research enterprise in the developing world today?**

The most important one that TWAS is trying to address is to build the capacity of universities and research institutions, especially in the science- and technology-lagging countries. The issue here is to substantially improve the quality of research and education to enable these universities to attract and train talented students. And of course, to develop and retain home-grown world-class leadership in science, technology and innovation. If this is not addressed as a priority, then the brain drain will continue and the developing world, especially the S&T-lagging countries, will continue to lose their best scientists.

▼ TWAS President Mohamed H.A. Hassan (centre left), and the Governing Council of the newly established Technology Bank for Least Developed Countries meets with then-Secretary-General Ban Ki-moon (centre right). (Photo: United Nations)

The second challenge is to achieve the UN Sustainable Development Goals (SDGs). Every country is now struggling to achieve the SDGs by 2030. But without the capacity to develop and deploy cutting-edge technologies, I don't think much can be achieved. The third is a long-term challenge that the majority of developing countries have been struggling with: how to increase the funding allocated to research and development to a minimum of 1% of GDP. No country in Africa, for example, has reached this target, yet.
Obviously these three challenges are closely inter-related.

**In the 1980s and 1990s, TWAS was one of the few voices at the global level advocating for science in the developing world. Years later, many developing countries have made great progress. Does this change TWAS's role?**

The continuing demand for TWAS South-South cooperation programmes very much relate to the rapidly changing landscape of global science. In 1983, when TWAS was founded, the developing countries – representing 85% of humanity combined – contributed only 15% of publications in science, technology and innovation in the world. But in 2016, according to the latest statistics compiled by the US National Science Foundation, the developing world contributed 44%.

> "The mandate of TWAS really coincides with the mandate of the Technology Bank when it comes to supporting the LDCs."
>
> *Mohamed H.A. Hassan*

Come 2016, for the first time, you see China producing more peer-reviewed research papers in international journals than the United States. That is followed by India; Brazil; Iran; Turkey; Taiwan, China; and Malaysia, in that order. All of these countries are among the top 20 in the world when it comes to the number of research papers they produce.

If we can involve those countries in more South-South cooperation, we could substantially expand our PhD and post-doctoral education fellowship programmes, which are available to talented students and young scientists in S&T-lagging countries. I think TWAS should aim for at least 1,000 fellowships per year, up from about 500 now.

TWAS should also prioritise fellowships in transformative areas on the frontier of STI to address critical real-life problems in developing countries. The Internet of Things, ICTs, Artificial Intelligence, digitisation, genomics and others have yet to be emphasised in our postgraduate and postdoctoral fellowship programmes.

We should also try to develop triangular partnerships involving excellent institutions from the North and South, with at least one of them from the S&T-lagging countries. Together they would look specifically at problems related to the SDGs.

Finally, I think that TWAS should partner with the newly established UN Technology Bank to build the research capacities of the LDCs to enable them to generate, adapt and commercialise cutting-edge technologies. The mandate of TWAS really coincides with the mandate of the Technology Bank when it comes to supporting the LDCs.

**What priorities have you set for TWAS in the four years of your presidency?**

First, we should strengthen our five Regional Partners. They should take more of the administrative duties related to capacity-building programmes, mainly the PhD and postdoctoral training fellowships. This will give the TWAS secretariat in Trieste more time to address new challenges and goals. Of course, this will also require more funding for the Regional Partners, which should be part of our fundraising effort.

Second, we should strengthen the role of TWAS as an advocate for science for policy and policy for science in developing countries. That can be implemented through the release of evidence-based statements and reports on issues of concern to the Global South. We can additionally convene policy-relevant workshops, and seminars involving academics and policymakers from different countries to discuss critical challenges of common interest.

Third, TWAS now has over 1,200 elected Fellows and the time has come to improve their diversity and engagement. It is discouraging to see that over 70% of TWAS Fellows come from very few countries. In addition, there are not enough women and talented young scientists in TWAS membership. And the majority of Academy members, maybe over 95% of them, are not active in the Academy affairs. We have to work hard to address these problems.

Fourth, we should strengthen the links between TWAS and the ministries of science, ministries of finance, academies of science, and the science- and technology-based industries in the Global South.

Back in 1988, TWAS established the Third World Network of Scientific Organisations, or TWNSO. At the request of the G77, it became COSTIS – the Consortium of Science, Technology and Innovation in the South. The transformation received strong support from the UN and the G77 member countries. Unfortunately, the office of COSTIS – currently located in UNESCO – is not operational. As TWAS president I would like to pursue restoring its operational status as a joint initiative between UNESCO, TWAS and G77.

The fifth priority is how to strengthen the TWAS financial base. TWAS is now operating with a budget of about USD5 million per year. We should try to double that by 2022. These funds should go to strengthening both our programmes and Endowment Fund.

▶ For a career of accomplishments in research and international cooperation, TWAS founding Executive Director Mohamed Hassan, right, has been elected a lifetime member of the Pontifical Academy of Sciences. (Photo: Servizio Fotografico Vaticano)

**Why is it that many countries in the developing world, the LDCs, the science- and technology-lagging countries, have not increased their R&D investment to 1% of GDP? In many cases the number is much less.**

Yes, there is no country in Africa and in the S&T-lagging countries that has reached the 1% level. Very recent statistics, including those that come from the Stockholm International Peace Research Institute, found disturbing imbalances in government expenditures for different sectors.

If you look at the global list of the top 16 countries in terms of military expenditure as a percentage of GDP, 13 are developing countries. Developed countries have only three – that's unbelievable! But more disturbing is the list of top 15 countries in terms of military expenditures as a percentage of overall government spending. Of the top 15, 11 are developing countries.

And you know what surprised me? Sudan is No. 1 on the list. Sudan spends 31% of its government funds on the army and military. And only the remaining 69% goes to other areas such as education, water, health – all tied to the SDGs. The question is: how can TWAS or members of TWAS, or Regional Partners, look at those statistics and enter into some kind of discussion with policymakers and decision-takers?

We as scientists need to produce the evidence, and argue effectively that it's important to spend more funds for research and development if they want to have economic growth.

We must also encourage the private sector to invest in research and development. The private sector in developing countries has a very small contribution to research and development.

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> *Mohamed H.A. Hassan*

**TWAS's activities in science diplomacy have grown substantially. Five years ago, we had one course per year, with the American Association for the Advancement of Science. Now we're working with India, South Africa, with the Islamic Development Bank and in other parts of the world. Do you see other areas, or other countries, that might be appropriate for TWAS science diplomacy engagement?**

I think we all agree that the scientists, policy makers and diplomats in the Gulf and Arab countries, especially Iran, Saudi Arabia, Yemen, Syria and Algeria are facing great challenges at the moment. Science diplomacy can play an effective role in establishing channels for communication and collaboration to help resolve these challenges.

TWAS Regional Partners can play a positive role. Our Arab Regional Partner in Alexandria can convene meetings and invite people from other countries without any problem. We could perhaps hold science diplomacy workshops there, especially for young scientists from the Gulf countries and the Arab region.

**One area of science diplomacy right now is supporting researchers who have been displaced by war in their home countries. TWAS has worked in this area, but there's much more that could be done. What could the Academy's role be?**

TWAS has been trying to help in this area, but I think universities, institutions and academies of science all should have a role – in Europe and in developed countries. They have a moral responsibility to help displaced scientists and students.

Most of these displaced scientists and refugees are actually in the developing world, in countries adjacent to the war zones. And the numbers are huge.

So perhaps the universities and research institutions in countries with large refugee populations should look at that issue. I think TWAS can encourage that, through its members and Regional Partners. Perhaps they can help these displaced scientists and students by finding institutions in the region where they can continue their work.

**More broadly, you have talked about the importance of harnessing the energy of diaspora scientists from the developing world. Could you describe what this would take?**

One of the things I would really like to pursue as president relates to the science diaspora. Associations of diaspora researchers and academics in the North are very important to consider because of the role they can play in helping science refugees, as well as in building bridges to their home countries. This is something we have discussed, but we have never pursued it vigorously. I would advocate a new initiative for TWAS, with the support of Fellows in the North, to establish a database of the most accomplished diaspora scientists in those countries.

So many of them have key positions at institutions in the North. I'm sure the majority of them are willing to go to their countries of origin from time to time and help in the scientific development of those countries. We've seen this in many occasions through the TWAS visiting scholar programmes, but it has not yet been done in the form of a comprehensive programme that TWAS can advance. ◘

# A SCIENCE DIPLOMAT FOR SUSTAINABILITY

*TWAS Science Diplomacy Programme alumna Antonethe Castaneda won the 2019 TWAS-Al-Kharafi Award for her work helping Latin American communities realize a sustainable future.*

by **Sean Treacy**

Antonethe Castaneda, a science diplomat and political scientist, is the recipient of the 2019 Fayzah M. Al-Kharafi Award. She won the award for her work bringing communities in Latin America together to plan for a future of renewable energy and sustainable development.

Castaneda specialized in international relations and sustainable development, and she entered science diplomacy because it was at the junction of her interests. She attended the TWAS-AAAS science diplomacy summer course in 2017, which she called an "incredible experience." She then received training in Panama with the International Network for Government Science Advice (INGSA), and further experience with Open Doors Programme of Using Science for / in Diplomacy for addressing global Challenges (S4D4C).

"I have worked with decision makers in the government sector, but I also like science and science diplomacy," she said. "The lesson of such interdisciplinary work is to have a holistic vision."

The award is named for 2004 TWAS Fellow Fayzah M. Al-Kharafi from Kuwait, who provides USD4,000 for the prize. Al-Kharafi, the former president of Kuwait University, was the first woman to head a major university in the Middle East. She is also a former TWAS vice president for the Arab Region.

"I am grateful to Prof. Al-Kharafi, for selecting me. It is gratifying that a scientist at her level considers you," Castaneda said. "As a Latin American and a Guatemalan I'm happy too. As a political scientist I feel so proud to participate in the world of exact sciences. It is another step toward becoming an international decision maker."

Castaneda has worked in several regions of Latin America to advance local communities' efforts to prosper sustainably. Teamwork, she said, is critical between decision makers at all levels – and this is especially true as climate change complicates the challenges each local community faces. She said her multi-disciplinary experience has been able to bring a synergistic force to Latin American communities and aid them in their plans for future growth.

"When you have more discipline, when you have more vision, you have strong objectives," she said. "In Latin America, we don't have many people with backgrounds in different disciplines. And in sustainable development this is my strong point, because I understand political issues, but I also understand the science."

For example, as a volunteer of UNESCO Con-E-Ect, she works to aid negotiations taking place in the area of Huehuetenango, a city in Guatemala's western highlands. There, decision makers are developing a plan to bring companies that specialize in renewable energy into the region and enter the electrical integration market in Central America. Decision makers include mayors, local community leaders, academics, and non-governmental organizations. And during negotiations between all these interests, Castaneda tries

▼ Antonethe Castaneda, second from left, at a power transmission substation in Guatemala. (Photo provided)

▲ Antonethe Castaneda

*Read more:*
*www.twas.org/node/14968/*

to show what benefits the community will see – both technological and economic – from hydroelectric power, while keeping the impact on the ecosystem low.

These negotiations can prove very important because of the severe, long-term impact they will have on local communities. For example, the regional communities of Chel and Xacbal have historically relied on smaller hydroelectric power plants for local energy consumption, but they are now negotiating to share a river basin with one of the largest hydroelectric plants in Guatemala.

Her role is to urge local decision makers to prioritize renewable energy development alongside other priorities that may seem to compete. "For Central America, and Guatemala specifically, they are at a top level risk for climate change," she said. "But they also don't have principle services like schools and hospitals because they live in far away areas. So a local decision maker may prefer a new hospital over a hydropower plant."

In Santa Ana, a city in western El Salvador, Castaneda works to convince local mayors to accept biogas, a renewable form of energy which has trouble competing with non-renewables like gas and coal.

The advantage of biogas is that it makes use of waste – typically rotten food or forest leavings – to generate energy. And a community with a biogas company can rely on it even if there is an oil crisis. So she has to convince decision makers there that the renewable form is worth the higher investment and lower profits.

"In Santa Ana, we don't have so many conflicts with the people, just decision makers, because they prefer fossil fuels to renewable energy," Castaneda said. "So we try to change their minds."

> "In Latin America, we don't have many people with backgrounds in different disciplines. And in sustainable development this is my strong point, because I understand political issues, but I also understand the science."
>
> *Antonethe Castaneda*

In Nova Friburgo, a community of 180,000 southeastern Brazil, she supports the focal point of UNESCO Con-E-Ect, with local sustainability, ecosystem and ecotourism organization to raise awareness of the need for risk management and hydropower projects.

Nova Friburgo, in 2011, suffered from floods that killed over 200 people. So Castaneda is trying to raise local decision makers' awareness of the effects of climate change. This will help local experts and authorities anticipate changes to local rivers, as well as take advantage of its strength for hydroelectric power more effectively. Castaneda was involved in a recent event there about risk management and the use of electricity for example.

"Today, it is not common for renewables to be approached with risk management," she said. "It takes teamwork and multidisciplinary cooperation in several countries. So we do not work only from science and technology, but with local and community decision makers." ◘

# PROTECTING LION COLONIES THROUGH EDUCATION

*Beninese ecologist Etotépé A. Sogbohossou, who urges local communities to value the importance of protecting wildlife, won the TWAS-Samira Omar Award.*

by **Cristina Serra**

Northern Benin is the home to several lion colonies. They live in a transboundary area called WAP (W-Arly-Pendjari), which also includes protected areas of Burkina Faso and Niger. But cohabitation with humans is not easy: sometimes they cause losses in livestock during raids on neighbouring villages, prompting humans to reply by hunting them.

Etotépé A. Sogbohossou is a Beninese researcher and lecturer from the University of Abomey-Calavi, Benin. She is the winner of the 2019 TWAS-Samira Omar Innovation for Sustainability Award for her work inspiring new generations to protect nature and, especially, large carnivores in West Africa.

"Human-lion conflict is a major threat to local lions' packs: mitigating friction and teaching local communitites the importance of sustainable use of natural resources is becoming more and more urgent," explained Sogbohossou, who works in her university's school of natural resources management and faculty of agricultural sciences.

Sogbohossou is not new to wildlife conservation: it's almost two decades that she is carrying out research on wild lions, with the aim of developing projects that both protect these wild felines and, at the same time, raise awareness among local communities.

With a PhD in conservation biology earned from the University of Leiden, the Netherlands, in 2011, she has soon become a pioneer in the study of lions in West and Central Africa. Her research was one of the first important investigations of its kind in this area.

Large carnivores are among the most endangered species on Earth: they have specific ecological needs such as water and food that often conflict with humans'. On the other side, lions are among the preferred targets for poachers and trophy collectors, who hunt them to make trophies, or in retaliation after lions kill cattle and other livestock

In 2012-2013, working as an ecologist for the African Wildlife Foundation in the WAP, Sogbohossou was actively involved in monitoring elephant and giraffe populations, taking notes of their conflicts with local communities. Then, more recently, she acquired her current role at the faculty of agricultural sciences of the University of Abomey-Calavi.

"At times, poachers kill lions because they want to sell parts of their body for medical or even magical use, because some people think they can become as powerful as the animal they killed," explained Sogbohossou.

"But despite their threatening appearance, lions are extremely vulnerable," added Sogbohossou, who is also a TWAS Young Affiliate (2018-2022) and an active member of the African Lion Working Group as well as of several commissions and groups of specialists of The International Union for Conservation of Nature (IUCN). "Exponential population growth

▶ Etotépé A. Sogbohossou is a TWAS Young Affiliate (2018-2022) and an active member of the African Lion Working Group.

▶ Sogbohossou has been carrying out research on wild lions for more than two decades. (Photo provided)

is forcing humans to come in closer proximity with lions, and even if these felines live in a reserve surrounded by a buffer zone devised to minimize conflicts, contacts may be frequent."

Some interesting results obtained from Sogbohossou's reserach regard the seasonal patterns that livestock predation follow. Lions tend to prey more in the late wet season, perhaps because livestock tend to scatter far from villages and natural prey are more difficult to hunt during the wet season. Other factors influencing the livestock depredation are the proximity to the reserve and the presence of safari hunting.

"Man-lion conflicts could be reduced by improving husbandry practices," Sogbohossou noted. "By changing herding practices and building predator-proof enclosures, local people would increase their chances to protect cattle from lions." As an example, she mentioned that the new Pendjari park management is building a fence that is expected to reduce man-lion conflicts and also lion and wildlife habitat encroachment.

Another relevant result stems from studies on lion genetics throughout Africa. Sogbohossou found that Benin lions, as well as West African lions, are genetically different from lions in East and South Africa.

"This outcome is relevant, because when talking about conservation it is important to know that all species must be protected to preserve biodiversity," she explained.

Receiving the TWAS-Samira Omar Award was an unexpected development for Sogbohossou. "I did not imagine I would win this award," she said "but I already know how I will use it. I would like to focus on education and use research results to raise awareness among policy makers and decision makers."

> "Despite their threatening appearance, lions are extremely vulnerable, and minimizing conflicts with humans is important."
>
> *Etotépé A. Sogbohossou*

And she added: "In 2019, lion experts – under the leadership of Disney Foundation and the Lion Recovery Fund – promised through a declaration to recover lions, to unlock their value. This will be my contribution to it. The award could also help buy a few pieces of equipment such as cameras for a wildlife survey. In addition, as it is not always easy to get funding, I hope it will serve as leverage to get more financial support for our battle against the endagerment of Earth's resources." ◘

*Read more: www.twas.org/node/14965/*

# RESEARCHER PROTECTS CROPS FROM PESTS

*Kenyan scientist Fathiya M. Khamis won the TWAS-Abdool Karim Award for her research on native and invasive pests.*

by **Cristina Serra**

Many rural smallholders in Africa rely on mango fruits and avocados for their survival. These crops are an important resource that assist the fight against poverty and for food security. Unfortunately, crops are often infested by invasive pests that compromise their commercial value.

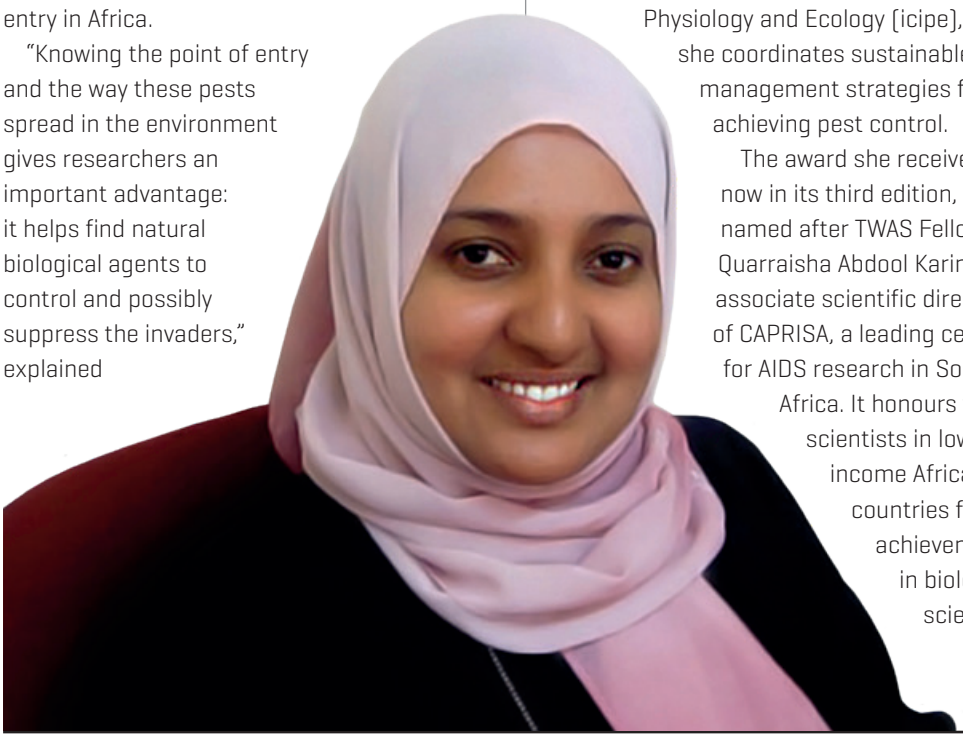
In the last two decades, an apparently new fruit fly called *Bactrocera invadens* has spread across many African countries, damaging the horticultural industry, spoiling up to 80% of the fruits, and preventing exports. Scientists adopted different approaches to characterize and contain these insects, including the identification of the insects' point of entry in Africa.

"Knowing the point of entry and the way these pests spread in the environment gives researchers an important advantage: it helps find natural biological agents to control and possibly suppress the invaders," explained molecular biologist Fathiya Mbarak Khamis from Kenya. Khamis is the recipient of the 2019 TWAS-Abdool Karim Award in biological sciences, a prize she received for the important contribution given to the identification of the pest's entry into Africa.

Khamis is an experienced molecular biologist who has completed her scientific education at Jomo Kenyatta University of Agriculture and Technology (JKUAT) and Kenyatta University, both in Kenya, where she earned her master's in biochemistry (2001-2004) and her PhD in molecular biology (2005-2009).

Today, she is a research scientist at the Kenya-based International Centre of Insect Physiology and Ecology (icipe), where she coordinates sustainable management strategies for achieving pest control.

The award she received, now in its third edition, is named after TWAS Fellow Quarraisha Abdool Karim, the associate scientific director of CAPRISA, a leading centre for AIDS research in South Africa. It honours women scientists in low-income African countries for their achievements in biological sciences.



▲ Fathiya M. Khamis, second from right, working with students at icipe laboratories.

◀ Khamis identified the point of entry in Africa of dangerous pests, making an important contribution to the fight against them.

## TRACKING THE PEST ROUTE

Almost a decade ago, Khamis began her investigation aimed at tracking the route of *B. invadens*. She used a molecular biology technique that proved that this pest entered Africa from South Asia, invading Kenya, then Tanzania and other countries.

However, new events soon emerged to confuse the situation: another pest from the Kaduna area in Nigeria started wreaking havoc. To rule out the chance that the pest could be a new species, rather than a case of re-infestation from the same one, Khamis carried out new experiments. She was able to prove that the two apparently diverse species were, in fact, the same.

> We use natural enemies of *B. dorsalis*, which attack the larval and the egg stages of the pest once released into the farm.
>
> *Fathiya M. Khamis*

"This achievement was very relevant because it shed light on the genetics of these pests. But it was even more important on the economic side: it eased the elimination of some trade barriers in the fruit exports, with meaningful economic benefits for local farmers," the scientist explained. If a pest is already familiar to science, scientists might already have resources to contain it and decrease the threat.

These findings propelled Khamis's career; icipe offered her a postdoctoral fellowship to carry out molecular characterization of key entomopathogenic micro-organisms, a field where she is making substantial progress.

At present, Khamis is coordinating two projects with icipe. The first one is part of the strategy against *B. dorsalis*. Along with her team, they have assembled a user-friendly tool box with five active components against the pests, and they encourage the farmers to use it in order to control the spread of this insect. "We use natural enemies of *B. dorsalis*, which attack the larval and the egg stages of the pest once released into the farm," she said.

In another, similar project Khamis is making good progress in the characterization of *Tuta absoluta*, a South American pest detected for the first time in Spain in 2006, which has invaded Africa in 2008, entering through Tunisia and finding its way down to Sub-Saharan Africa.

However, her work covers a much broader spectrum of activities. Khamis is also assessing the safety of edible insects, and is mobilizing resources for new projects to integrate management practices for pests of agricultural and economic importance. Her role in organizing training programmes and building research capacity in Africa through mentoring also contributed to her receiving the award.

Receiving the prize was "the happiest moment in my life," she said. "It is not only a highlight in my scientific career and an important recognition, but also a personal reward as a scientist. My director general, Dr. Segenet Kelemu, who is very encouraging to young and upcoming scientists, my supervisors and mentors and my institution will be very happy."

The award will be instrumental in reinforcing an ongoing collaboration that the scientist built during her PhD training from 2008 to 2009 at the University of Pavia, Italy. Liaising with Ministries of Agriculture personnel is now an important part of Khamis's work. "When we do dissemination among farmers and invite them to use our research kits we need approval from authorities. This is where TWAS's Award can be very useful." ◘

*Read more:*
*www.twas.org/node/14967/*

# IN SEARCH OF MEDICAL MOLECULES

*Nepalese chemist Achyut Adhikari won the TWAS-Atta-ur-Rahman Award for his research aiming to help lift up his country's economy.*

by **Sean Treacy**

Nepalese chemist Achyut Adhikari is the recipient of the 2019 Atta-ur-Rahman Award in Chemistry. He won the award for his work using natural products chemistry in Nepal isolating compounds in regional plants that can be put to use in medicine or commercial products.

He trained in Pakistan for his PhD and Brazil as a postdoctoral researcher, and then spent eight years in Pakistan on the job, developing his knowledge and skills. He then went back to his home country of Nepal about two-and-a-half years ago and established a natural products research lab. There, his work focuses on local plants and spices, seeking everything from medically useful compounds to items that could advance Nepal's profile on the global market.

"When I was in Pakistan, my aim was different: I concentrated on drug discovery for diabetes and cancer and such," he said. "When I returned to Nepal my focus had changed. We don't have sophisticated labs, so we can't do deep research. But I want to concentrate on developing products from, say, ginger and cinnamon. These plants are common in Nepal and have a cheap price. But with the research, I can develop techniques and get a better price. It's science for society."

One example is a bushy plant called the winger prickly ash that also grows in Nepal and can be used to extract compounds that promote insulin secretion, he said.

"Many people still depend on traditional plants, so we're trying to do some scientific verification of these traditionally used plants," he said.

Another medically useful plant is a conifer called the English Yew [*Taxus baccata*] that is found in Nepal's mountains. Researchers want to extract a compound which can be easily converted into existing anti-cancer drug called Taxol from its small, thin leaves. If they can isolate the compound and start producing it, they could start selling it on the international market.

Adhikari is also working on other Nepali products, some of which are relevant to health-conscious consumers. "We have cinnamon, ginger, and Nepali pepper," he said. "Nepali pepper has already got attention."

It's common for Nepalese people to mix Nepali pepper into their chutney. People consider it useful, he said, because it's said to help with diabetes – and he has isolated the insulin-generating compound within it. It's also useful for blood-pressure control, liver protection, to prevent tooth decay, as well as against oral and prostate cancer.

He is also researching how to process oil from local ginger. The goal is to start exporting ginger oil from Nepal to Western countries.

▲ TWAS-Atta-ur-Rahman Award winner Achyut Adhikari with his research team. (Photo provided)

◀ Achyut Adhikari is using biochemistry to look for ways to stimulate the Nepalese economy.

Nepal currently exports ginger to India for a cheap price, but India is currently the only country they sell it to. So if India decides to not buy any ginger for a year, their harvest goes to waste. However, if Nepal can start an industry harvesting ginger oil, they'll have a whole new product they can reliably sell every year to Europe and the United States, where there is a large demand.

"Now I am extracting ginger oil from different districts of Nepal, and sending them for testing in a lab in the United States to find out which ginger is good," he said. "We have different varieties, and their oil composition and chemical profile change according to the altitude."The oil also needs to be free of pesticide residue, which is a large problem for plants in Nepal. So pesticide analysis is part of his work.

Adhikari is supervising two PhD students and 10 master's students at the Central Department of Chemistry of Tribhuvan University in Kirtipur, Nepal. They work in different fields – some on ginger, some on medicinal plants, and some on pesticide residue. He is also consulting local essential oil industries that extract and export oils of aromatic plants, and his master's students collaborate with the companies on their research.

"I am trying to teach students, collaborating with industries, lobbying with governments to add value in medicinal plants of Nepal," he said.

Since Nepal spares little money for scientific research, Adhikari's lab has partnerships in Japan, India, Sri Lanka and the United States for analysis of samples.

> "These plants are common in Nepal and have a cheap price. But with the research, I can develop techniques and get a better price. It's science for society."
>
> *Achyut Adhikari*

He said the award will inspire him to do more research, and help him convince the government to invest in research. "I am so happy to receive this award," he added, "because Prof. Atta-ur-Rahman is my teacher as well as role model and I learned most of these things from him."

"My research work will help for the standardization of Nepali herbal and aromatic products," he added. "After that, the products will get marketed in Europe and America." ◘

*Read more: www.twas.org/node/14961/*

# A LIFE DEDICATED TO GEOLOGY

*Geologist Evelyne I. Mbede from Tanzania is the recipient of the 2019 TWAS-C.N.R. Rao Award for her work on disaster preparedness and seismic studies.*

by **Cristina Serra**

Sometimes childhood dreams cannot be fulfilled, but sometimes it works out for the best. As a child, Tanzanian geologist Evelyne I. Mbede always dreamed of being an austronaut, but she ended up studying geology. She earned her PhD from the Technical University Berlin, in 1993, and 10 years later was appointed the head of the geology department at the University of Dar es Salaam (UDSM), in Tanzania.

For years, she lived in a region of geological importance – the exposed outcrops of the East African Rift. She focused her research on studying volcanoes and earthquakes. Then, for a decade, she served as the director of STI at Tanzania's Ministry of Communication of Science and Technology (2007-2016). For her unceasing work and commitment, and her significant contributions to Earth science and reduction of natural disasters, she received the 2019 TWAS-C.N.R. Rao Award for Scientific Research.

"I did not expect this award at all," she said. "I was surprised when I got the notification, because I felt that my career was similar to that of other colleagues: we Tanzanian scientists are all equally passionate for our country."

The TWAS-C.N.R. Rao Award for scientific research is named after former TWAS's President C.N.R. Rao, a world-renowned chemist and a leading expert in solid state and materials chemistry. The award comes with a cash prize of USD5,000, and is designed to honour TWAS Fellows from the Least Developed Countries (LDCs) who have made significant contributions to global science.

Mbede's career started in the geology department at UDSM, where she served as the

▶ Geologist Evelyne I. Mbede is now investigating the Rukwa Rift Basin in Southwestern Tanzania, where helium reservoirs could hide.

▼ The mountain Ol Doinyo Lengai, whose name means 'Mountain of God', is an active Tanzanian volcano in the East African Rift that Mbede is studying. (Photo provided)

head of the geology department from 2004 to 2006, and where she was later appointed the first female dean to the faculty of science (2006-2007).

Things were not always easy for her. Being a woman scientist often meant to take very firm stances, at times. But during her mandate with the Ministry, from 2007 to 2016, Tanzania experienced a notable increase in government funding for science and technology. "I always tried to have a clear vision of my role: to help young scientists and provide information about scholarships, and on how to advance in science," she maintained.

Today, she is an associate professor in Earth sciences at UDSM's geology department. "I am definitely a scientist and teaching is among my preferred activities," she said. "But those 10 years at the ministry were an experience I really enjoyed."

Part of her work is measuring and analysing geological features. In addition, she teaches local populations to be aware of potential risks comig from active volcanoes and earthquakes. Training people who live in highly tectonic areas is important, she said. After a seismic event, she and her team rush to the earthquake-stricken area to make sure that people are not affected by aftershocks.

"Preparedness is important," she asserted. "This is why, with my team, we constantly engage in advising the government about seismic risk. We also offer the population sound training on how to face earthquakes or volcanoes in case of eruptions."

Today Mbede has a new project: She is investigating the Rukwa Rift Basin in Southwestern Tanzania, where geologists assume several helium reservoirs could hide. Helium is important because this gas is now used in new manufacturing and research techniques such as magnetic resonance imaging. This is why she is now mapping the area: she hopes to identify potential helium reservoirs and to establish geological models that clarify the process of helium generation and trapping under the sedimentary basins in the rift.

"The global helium demand has more than doubled throughout the last 20 years," she observed. "We believe that Tanzanian sedimentary rift basins hide substantial concentrations of this gas. This investigation represents a great opportunity for Tanzania: it would pave the way to joint collaborations for our university and private companies. And it would help us build a new class of experts in various disciplines related to this research."

> "Preparedness is important. This is why, with my team, we constantly engage in advising the government about seismic risk."
>
> *Evelyne I. Mbede*

The helium project also holds great economic promise: it may increase the value of the basin and attract more investors to Tanzania. Ultimately, this would set in motion new government efforts towards industrialization, ensuring adequate and reliable supply of helium gas for diverse uses.

Commenting on the TWAS award, Mbede said the prize will be useful to buy new equipment needed for her research, to help young PhD students finish their education and publish scientific papers, and to establish new collaborations to increase her group's impact on the international scene. "Of course, it will also allow us to supplement our efforts in the field and collect more samples for the project in Rukwa basin. I am very excited!" ■

*Read more: www.twas.org/node/14972/*

# PUTTING TRADE POLICY UNDER A LENS

*Chinese social economist Yang Cuihong won the TWAS-Siwei Cheng Award in Economic Sciences for her models that analyze China's status in the global economy and more.*

by **Sean Treacy**

Yang Cuihong, a Chinese social economist who specializes in modelling the economy, has won the 2020 TWAS-Siwei Cheng Award in Economic Sciences.

Yang is a leading expert in the field of economic modelling. Her insightful work has helped both China and its trade partners understand the dynamics of today's international trade relationships, and has been hailed by prominent international trade organisations.

China also uses her models to study a wide range of important economic issues, including water conservation to the grain market. Yang's research on global value chains has been influential all over the world. "Global value chains" is a technical term referring to how different countries take on different roles in the process of producing valuable goods for the market. The Organisation for Economic Co-operation and Development (OECD), the World Trade Organization (WTO) and Asia-Pacific Economic Cooperation (APEC) are among the major international organizations that have adopted her research.

"It's a great honour to win the award," Yang said. "It also helps our prestige in this area. Another thing is that it's a big encouragement to our colleagues who do very similar research. I am very happy that it acknowledges our contribution."

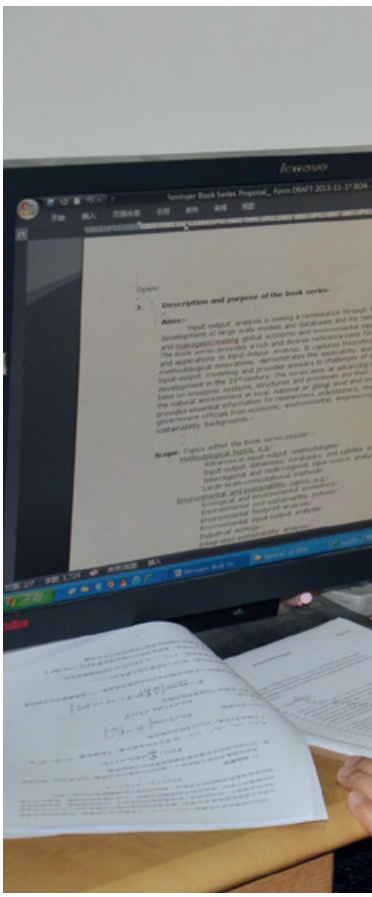
She added: "For me it makes me more confident about solving such issues not only for China but also for some other developing economies, even developed economies.

When it comes to global value chains, Yang's research focuses on a concept called "processing trade." Processing trade describes China's role as a major manufacturer in the global market. China has to import a large amount of basic materials – raw materials such as wood and metals, but also component parts such as chips – from other countries or regions. Then, China assembles finished products from those materials and exports them for sale on markets all over the world. The downside is that China becomes dependent on imports for those basic materials and component parts.

"Our main mission is to grasp the major economic problems not only in China but also other countries," Yang said. "Our first research project was to assess the importance of the difference between processing and non-processing trade. The consequences were to develop a new model that captured the difference, which traditional models could not capture."

The reason understanding processing trade is important, is that it's an alternative to looking at gross trade statistics, which only provide a one-dimensional picture of the international economy. By understanding China's role as an assembler of sorts in the production process, a more-detailed picture emerges of how China adds value to commercial goods.

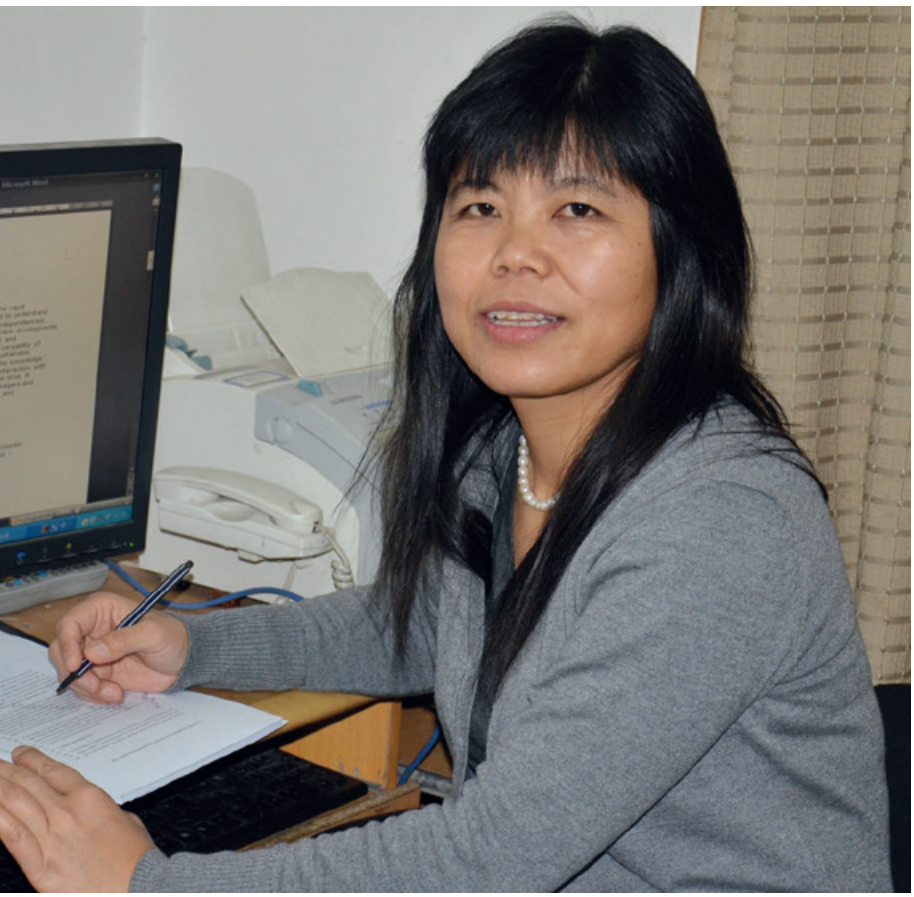
Yang and her collaborators' model on processing trade has produced information



▲ TWAS-Siwei Cheng Award winner Yang Cuihong at her work station. (Photo provided)

that is vital to China and its trade partners. For example, one result projected that China-to-U.S. trade surplus would drop 40 to 50% if measured in value added obtained by their new model. Their models also captured the benefits that Japan, Korea and China could share by diversifying their roles in economic production and trade.

Her work also supported the policy development of the Chinese government. This won her a position with China's Ministry of Commerce where she leads a group of 30



researchers who study the effects of trade. The OECD and WTO have also recommended her approach to member economies, especially those with similar roles in international trade to China.

## MODELLING KEY RESOURCES

Yang also developed a new model for estimating the benefits and costs of water conservation in the developing world.

After a nation-wide series of floods in 1998, she explained, China needed a wide-scale water conservation project to protect its natural water resources and ensure the provision of healthy water to people. So she was hired to conduct a research project for China's Ministry of Water Resources. Yang's job was to determine the breadth of the needed expenditure in a long-term, resource heavy project.

"They needed to understand the cost – local and national," Yang said. "What we did was construct an optimization model to determine the fixed investment in water conservation, for the expenditure of the central government."

Since 2011, Yang and her colleagues have also worked to predict China's grain output in major production areas, providing China with yearly policy reports. "We have suffered from grain shortages in past years," she said. "We have constructed a model to make a projection of China's grain output not only for the nation, but for major production areas such as wheat and maize."

> "Our main mission is to grasp the major economic problems not only in China but also other countries."
>
> *Yang Cuihong*

Their project was accurate enough that China's Ministry of Agriculture used their reports to plan to balance grain production, consumption, imports and exports. The average error rate of the models for major production areas from 2011 to 2017 was only 1.5%.

She has also done research on energy consumption, complementing what in 2005 was the Chinese government's plan to reduce energy consumption in the country by 25% by the end of 2010. ◘

*Read more: www.twas.org/node/14977/*

# GETTING SCIENCE DIPLOMACY OUT OF ITS SILO

*It's time for science and diplomacy to recognize that technological change has made everyone part of one big new network, Austrian diplomat Clemens Mantl said at a TWAS-S4D4C workshop.*

▲ Participants in the S4D4C science diplomacy workshop.

by **Sean Treacy**

Diplomat Clemens Mantl speaks at the workshop "Science meets Diplomacy: a new European perspective." In international relations, politics typically come first, and science follows behind. But according to experienced diplomat Clemens Mantl, successful diplomacy in the future will require an in-depth understanding of how science and technology are transforming the way foreign politics work.

That's the essential character needed for science diplomacy in the 21st century, said Mantl, the consul general of the Republic of Austria in Milan. Mantl was also the director of the Office of Science and Technology Austria (OSTA) in Washington D.C. for four years and served as the director of the Austrian Cultural Forums in Teheran, Iran, and in Cairo, Egypt, as well as in the Austrian embassies in Belgrade, Damascus and Prague.

Speaking on the opening day of the first S4D4C science diplomacy workshop, titled "Science meets Diplomacy: a new European perspective", Mantl offered an interpretation of science diplomacy that he called atypical for a diplomat. Networking is a diplomat's bread and butter, he explained. Yet now, networking has become a science in itself. This is where science diplomacy can achieve something new – it is in a unique position to apply the science of networking to the core of diplomatic work itself.

"Diplomats are bureaucrats, but there are quite a bunch of similarities with scientists," Mantl said. "We both are, in a way, investigators. We both try to find solutions to fundamental problems of our societies – and, whatever we do at the end there has to be a paper. Eventually, with our papers at hand, both of us struggle to get our message across to the public."

This was the first S4D4C Science Diplomacy Workshop, held in Trieste, Italy, from 21-23 October 2019 and hosted by TWAS, a partner in the S4D4C consortium.

S4D4C – which stands for Using Science for/in Diplomacy for Addressing Societal Challenges – works to support the European science diplomacy, the European Union foreign policy goals and especially the development of solutions for global challenges.

The Trieste workshop drew over 30 speakers and participants from over a dozen countries – mostly from EU Member States – but also from Russia, Algeria and Ukraine. A second workshop has taken place in Vienna, Austria, from 25-27 November 2019.

The workshops are designed for scientists, diplomats, policymakers and other experts in fields where science, technology and foreign policy intersect. The workshops use lectures,

▼ Clemens Mantl

> For many diplomats, science is a tool and scientists are perfect agents of cooperation in bilateral relations. *Clemens Mantl*

panels and interactive events such as role-playing simulations to build important skills and establish a community around science diplomacy that grows beyond the workshops.

### "UNDERSTANDING THE WHOLE"

Mantl has direct experience in network-building. He was director of OSTA for four years, and during that time he managed the Research and Innovation Network Austria (RINA), an institution through which diplomats and others could tap the expertise of 3,000 Austrian scientists in the U.S. and Canada.

Mantl compared traditional diplomacy to a messy network of wires interwoven and linked up with one another. He said these wires tend to complicate the work of diplomacy, sometimes causing diplomats to lose focus on national interests and instead to focus disproportionately on the tools of their trade, such as the use of soft power and various subcategories of expertise.

The result of the complexity is that various means of achieving diplomatic goals become siloed into categories of specialists – for example: economics, sports, culture and science.

As an example, he said that during the time he was involved in cultural diplomacy he would advocate for how the arts can unite people across differences. But sometimes he and his colleagues would over-focus on culture – the tool they were using – and lose sight of the solution to the problem or the national interests they were supposed to pursue. The truth, in culture, is that there are also elements of exclusion rather than connection-building, but the fixation on culture that was part of the culture diplomacy scene became more important than understanding that complication.

"For many diplomats, science is a tool and scientists are perfect agents of cooperation in bilateral relations," he said. "They can play this role even independently from their readiness to explicitly act on behalf of their country."

The way to make science diplomacy more effective would be to take an interdisciplinary approach in diplomacy. He advocates for new, integrated teams of diplomats, scientists and other experts. Scientists and experts could provide curricula on science, research, technology and innovation; but an effective approach should also include instruction on interdisciplinary competence – skills still largely missing among both scientists and diplomats, and an area where science diplomacy could prove important.

By extension, broadening and improving networks would also pull all the other areas of expertise out of their respective siloes and allow various experts of all kinds to partner with diplomats, and each other. He described it as an interdisciplinary approach that is "about understanding the whole."

"There is a clear difference between expert cooperation and political cooperation but yes – of course – they support each other," he said. "One of the core competences of diplomats in order to act persuasively in their national interest is a high level of intercultural competence and knowledge of networking and connecting." ◘

*Read more:*
*www.twas.org/node/14861/*

◀ From left: Fernando Buarque, Bolanle Ojokoh, panel chairperson Alessandra Ressa, Laura Margheri and Tshilidzi Marwala take part in the TWAS-organised Trieste Next roundtable on the 4th Industrial Revolution.

# OPENING THE DOOR TO THE 4TH INDUSTRIAL REVOLUTION

by **Cristina Serra**

*What are the opportunities and potential downsides of the 4th Industrial Revolution? Experts at 2019 Trieste Next festival debated the pros and cons.*

In science-fiction movies Artificial Intelligence – or AI – often shapes the world. Humanoids serve humans, services and facilities are automated, and powerful computing systems can learn without human input.

It's hard to believe, but it seems that future is already here.

Are there potential negative effects? Will there be risks to privacy and freedom? What if what is globally known as the Fourth Industrial Revolution displaces millions of jobs, leaving the Global South, in particular, exposed?

For the 2019 edition of the international science festival Trieste Next (27-29 September) titled "Big Data, Deep Science", TWAS organized a roundtable with four international experts on themes related to AI, robotics and the changes and challenges that this is introducing, especially in developing countries. The TWAS event was titled "The promise – and risk – of the Fourth Industrial Revolution".

The speakers were: Tshilidzi Marwala, a TWAS Fellow from the University of Johannesburg in South Africa; Bolanle Ojokoh, a TWAS Young Affiliate from Federal University of Technology in Akure, Nigeria; Laura Margheri from the Center for Micro-BioRobotics at the Italian Institute of Technology, Pisa, Italy; and Fernando Buarque from Universidade de Pernambuco in Brazil.

"AI is neither good nor bad. It is a very powerful tool that can offer guidance in various fields: to predict future wars, to make precise medical diagnosis and to enhance efficiency in trades," observed Tshilidzi Marwala, vice chancellor and principal at University of Johannesburg, South Africa.

Ojokoh mentioned the great number of potential advancements granted by smart machines imitating intelligent human behaviour: "We have many applications in fields as agriculture, food security, disaster preparedness and environment management," she said, citing a project involving Nigeria and Benin, for which she is seeking funds.

At the Italian Institute of Technology, in the Bioinspired Soft Robotics research line, nature is taken as the main source of inspiration for the design of innovative robotic technologies. "Living systems have acquired experience during evolution, adapting to changing conditions, and in robotics we can use this experience as a guide for our research," noted Margheri.

"It has become a major paradigm for the design of soft technologies and soft-bodied arms and robots, able to better adapt to the environment and be more safe during interactions."

Buarque warned that more than 2,000 years have passed for the first three revolutions to occur, and only one generation between the third and the fourth. Even positive applications such as face recognition to fight criminality, and automation in assembly lines and in traffic management, need to be carefully used. "If we do not pay attention to what is going on now, computers will invert the roles. Tools are alive and we will be the tasks." ◘

*Read more: www.twas.org/node/14868/*

# PEOPLE, PLACES & EVENTS

**CHATTOPADHYAY RECEIVES THE RAMACHANDRAN GOLD MEDAL**

Professor **Amitabha Chattopadhyay**, a 2017 TWAS Fellow and the 2016 recipient of a 2016 TWAS Prize, was honoured with the Ramachandran Gold Medal for Excellence in Biological Sciences & Technology by the Council of Scientific and Industrial Research (CSIR) of India.

Chattopadhyay obtained his PhD from the State University of New York at Stony Brook, and was a postdoctoral fellow at the University of California at Davis. Then he joined the Centre for Cellular and Molecular Biology (CCMB) in Hyderabad, India, where he is currently a Science and Engineering Research Board Distinguished Fellow.

His major scientific interest is membrane and receptor biology: to understand the functioning of these cellular components he employs a variety of approaches, integrating biophysics, biochemistry and cell biology. His research on Leishmaniosis - a disease caused by parasites of the *Leishmania* type - and his commitment to science made him succeed in filing two patents that are currently used in the treatment of this disease.

For its relevance and medical implications, his research was often popularized by major Indian newspapers like the *The Times of India* and *The Hindu*. Chattopadhyay is also a distinguished visiting professor in the department of chemistry at the Indian Institute of Technology Bombay in Mumbai and an adjunct professor at the Tata Institute of Fundamental Research, also in Mumbai. He is a dedicated tutor of both PhD students and postdocs.

**EQBAL DAUQAN WINS THE CROSS-CULTURAL BRIDGE BUILDER'S AWARD**

The University of Agder (UiA) in Norway honoured Yemeni biochemist **Eqbal Dauqan** with the Cross-Cultural Bridge Builder's Prize for being a passionate University's ambassador. Dauqan, a native of Yemen, is a war-displaced scientist who was forced to leave her country seeking fortune, and a chance to work as a scientist far from home. She earned her bachelor's in biological chemistry (2002) at the department of chemistry, Taiz University, Yemen. In 2008, she obtained a master's in organic chemistry from Taiz University, and a scholarship by the Trieste-based Organization for Women in Science for the Developing World (OWSD) to pursue her doctoral studies in Malaysia. In 2012 she held her PhD in biochemistry from the University Kebangsaan, Malaysia, where she continued working as postdoctoral fellow in chemical science and food technology.

A very active researcher, in 2015 Dauqan received the Elsevier Foundation Award for Early Career Women Scientists in the Developing World for her research on the antioxidant properties of vegetable oils and studies in sensory evaluation and organic chemistry.

Now she is a lecturer and researcher at UiA, in the department of nutrition and public health where she is considered a role model, able to inspire other women from developing countries to pursue an academic career and contribute positively to socio-cultural development. She was awarded not only for the quality of her science and for supervising students, but also for her unique ability to make contact and build bridges between her own culture and others'.

**ATTA-UR-RAHMAN AWARDED BY THE PRESIDENT OF CHINA**

Pakistani organic chemist Prof. **Atta-ur-Rahman**, elected to TWAS in 1985, has been conferred the International Science and Technology Cooperation Award, the highest scientific award that China offers to outstanding scientists. The ceremony was held at the Great People's Hall in Beijing and the prize was conferred by Xi Jinping, the president of the People's Republic of China.

Atta-ur-Rahman is currently the chairman of Prime Minister of Pakistan's national task force on science and technology, and the vice chairman of the Prime Minister's task force on technology driven knowledge-economy, which is chaired by the Prime Minister.

He is also the president of the Network of Academies of Science of Islamic Countries, and served as the president of the Pakistan Academy of Sciences.

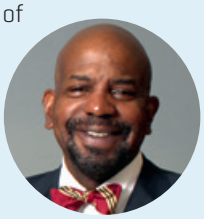
He earned his PhD elsewhere in 1968 in organic chemistry from Cambridge University (U.K.) and is the first scientist from the Muslim world who won the prestigious UNESCO Science Prize, in 1999. In 2006, he was

# PEOPLE, PLACES & EVENTS

elected as Fellow of the Royal Society (London), at that time the fourth Muslim scientist ever.
In 2009, he won the TWAS Prize for Institution Building, in recognition of his contributions to seminal changes in the higher education sector in Pakistan. He authored more than 1,250 publications, edited or authored 341 books, 69 chapters in scientific books and has been granted 45 patents. Under his supervision 83 students completed their PhD.

**CATO LAURENCIN HONOURED TWICE**

**Cato Thomas Laurencin**, a 2006 TWAS Fellow and the Albert and Wilda Van Dusen Distinguished Professor of orthopaedic surgery at the University of Connecticut was elected to the American Academy of Arts and Sciences in October 2019.



At the same time, Laurencin was named the 2019 winner of the Simon Ramo Founders Award by the National Academy of Engineering (NAE), for his contributions and leadership in engineering.
Laurencin, who is also chief executive officer of the Connecticut Convergence Institute for Translation in Regenerative Engineering, is a world-renowned leader in stem cell science, nanotechnology and biomaterials, as well as in regenerative engineering, a field in which he stood as a pioneer. He was listed in the America's top doctors for 15 years, and was honoured three times by U.S. presidents. The Academy of Arts and Science membership honours outstanding individuals who have obtained important achievements in the academia. Laurencin, who earned his M.D. from Harvard Medical School and his PhD in biochemical engineering/biotecnology from the Massachusetts Institute of Technology is among the active members of the Academy of Arts and Science. An elected member of NAE, Cato Laurencin was honoured the Simon Ramo Founders award "for fundamental, critical, and groundbreaking scientific advances in the engineering of tissues, guiding technology and science policy, and promoting diversity and excellence in science."

**JEREMIE ZOUEU AWARDED FOR RESEARCH AND INNOVATION**

**Jeremie Zoueu**, a physicist from Ivory Coast, has been awarded the National Award of Excellence for research and innovation by the president of the Ivory Coast, in 2019.
Zoueu is the coordinator and director of the Interdisciplinary Research Unit in Electronic and Electricity at the National Polytechnique Institute Félix Houphouët-Boigny (INP-HB) in the Ivory Coast, and the coordinator of the African Spectral Imaging Network. He is also the vice-president of the Ivorian Physical Society.

In the past, TWAS honoured Zoueu three times for his work in the biomedical field, offering him a TWAS research Grant in 2009, 2011 and 2014 respectively.
The latest award comes as a recognition for a number of initiatives he took to promote science in Ivory Coast. He has built the main biomedical optics laboratory of the subregion from scratch, granting facilities with international standards of research, thus allowing students from across the African subregions to carry out valuable work to obtain master's degrees and PhDs. With some colleagues, Zoueu founded the African Spectral Imaging Network. The network, in its 10th year now, includes eight African countries, and uses self-developed instruments for malaria diagnosis, and for tropical plants diseases diagnostics.
Early in his scientific career, he studied and worked in France, Italy, Germany, Sweden, and in many African countries. Today he resides in the Ivory Coast where he is also committed to organize outreach activities for all levels students to increase their interest for science and improve gender balance in science.

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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 laureate. Today, TWAS has almost 1,300 elected Fellows from more than 100 countries; 14 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, the Academy'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 more than 460 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 nearly 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 more than 9,000 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)** represents more than 140 national and regional science and medical academies worldwide. IAP provides high-quality analysis 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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