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OWSD



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LETTER FROM THE OWSD PRESIDENT



I am thrilled to be writing this editorial for the OWSD 2018 Annual report. While we have always made reports to donors, until now we have not had the resources to put together an Annual Report that is – I hope you will agree – not just informative and comprehensive, but which celebrates in big beautiful colour OWSD members' and fellows' achievements and successes from all around the world!

2018 has been the most exciting and event-filled year. It is 25 years since the official launch of the Organization in 1993. It is 20 years since the first OWSD PhD fellowship funds were awarded and the beginning of our collaboration with Sweden (Sida). This is also the first year we began a brand new collaboration with Canada (IDRC) and awarded the first Early Career fellowships. We continue to celebrate excellent women scientists from the developing

world with a prize scheme funded by the Elsevier Foundation.

OWSD, in 2018, is an internationally respected organization, championing trailblazing research by women scientists and connecting, supporting and celebrating women scientists around the world through our membership of more than 7,000. In 2018, we are proud to celebrate OWSD's 250th PhD fellowship graduate!

OWSD 25th anniversary events have been celebrated by members around the world and linked to the launches of seven new national chapters: in Indonesia, Kenya, Mauritius, Myanmar, Rwanda, Sri Lanka and Zimbabwe. Four chapters were re-launched and held international celebrations in Bangladesh, Ghana, India and Sudan.

The OWSD Secretariat continues to work very closely in Trieste with The World Academy of Sciences, the Inter Academy Partnership and our hosts, the International Centre for Theoretical Physics. As a programme unit of UNESCO, we have contributed to making the challenges and achievements of women scientists from developing countries more visible on the world stage — but there is still much to be done.

We can't wait to continue collaborating with you in 2019!


Jennifer Thomson
OWSD President



OWSD Early Career Fellow Shobha Poudel working with smallholder farmers in Nepal to assess the effectiveness of climate-smart agricultural practices.

OWSD 25TH ANNIVERSARY



In 1998, what is now OWSD began as the seed of an idea at a TWAS conference on 'The Role of Women in the Development of Science and Technology in the Third World,' in Trieste, Italy.

A study group of top women scientists and other experts was set up to explore the possibility of creating an organization that would champion the experience, needs and skills of women scientists in the developing world. At a further meeting in Trieste the next year (20-22 March 1989) the Third World Organization for Women in Science (TWOWS) was established and a constitution agreed and adopted.

TWOWS was officially launched in Cairo, Egypt in 1993, at the First General Assembly. It was not until the Fourth General Assembly held in Beijing, China, 17 years later (2010) that members voted to change

the name to the Organization for Women in Science for the Developing World (OWSD).

This year, OWSD celebrates its 25th anniversary, and is now an organization of more than 7100 members from 150 countries. Members have established National Chapters in 20 countries to organize activities to promote women's and girls' participation in STEM at all levels, including outreach to schools, events to build professional skills for working scientists, and engagement with policymakers.

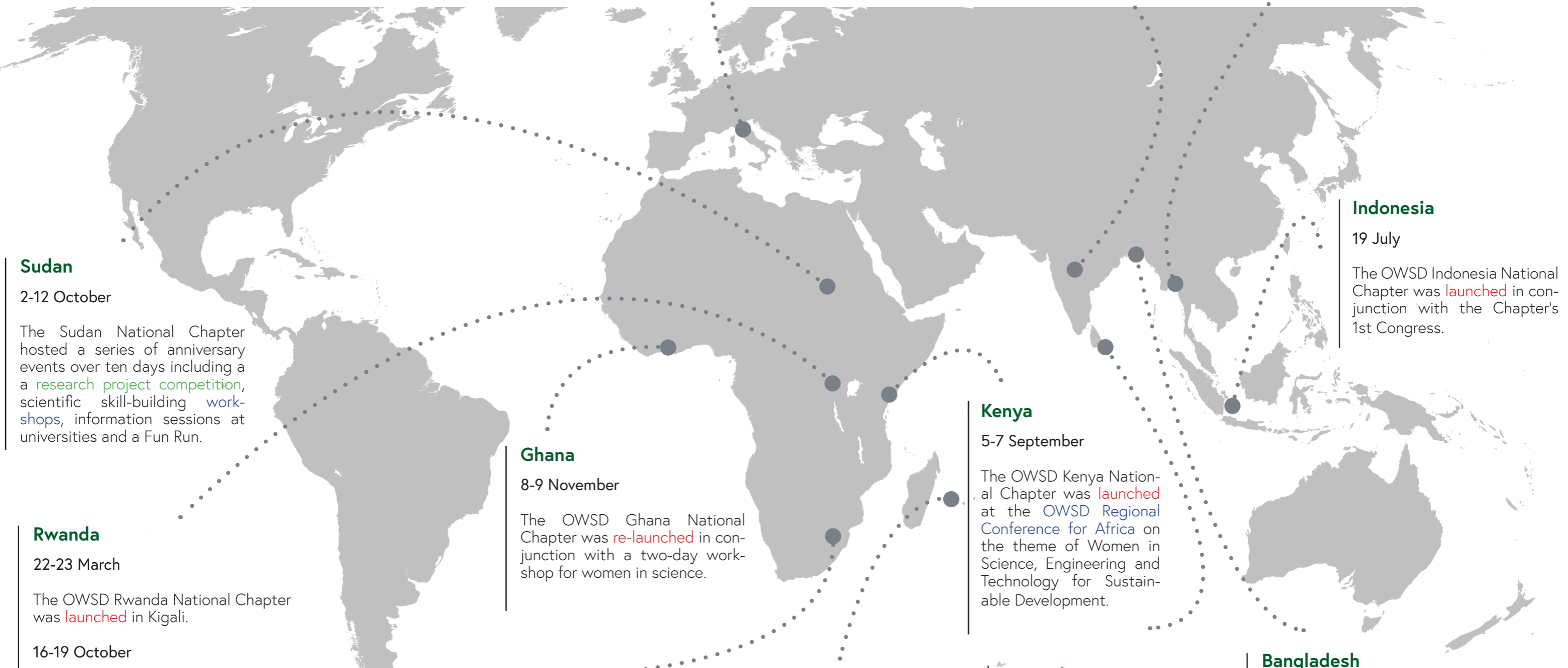
OWSD programmes include two fellowship schemes: a PhD fellowship focused on South-South mobility, which now has more than 250 graduates; and an Early Career fellowship launched this year that supports women scientists in the developing world with research grants of up to USD 50,000 over two years, to build up international-level research centers at their institutes. OWSD also has an awards programme to promote the visibility of early career women scientists.

As OWSD continues to grow and expand, we look back on the last quarter of a century and acknowledge the amazing women (and men!) who believed in its vision and have worked hard to make it a reality. Here's to hoping that the next 25 years can see their efforts continue to pay off in advancing the world closer and closer to gender equality in science.





The OWSD 25th Anniversary was celebrated all around the world. Here are some of the ways in which our National Chapters and other members marked the occasion.



Sudan

2-12 October

The Sudan National Chapter hosted a series of anniversary events over ten days including a **research project competition**, scientific skill-building **workshops**, information sessions at universities and a Fun Run.

Rwanda

22-23 March

The OWSD Rwanda National Chapter was **launched** in Kigali.

16-19 October

The Rwanda National Chapter hosted a **Women in Science workshop** and OWSD 25th Anniversary celebration in collaboration with the East African Institute for Fundamental Research and the University of Rwanda.

Ghana

8-9 November

The OWSD Ghana National Chapter was **re-launched** in conjunction with a two-day workshop for women in science.

Zimbabwe

16 November

The OWSD Zimbabwe National Chapter was **launched** in Harare with more than 300 participants.

Mauritius

19 February

The OWSD Mauritius National Chapter was officially **launched** by Mauritian President and OWSD member Dr. Ameenah Gurib-Fakim.

Italy

August-November

The OWSD Secretariat hosted a **video contest** asking "Why do you celebrate OWSD?" The 25 winners can be seen at: www.owsd.net/25-anniversary

India

30-31 October

The OWSD India National Chapter hosted a **conference** on Empowering and Enabling Women in Science in New Delhi.

Myanmar

5 November

The OWSD Myanmar National Chapter was **launched** in Yangon.

Indonesia

19 July

The OWSD Indonesia National Chapter was **launched** in conjunction with the Chapter's 1st Congress.

Kenya

5-7 September

The OWSD Kenya National Chapter was **launched** at the **OWSD Regional Conference for Africa** on the theme of Women in Science, Engineering and Technology for Sustainable Development.

Sri Lanka

29 March

The OWSD Sri Lanka National Chapter was **launched** in Colombo in parallel with the **South Asian Biotechnology Conference**.

Bangladesh

10 November

The OWSD Bangladesh National Chapter was **re-launched** at an **international conference** in Dhaka on the theme of Challenging Research by Women Scientists in STEM, concluding a series of **seven seminars** held from September to November.

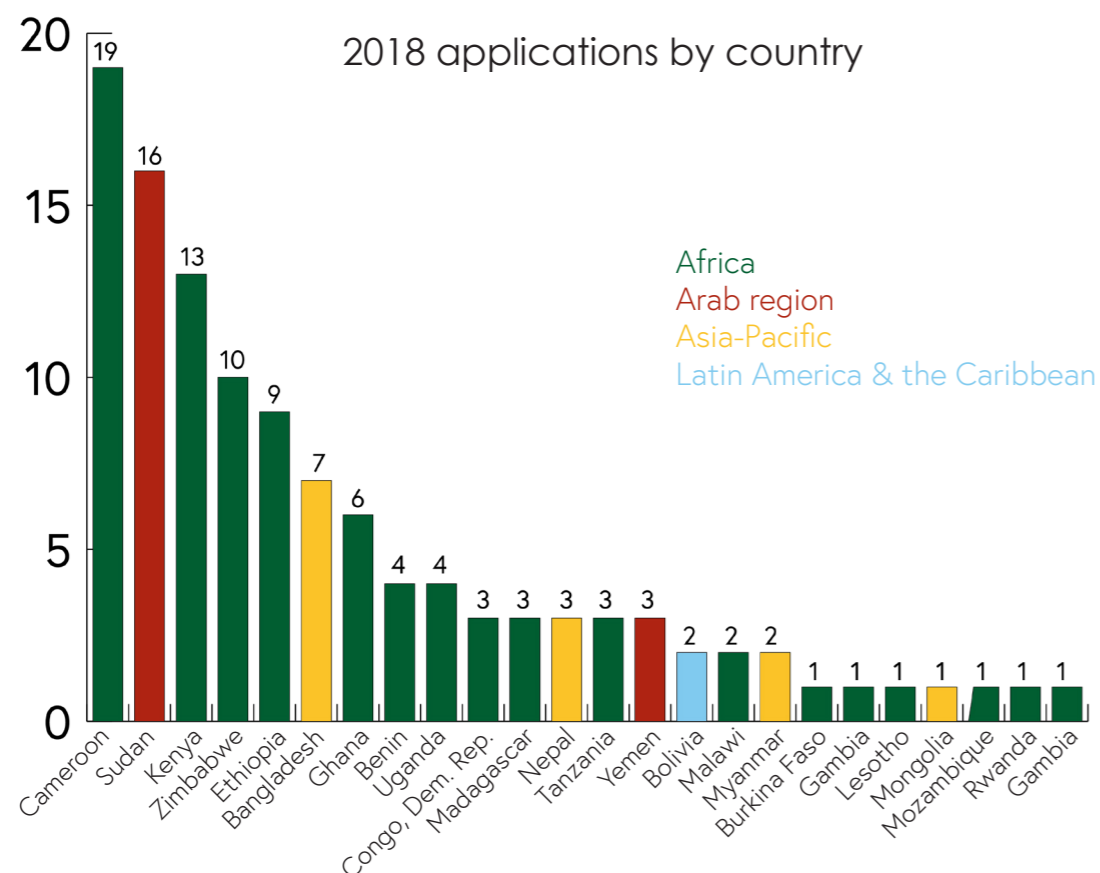
OWSD PHD FELLOWSHIPS

OWSD's flagship programme for the last 20 years has been the South-to-South PhD fellowship programme, which promotes mobility of women scientists. The fellowship supports women from scientifically- and technologically-lagging countries (STLCs) to undertake PhD research at a host institution of recognized research excellence in another developing country. Fellows may choose between a full-time option and the so-called 'sandwich' option, which provides for shorter-term research visits. The fellowship covers full funding for the PhD fellows' monthly stipends when on site, return travel, visa and health insurance costs, as well as tuition and registration fees when necessary. All funding for the PhD fellowship programme is provided by the Swedish International Development Cooperation Agency (Sida).

Over the last ten years, a total of 314 fellowships have been awarded. By 31 Dec 2018, 251 fellows had successfully graduated, and a further 193 were enrolled and completing their studies. Due to an increase in the funds provided by Sida, more than one-third of all awards made in the last 20 years were given between 2014-2018.

APPLICATIONS

In 2017, the list of eligible countries for the PhD fellowship was also revised, in agreement with donors, in order to concentrate OWSD's impact in countries where science and technology is significantly lag-



ging. The immediate effect of this change was that some countries which had previously been eligible became ineligible – most notably Nigeria, which alone had provided one-third of all fellowship applications – while several countries in Latin America and the Caribbean became eligible for the first time. The PhD fellowships are now open to applicants from 48 Least Developed Countries (LDCs), plus 18 countries selected because of their low income levels and specific needs for support in building scientific research capacity.

In 2018...

116 eligible applications

90 applications recommended

56% of applications from least developed countries

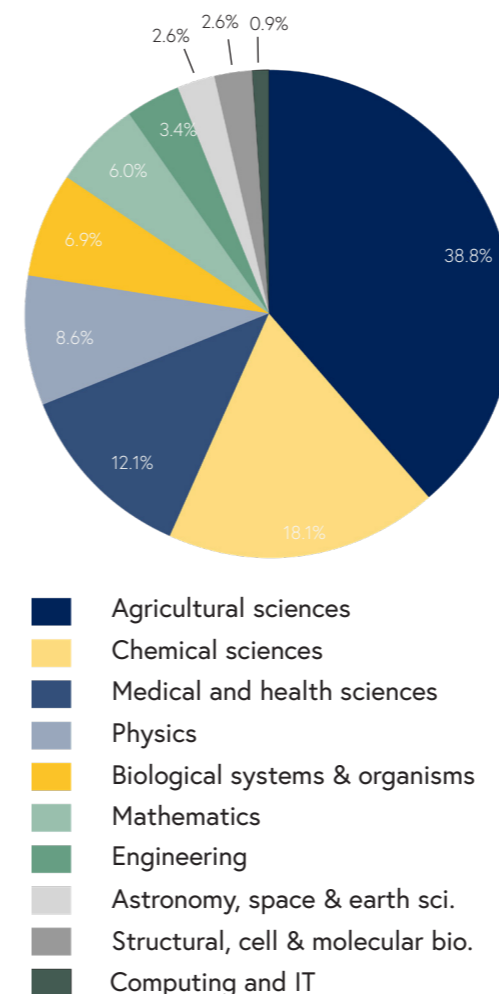
A total of 116 eligible applications were received in 2018, and of these 90 were recommended by the selection committee.

Where from? Applications were received from 24 countries, of which 18 were LDCs (56% of total applications). Following the revision of the eligible countries, Cameroon replaced Nigeria as the most popular nationality for applicants; Sudan continued to be very well represented (14%). Two applications were also received from Bolivia during its first year of eligibility.

Where to? Among the host countries selected by applicants, South Africa was by far the most popular (45%), followed by Malaysia (15%) and China (9%).

In what? Consistent with previous years, the highest number of applications were in agricultural sciences (39%). However, 2018 saw a significant number of applications from disciplines where women are typically underrepresented, including chemical sciences (18%), physics (9%) and mathematics (6%).

2018 applications by discipline



2013 PhD Fellow Fatema Hossain
Brishti from Bangladesh



2018 PhD Fellowship Graduate
Alinesi Chakwiya from Zambia

AWARDS

In 2018, ten full-time and six sandwich fellowships were awarded.

Where from? The awardees came from ten countries: Cameroon, the Democratic Republic of Congo; Ethiopia (3); Kenya (2); Lesotho; Mozambique; Myanmar; Sudan (3); Zambia; and Zimbabwe (2).

Where to? Twelve of the 16 fellows selected host institutes in South Africa, two in Kenya, and one each in China and Oman.

In 2018...

- 16** fellowships awarded
- 11** fellows from LDCs
- 10** full-time fellowships
- 6** sandwich fellowships

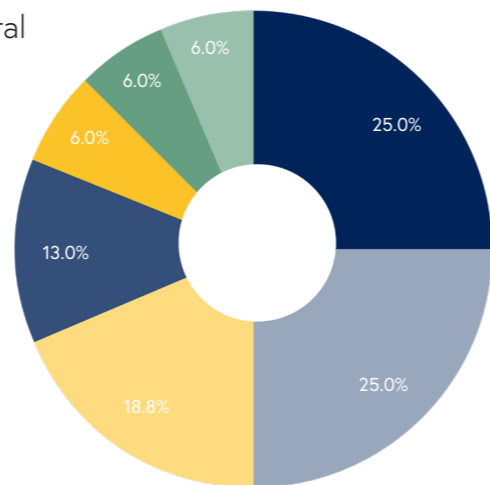
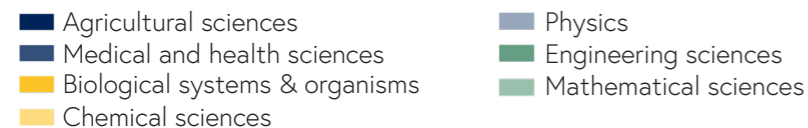


YOLANDE IKALA OPENDA
2018 PHD FELLOW, DEMOCRATIC REPUBLIC OF CONGO

Awarded a full-time fellowship to pursue her PhD in chemical sciences at Rhodes University in South Africa. Her research focuses on synthesizing new photosensitizing molecules for use in Photodynamic Antimicrobial Chemotherapy (PACT), a therapy that can treat various infections and diseases including some cancers.

In what? Four of the 16 awards given were in the field of agricultural sciences, four in physics, three in chemical sciences, two in medicine & health, and one each in biological systems & organisms, engineering, and mathematical sciences.

OWSD PhD Fellowships awarded by discipline



ONGOING FELLOWS

In 2018, there were more than 150 OWSD PhD fellows on-site completing their PhDs. These fellows are from 30 countries; more than half are from Least Developed Countries (LDCs).

In addition to the standard fellowship funding, OWSD also provides a conference support grant, which allows fellows to travel internationally to support their research. Presenting work at conferences, receiving specialized training, and networking with specialists in their fields are vital elements of academic training which would in the majority of cases not be possible for these scientists without this special fund.

In 2018, 47 OWSD PhD fellows traveled to 60 conferences and workshops using the conference support grant. Twenty-nine attended international conferences, and of these ten presented papers.



“The exposure of presenting at an international conference was phenomenal. Being able to interact with experts in my field of study and have them comment on my work was profoundly insightful.”

MAGGIE GOLIE MUNTHALI
2014 PHD FELLOW, MALAWI

In 2018...

- 47** fellows traveling with conference support
- 29** international conferences attended
- 10** papers presented at international conferences

GRADUATES

In the year of its 25th anniversary, OWSD reached the important milestone of having graduated 250 women scientists from the PhD fellowship programme – plus one. Of the 251 graduates, 26 completed their PhDs in 2018; 14 of these were from LDCs.

Where from? OWSD PhD graduates originate from 34 countries across Africa and Asia: Nigeria (56); Bangladesh (28); Sudan (25); Cameroon (20); Myanmar (18); Kenya (15); Uganda (12); Zimbabwe (11); Ethiopia (8); Ghana (7); Benin and Tanzania (6 each); Malawi, Yemen, and Zambia (4 each); Lesotho and Nepal (3 each); the Republic of Congo, the Kingdom of Eswatini, and Madagascar, and Rwanda (2 each); and Angola, Botswana, Burkina Faso, the Democratic Republic of the Congo, Gabon, Mauritania, Mauritius, Mozambique, Namibia, Senegal, Sierra Leone, South Africa, and Togo (1 each).

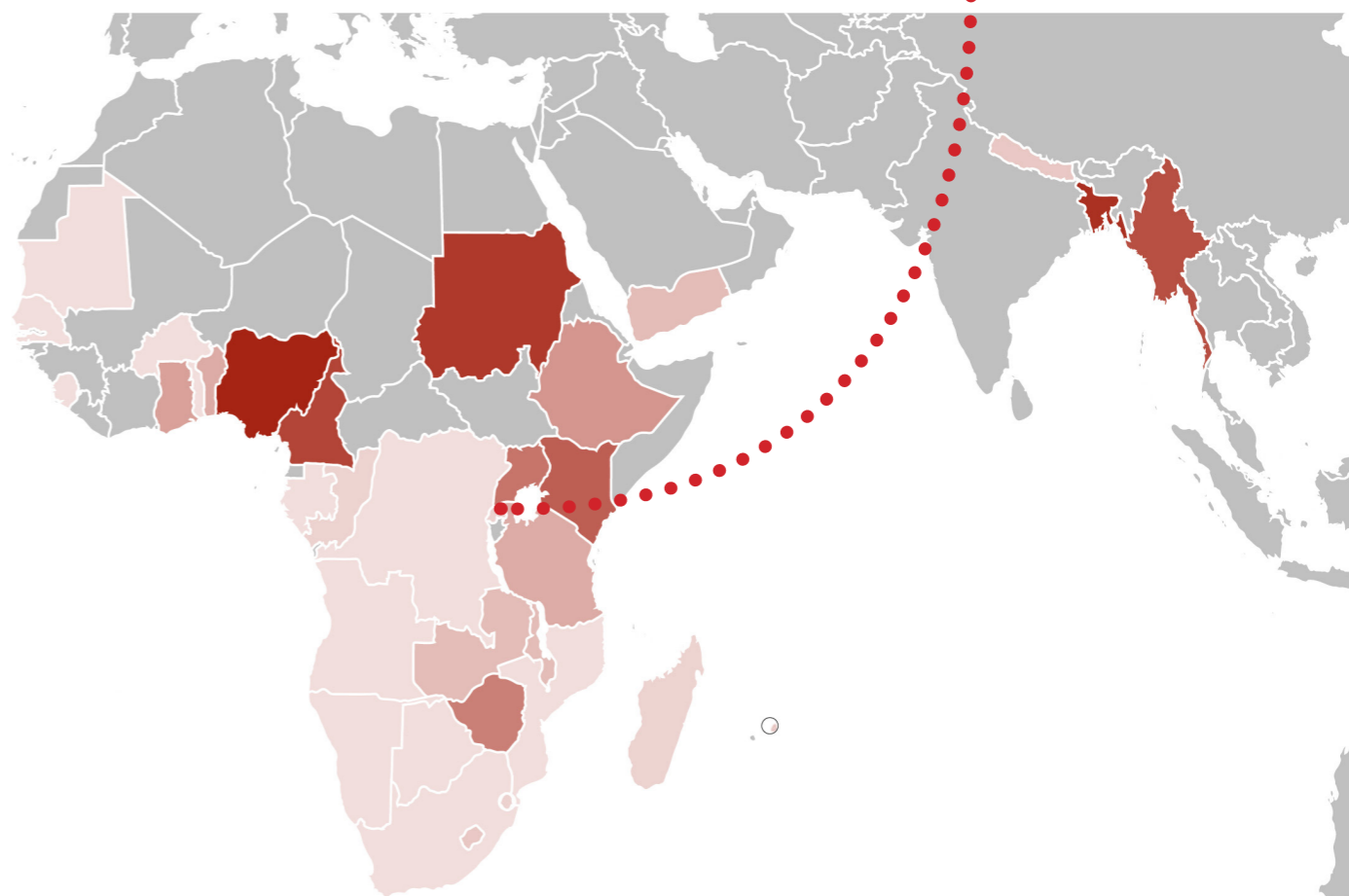


MARIE CHANTAL CYULINYA

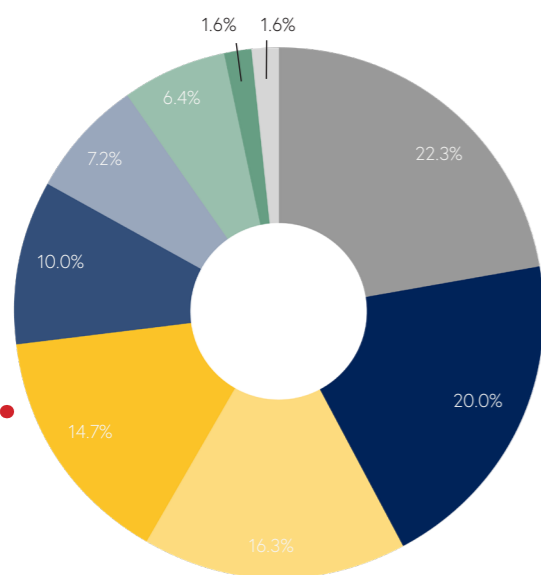
2013 PHD FELLOW, RWANDA

When she graduated in 2018, Marie Chantal became the first woman in Rwanda to hold a PhD in physics. She was also active in founding the OWSD Rwanda National Chapter.

OWSD PhD Graduates, all-time



In what? The most represented field among OWSD PhD graduates is structural, cell and molecular biology (22%), followed by agricultural sciences (20%), chemical sciences (16%), biological systems and organisms (15%), medical and health sciences including neurosciences (10%), physics (7%), mathematical sciences (6%), engineering sciences (2%), and astronomy, space and earth sciences (2%).



OWSD PhD Graduates by discipline

- Structural, cell and molecular biology
- Agricultural sciences
- Chemical sciences
- Biological systems and organisms
- Medical and health sciences
- Physics
- Mathematical sciences
- Engineering sciences
- Astronomy, space and earth sciences

OWSD PhD fellowship alumnae have gone on to head academic departments, found NGOs, become entrepreneurs, and author books, among countless other accomplishments. Many are deeply committed to giving back to their communities, including creating opportunities for future generations of women scientists.



SYLVIANE VOLAMPENO

2005 PHD FELLOW, MADAGASCAR

Founder and President of Mikajy Natiora Lemur Conservation Network, a network of 60 organizations working to protect Madagascar's lemur species from extinction; Lecturer, University of Antananarivo.

MUBANGA LOMBE

1999 PHD FELLOW, ZAMBIA

Head of the Mathematics and Statistics Department at the University of Zambia and a board member of the Entrepreneurs Financial Centre, a micro-finance financial institution serving micro, small and medium-sized enterprises (SMEs) in Zambia.



IRENE NAIGAGA

1998 PHD FELLOW, UGANDA

Regional programme manager and board secretary at One Health Central and Eastern Africa (OHCEA), a network of 24 institutions of public health, veterinary, global health, environmental sciences and pathobiology in eight countries in East, Central and West Africa.



OWSD PhD Alumna
Shamsun Nahar Khan.
from Bangladesh

Photo courtesy of: Global Young Academy (GYA), to which Khan was elected a member in 2014.

SPOTLIGHT ON: SALMA SYLLA MBAYE

Photo credit: NASA/Johns Hopkins University Applied Physics Laboratory/
Southwest Research Institute/Mike Grusin



In 2010, OWSD PhD Fellow Salma Sylla Mbaye was at a conference in her native Dakar when she met Belgian astrophysicist Katrien Kolenberg. They discussed Salma's enthusiasm for astronomy, and she was convinced to pursue a PhD in astrophysics — but there was one major hurdle: astrophysics wasn't yet taught at any university in Senegal, despite many efforts to promote astronomy by the Senegalese Association for the Promotion of Astronomy (ASPA). Seven years later, the pair came across the Call for Applications for the OWSD PhD Fellowship. Salma decided to apply for the fellowship under the sandwich option in 2017 and was selected as one of 29 fellows that year. The sandwich fellowship allows her to make up to three visits to the University of Cadi Ayyad in Morocco, where she is carrying out research under Professor Zouhair Benkhaldoun. She will return to receive her PhD in astrophysics from the University of Cheikh Anta Diop in Senegal. When she graduates, she will become the first astrophysicist in Senegal. Her PhD project is part of the continent-wide Africa Initiative for Planetary and Space Sciences, and in addition to the University Cheikh Anta Diop and University of Cadi Ayyad also involves partnerships with the Paris Observatory in France and the University of Antwerp in Belgium.

Salma's PhD research compares the impacts of meteors on Jupiter and the Moon. By studying the flashes resulting from the impacts, she hopes to be able to help astrophysicists make a more precise estimate of the age of the outer solar system.

Salma decided to focus on this subject specifically as a way to attract the next generation of Senegalese scientists into astronomy and astrophysics. She believes in the importance of engaging the public in science. "What has surprised me is that when I talk about my research," she says, "most people look at me like they're lost, as if my field of research is unknown. Now I understand that if we do research, in addition to establishing connections with other researchers, we must also communicate and do a lot of outreach in order to share our science with the community."

Salma has already followed through on her intentions. In November, 2018 she published an article on CNN's website about a collaboration between Senegalese astronomers and NASA to observe the

icy celestial object known as Ultima Thule using NASA's New Horizons spacecraft. She also has plans to work with the Office of Astronomy for Development and the Africa Initiative for Planetary and Space Science to do outreach in astronomy at schools in Senegal and in neighboring countries in West Africa.

After she receives her PhD, Salma intends to teach astronomy at the University of Cheikh Anta Diop. She also hopes to work on strengthening Senegal's connections with the international astrophysics community — such as those established during the NASA collaboration — in order to grow its emerging astronomy community.



Photo credit: Omar Ouchaou

OWSD EARLY CAREER FELLOWSHIPS

In 2018, OWSD launched a new Early Career fellowship, with funding from the Canadian International Development Research Centre (IDRC). The fellowship greatly expands the scope of OWSD's programmes, and offers the opportunity for women living in under-resourced countries in the South to carry out research at an international level and build up research centres at institutes in their home countries.

The fellowship provides women scientists in developing countries with up to USD 50,000 for equipment and resources over a two-year period. It is offered to individual women who have completed their PhDs in STEM subjects within the last ten years and are employed at an academic or scientific research institute in one of the eligible countries.

There is a strong focus of the fellowship on innovation and impact on a broader scale; fellows must demonstrate the potential for their research to be converted into marketable products or processes, through collaboration with industry or private or public sector partners. The long-term aim is to contribute to the emergence of a new generation of women leaders in STEM and to promote their participation in the sustainable development of their countries.

APPLICATIONS

In the first year of the fellowship programme, 182 eligible women scientists applied for the Early Career fellowship.

Where from? Applications were received from 30 countries, of which 21 were LDCs (49% of total applications). The most applications were received from Kenya (16%), followed by Sri Lanka, Cameroon, and Uganda. Africa contributed nearly three quarters of all applications (71%); 26% of applications were from Asia, 2% from Latin America and the Caribbean, and 1% from the Arab region.

In what? The most popular fields for applicants were agricultural sciences (31%), followed by medical and health sciences (20%). Fewer applications were received in fields where women tend to be underrepresented, in particular mathematics (4%) and computing and information technology (4%).

In 2018...

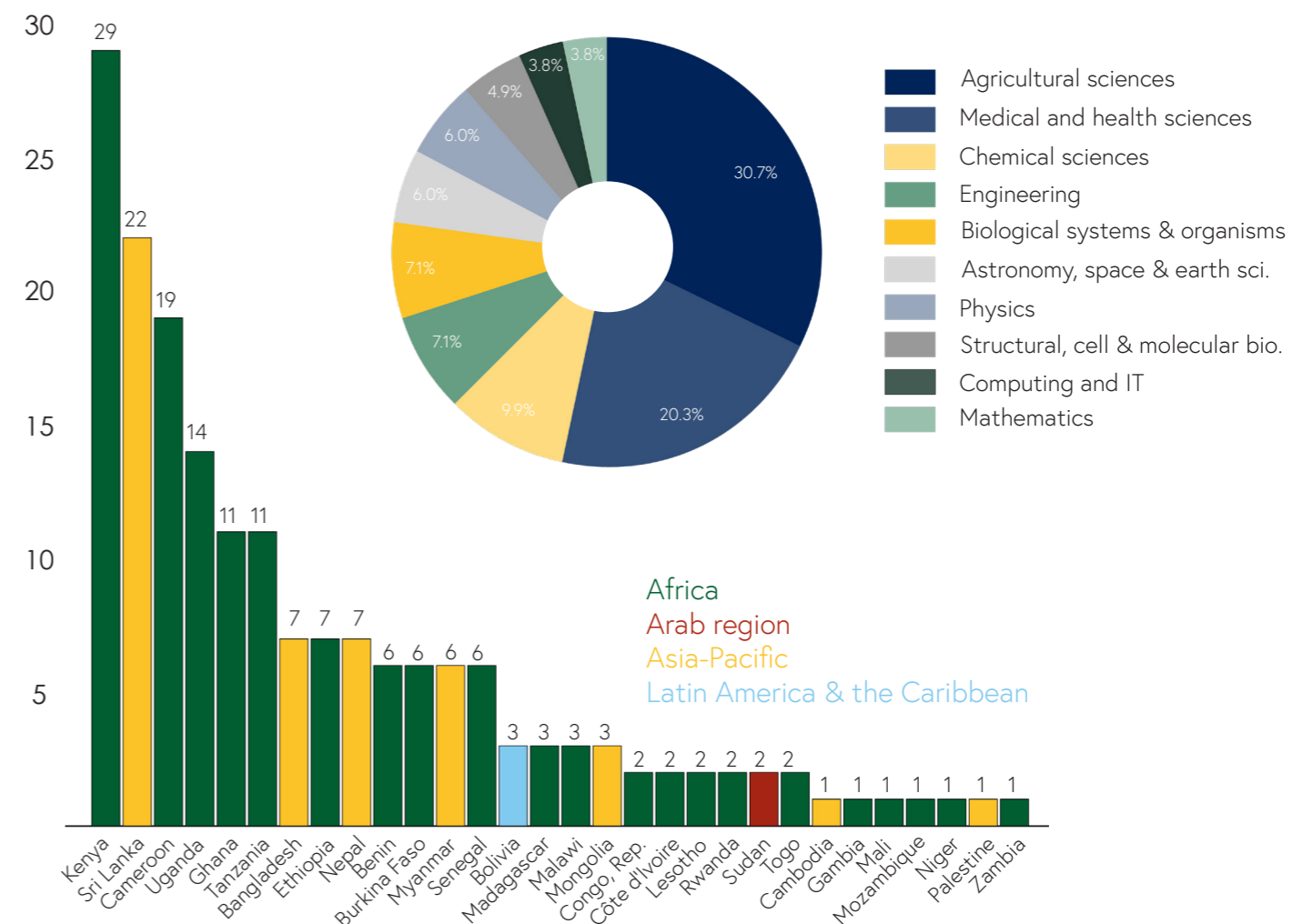
182 eligible applications

74 applications highly recommended

49% of applications from LDCs



2018 Early Career fellowship applications, by country and discipline





*OWSD Early Career fellows
Maryse Nkoua Ngavouka from
the Republic of Congo and
Emilia Lyonga from Cameroon*

AWARDS

The first cohort of the Early Career fellowship was made up of 19 fellows.

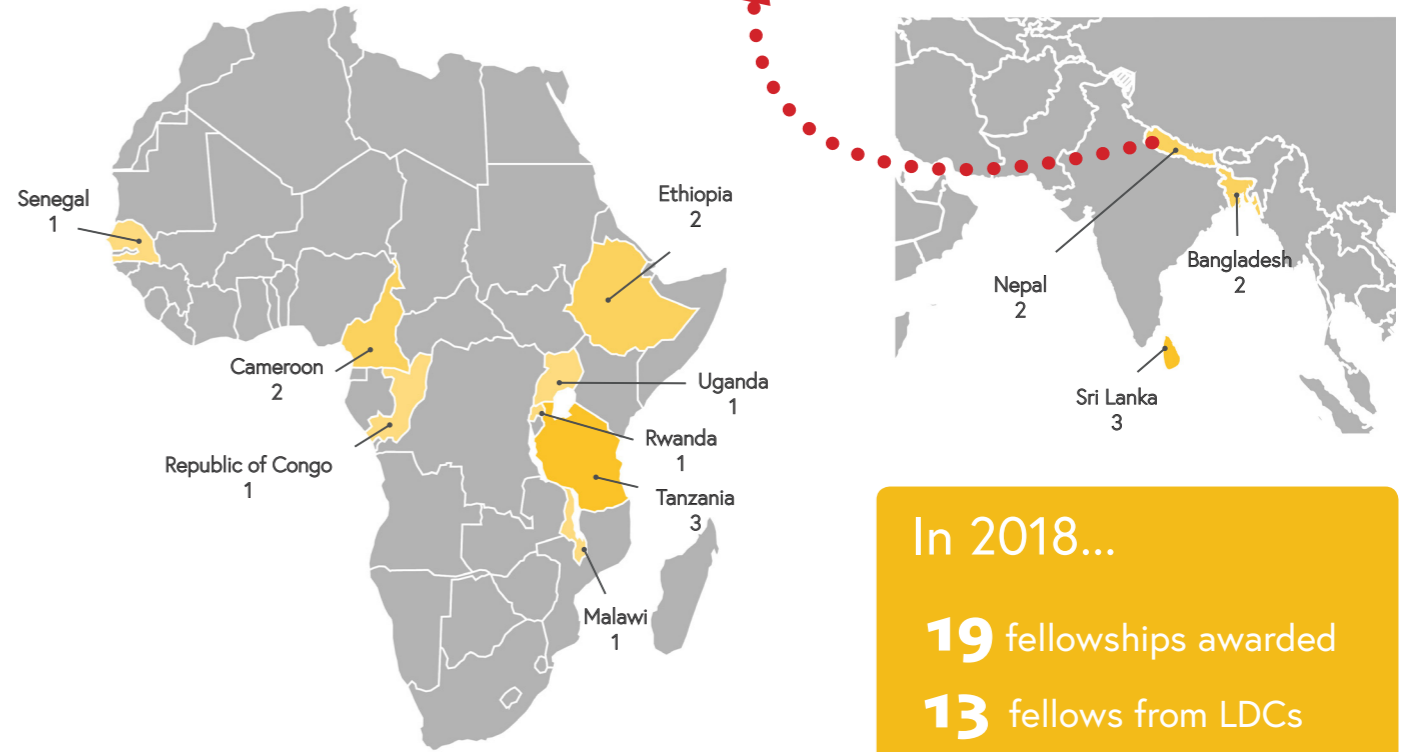
Where from? The awardees came from 11 countries in Africa and Asia: three fellows each from Sri Lanka and Tanzania; two each from Bangladesh, Cameroon, Ethiopia, and Nepal; and one each from the Republic of Congo, Malawi, Rwanda, Senegal, and Uganda. Thirteen of the 19 fellows are from LDCs.

All of the awarded fellows except three had completed their PhDs in a country other than their home country; only five completed their PhDs at an institute in the Global South. This underscores the need for centres of research excellence in the South.



HEMU KAFLE
2018 EARLY CAREER FELLOW, NEPAL

An environmental scientist specialized in remote sensing, whose research project will build low-cost mobile weather stations to study drought in Nepal.

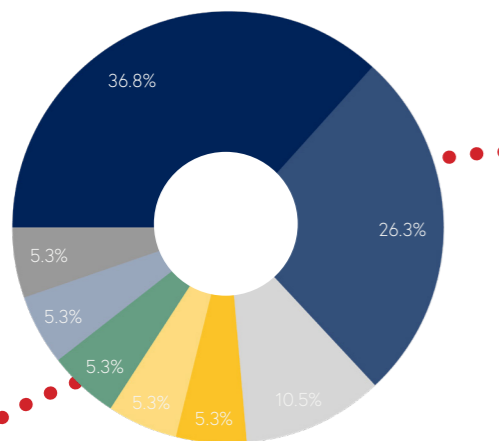


In 2018...
19 fellowships awarded
13 fellows from LDCs

**Home institutes of
2018 Early Career fellows**

Jahangirnagar University, Bangladesh	Pokhara University, Nepal
University of Dhaka, Bangladesh	Rwanda Agr. and Animal Resources Development Board, Rwanda
University of Buea, Cameroon	Institut Pasteur de Dakar, Senegal
University of Yaounde I, Cameroon	University of Kelaniya, Sri Lanka
Inst. Nat..de Recherche en Sci. Exactes et Naturelle, Rep. of Congo	University of Peradeniya, Sri Lanka
Ethiopian Institute of Agricultural Research, Ethiopia	University of Sri Jayewardenepura, Sri Lanka
Jimma University, Ethiopia	University of Dar Es Salaam, Tanzania (3)
Lilongwe University of Agriculture, Malawi	Makerere University, Uganda
Kathmandu Institute of Applied Sciences, Nepal	

In what? The research projects of seven of the 19 Early Career fellows in the first cohort are in the agricultural sciences, five in the medical and health sciences, two in astronomy, space and earth sciences, and one each in biological systems and organisms, chemical sciences, engineering sciences, physics, and structural, cell and molecular biology.



- Agricultural sciences
- Medical and health sciences
- Astronomy, space and earth sciences
- Biological systems & organisms
- Chemical sciences
- Engineering sciences
- Physics
- Molecular, cell and structural biology



MUNAWAR SULTANA
2018 EARLY CAREER FELLOW,
BANGLADESH

Dr. Sultana is currently developing a veterinary vaccine and a low-cost diagnostic kit for the foot-and-mouth disease virus, using microbial genomics and bioinformatics tools. Foot-and-mouth is a very infectious disease endemic in South Asia that affects cattle, sheep, goats, and pigs. Vaccination and improved diagnosis would help to improve food security in the region as well as rural agriculture-based economies and employment.

Other research projects funded under the fellowship include projects to identify early biomarkers of severe dengue fever, to investigate links between pesticide use and breast cancer in Ethiopia, and to create an energy microgrid system in the Congo using biofuels generated from solar heat and biomass.

EARLY CAREER WORKSHOPS

Early Career fellows take part in two training workshops during the fellowship, focused on improving their leadership, management, and outreach skills, as well as how to forge links with industry.

The first workshop is an orientation workshop designed to prepare them for managing their research grants, with training on budgeting and procurement, reporting and data management, and effective networking.

The first orientation workshop took place in Tri-

este, Italy from 10-14 December 2018. The fellows attended sessions on incorporating gender and sustainable development perspectives in their research projects, on working with partners in science academies and industry, and on developing different leadership styles and managing research teams.

The fellows also visited two local labs during the week: the FabLab at ICTP, where they learned about rapid prototyping technology and 3D printing; and the International Centre for Genetic Engineering and Biotechnology (ICGEB), where they learned about technology transfer and the patent process.

A second regional workshop to be held in Tanzania in 2019 will focus on the commercial aspects of transforming the fellows' research into marketable products.



“
One of the key things that I am taking back home [from the orientation workshop] is how to integrate the Sustainable Development Goals into my research.

SIANA NKYA
2018 EARLY CAREER FELLOW, TANZANIA



PENDO BIGAMBO
2018 EARLY CAREER FELLOW,
TANZANIA

Dr. Bigambo's research focuses on using nanoprocessing technology to produce nanofibres from cotton-based waste fabrics. This will help to reduce environmental hazards associated with textile disposal, much of which is currently done through landfill or incineration. The Early Career fellowship will support the purchase of an electrospinning machine for her lab to produce the nanofibres on a large scale. Nanofibres can provide better durability, flame resistance, light protection, and other advantages over traditional fibres.



2018 Early Career fellows from Ethiopia, Seblework Shegen and Kassaye Tolessa Sherge

SPOTLIGHT ON: MASHURA SHAMMI



When environmental chemist Mashura Shammi completed her PhD at the Xinjiang Institute of Ecology and Geography in China in 2017, she returned to her home country of Bangladesh to begin an Assistant Professor position at Jahangirnagar University in Dhaka. Working in the Department of Environmental Sciences, Dr. Shammi is interested in the dynamics of cycles of chemical elements (such as carbon, nitrogen and phosphorous) and how they influence and are influenced by biological systems, a field known as biogeochemistry. Specifically, she focuses on dissolved organic matter (DOM), a mixture of various organic substances that is commonly found in natural water sources, and Dr. Shammi is interested in how the decomposition of DOM substances is linked to greenhouse gas emissions.

Dr. Shammi's research project funded under the OWSD Early Career fellowship will help to understand the dynamics of DOM substances and greenhouse gas (GHG) emissions in the Ganges River system of Bangladesh. The Ganges is one of the largest river systems in the world, but little is known about its carbon dynamics, including levels of GHG emissions. Dr. Shammi's project will establish a biogeochemistry laboratory equipped to measure and map the emissions of GHGs in the river – particularly methane (CH₄) and carbon dioxide (CO₂) – over both space and time. This research will also help to more clearly identify the relative contributions to GHG emissions of naturally occurring and anthropogenic (human-generated) DOMs.

In order to carry out her project, Dr. Shammi will work with a team of three other scientists from Jahangirnagar University as well as two international collaborators from China and Japan. The funding from the Early Career fellowship will allow them to purchase computers, software and other hardware for the lab, as well as laboratory consumables. It will also support one master's-level and one additional research assistant, and fund site visits to the upper Ganges and lower Ganges regions for data collection.

With a well-equipped laboratory dedicated specifically to biogeochemistry, Dr. Shammi hopes that her department's Water Research Center will establish links with industries in the private sector and implement productive partnerships around industrial wastewater testing and treatment. The centre's research will also help to fill a crucial gap in the global understanding of carbon dynamics and greenhouse gas emissions by providing data on one of the world's largest river systems.



OWSD

MEMBERSHIP

OWSD began as a membership organization, and the members remain the foundation for all OWSD programmes and activities. Members are able to connect and network with each other through the OWSD website, at international and regional OWSD conferences and workshops, and through the OWSD National Chapters. Members also gain access to frequent opportunities for training, travel, research visits and other funding through announcements shared to the OWSD mailing list.

By the end of 2018, OWSD membership had grown to include 7183 members, 1047 of whom registered in 2018. The large majority (87%) of these are women scientists from the developing world with at least a master's degree in the natural sciences or social sciences (full members). OWSD also has affiliate members, who are women scientists from developing countries with at least a bachelor's degree in the sciences.

In 2018, the membership categories of OWSD also included associate membership, open to men as well as social scientists. The membership categories were revised midway through 2018 to make social

scientists eligible for both full and affiliate membership for the first time and to restrict both membership categories to women from developing countries. The associate membership category was discontinued. Male members who are associates, in addition to male and female scientists from the developed world, will be reassigned in 2019 to a new category designated Friends of OWSD, supporters with at least an undergraduate degree who are committed to promoting the objectives of OWSD. For the purposes of this report, however, member numbers refer to the previous membership categories (including associate members).

Where from?

In 2018, OWSD members came from 150 different countries across six continents. Nearly half of these members were in the Africa region (48%) followed by the Asia-Pacific region (24%), the Arab region (14%), and Latin America and the Caribbean (12%). Members from other countries (primarily Europe and North America) made up about 2% of membership. Nigeria had more than twice as many members (1731) as the country with the second most members, India (689). Following these two countries, the countries with the most OWSD members were Sudan (401), Egypt (345), South Africa (244), Pakistan (229), Kenya (211), Cameroon (187), Ghana (174), and Cuba (169).

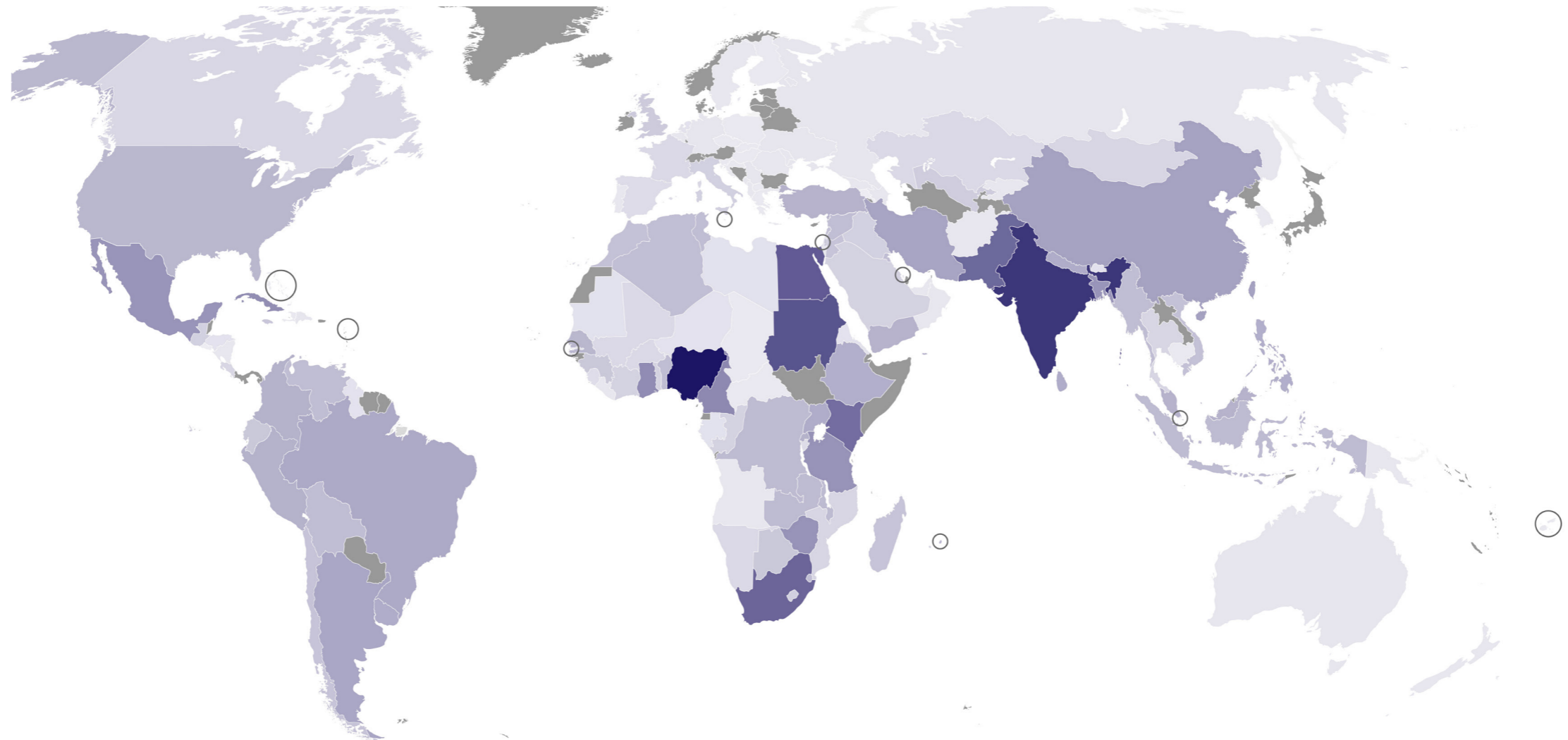
Slightly less than one-fifth (19%) of OWSD members were from LDCs. The LDCs with the most OWSD members, were Sudan (401), Tanzania (138), Bangladesh (136), Uganda (76), and Nepal (73).

In 2018...

7183 members

1047 members new in 2018

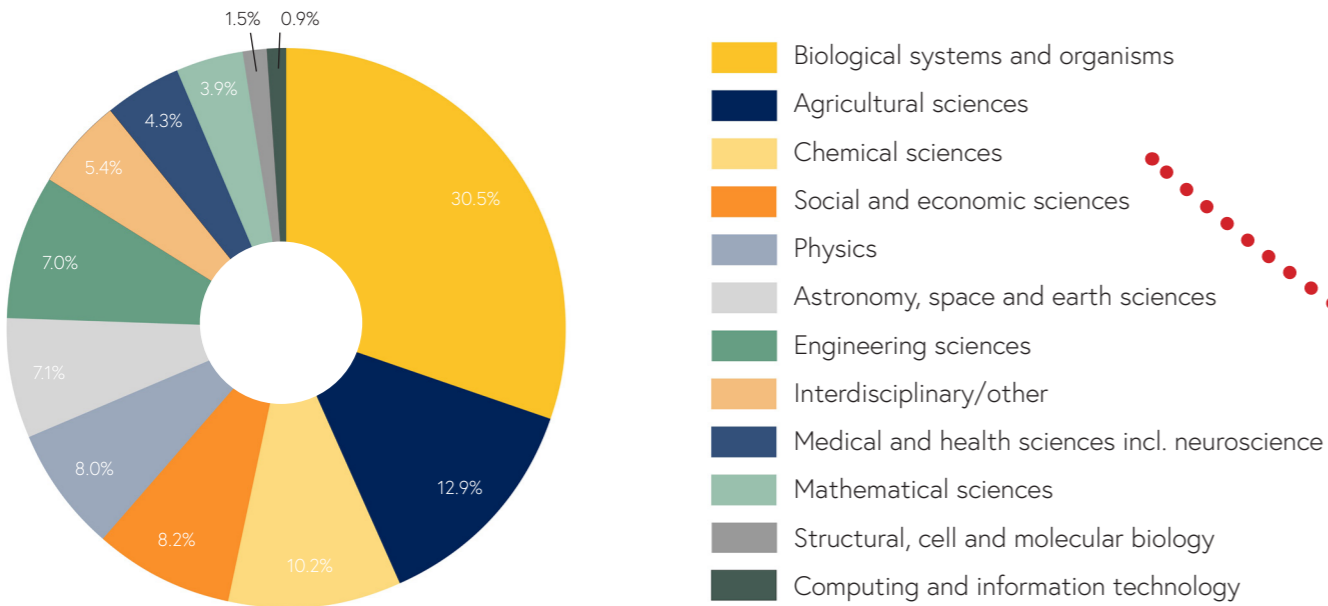
1346 members from LDCs



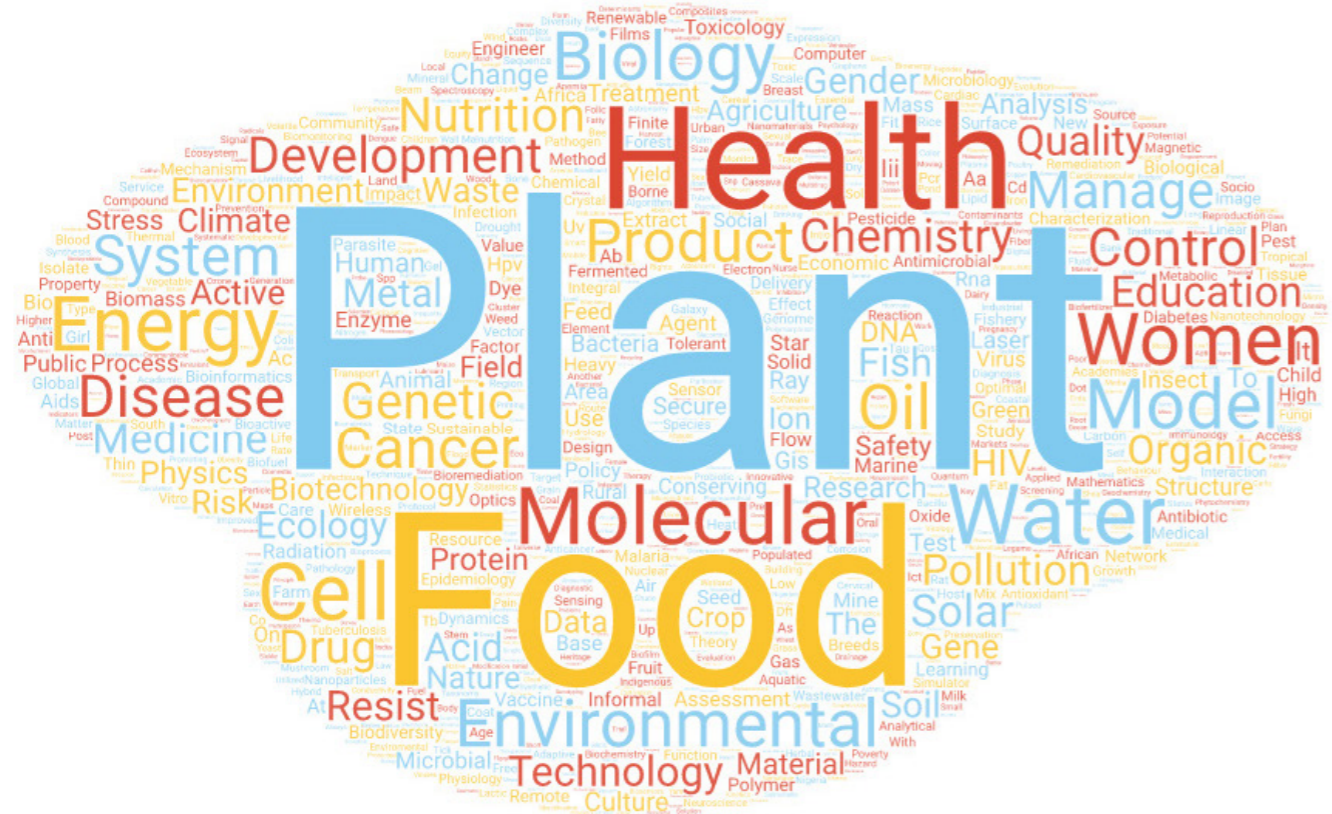
In what?

OWSD members represent a huge variety of scientific disciplines. Under the general research categories which OWSD uses for statistical purposes, biological systems and organisms are the most represented discipline by a significant margin, with more than 30% of members. This is followed by agricultural sciences (13%), chemical sciences (10%), social and economic sciences (8%), and physics (8%)*.

*For the 5958 members whose discipline is known. The remaining members were registered before this information was collected.



These categories do not, however, capture the vast array of scientific subjects that members specialize in, which span countless branches of research and often combine elements of two or more of these disciplines. The word cloud below shows which keywords are most popular in members' self-descriptions of their research. This gives a better picture of not only what members are researching, but what the potential applications of their research are as well as the larger societal and environmental issues that they hope to address.



CLARIMAR CAMACHO

MEMBER, VENEZUELA

Dr. Camacho is a chemist developing multimetallic sulfides catalysts for the removal of heteroatoms (atoms other than carbon or hydrogen) from crude oils and from renewable waste vegetable oils through hydrotreatment. Venezuela has large amounts of crude oils which are refined to produce gasoline and diesel fuel. Removing heteroatoms, particularly sulfur and nitrogen, from the crude oil will ensure that less of these are emitted through automotive fuel, reducing smog and acid rain.



OWSD Rwanda member Alice Ikuzwe with Kathy Kantengwa, National Coordinator of the Forum for African Woman Educationalists (FAWE) - Rwanda

OWSD NATIONAL CHAPTERS

OWSD members may organize National Chapters in order to promote women's participation in science and technology and in scientific leadership at the national and regional levels. At least 20 full members are necessary in order to form a National Chapter. Once Chapters are established, members carry out strategic activities according to priorities they identify within their own countries, including outreach to schools and the public, organization of conferences, workshops, and training opportunities for women scientists, contributions to policy development, and data collection on the status of women in science in their countries.

The number of OWSD National Chapters grew significantly in 2018 from 13 to 20, with seven new National Chapters launched in Indonesia, Kenya, Mauritius, Myanmar, Sri Lanka, Rwanda, and Zimbabwe. In addition, the Ghana National Chapter re-launched after a period of inactivity. There are previous-

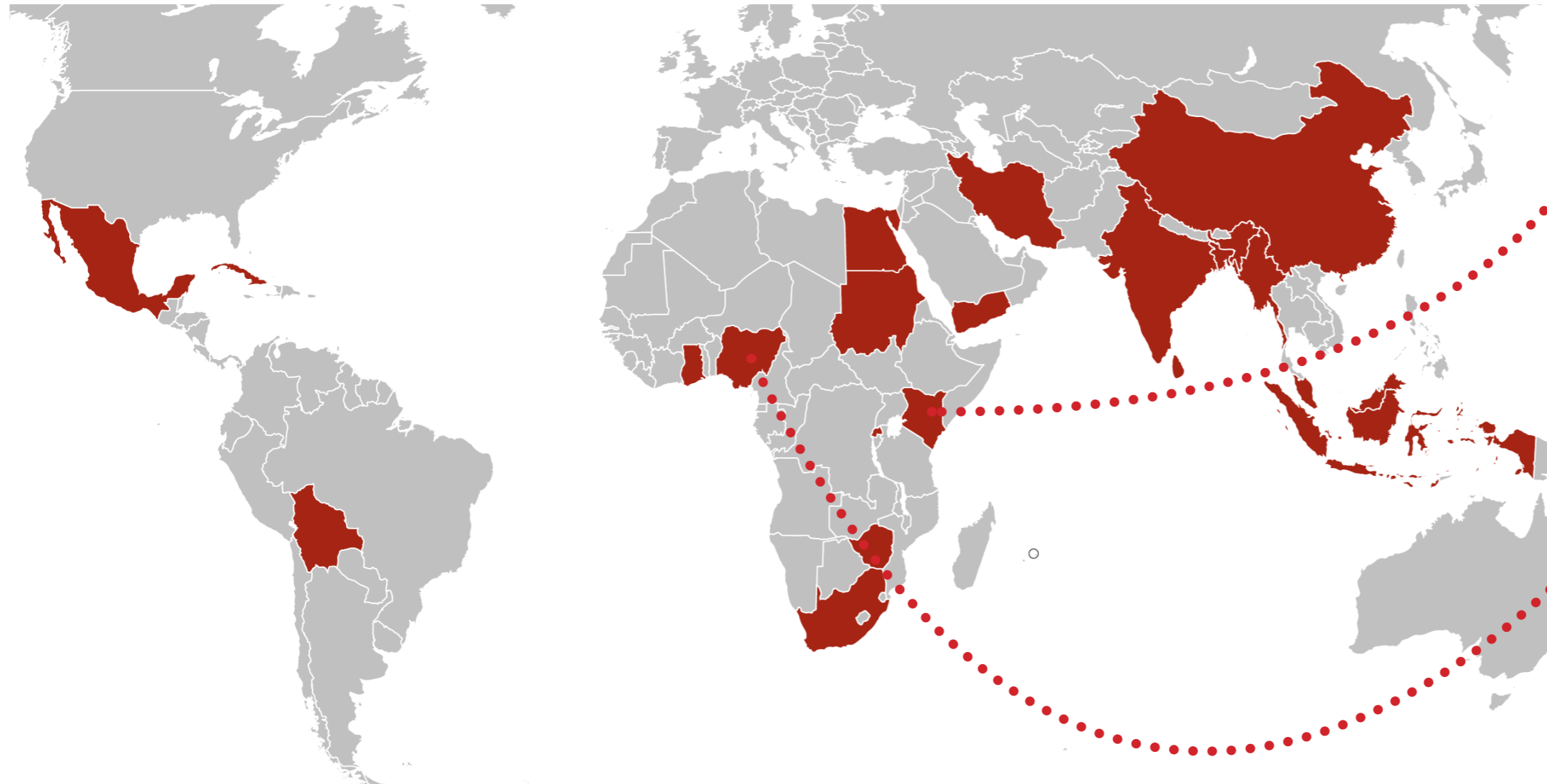
ly established National Chapters in Bangladesh, Bolivia, China, Cuba, Egypt, India, Iran, Malaysia, Mexico, Nigeria, South Africa, Sudan, and Yemen. Collectively, more than 5200 OWSD members are members of National Chapters. Membership in a National Chapter is open to both nationals of that country as well as any OWSD member residing there.

In 2018...

20 OWSD National Chapters

7 new OWSD National Chapters launched

(**+1** National Chapter re-launched)



“

Becoming an OWSD member has fired up my passion to encourage girls from an early age to join science-oriented careers. Coming together to form the OWSD Kenya National Chapter has greatly enhanced networking and has escalated my engagement with fellow women in science to a national and regional level.

”

**PATRICIAH WANJIKU
WAMBUGU**
CHAIR, OWSD KENYA NATIONAL CHAPTER



OWSD NIGERIA NATIONAL CHAPTER

OWSD's largest National Chapter, with more than 1700 members, was founded in 2010 and is based at the University of Uyo, with subchapters at seven additional universities throughout the country.

SPOTLIGHT ON: OWSD SUDAN NATIONAL CHAPTER



OWSD Sudan National Chapter workshop participants Wafa Osman and Tasneem Abu Haraz.

With more than 400 members, Sudan is the third-largest OWSD National Chapter and one of its most active. For the 25th Anniversary of OWSD, a series of events organized across ten days and several cities in Sudan demonstrated the National Chapter's enthusiasm for promoting women and girls in science.

The events took place from 2-12 October, kicking off with an opening reception and Innovative Research Competition at the Embassy of Sweden on October 2, and concluding with an awareness-raising campaign at local universities from 7-12 October to introduce students to OWSD. All events were organized by the National Chapter in collaboration with the Sudanese National Academy of Sciences (SNAS), the Khartoum office of UNESCO, the Swedish embassy of Khartoum, the Khartoum DAL Group and Al-Neelain University.

The Sudanese Minister for Higher Education and Scientific Research, Al-Sadig Al-Hadi Al-Mahdi, attended the opening reception and expressed his appreciation and support of OWSD to students and professors attending from more than 20 Sudanese universities.

From 3-6 October, parallel workshops were held at the DAL Excellence Center and at the UNESCO Khartoum office. The DAL workshop, organized by DAL Foods, focused on scientific skills including proposal writing, publication writing and data analysis, while the UNESCO workshop focused on developing communications skills.

On 5 October, a 5 km Fun Run was organized to bring attention to the importance of science in daily life and to encourage girls and young women to participate in scientific development. The three-hour Fun Run was held in the Green Yard park in Khartoum, with more than 500 people participating.

Finally, OWSD representatives delivered a programme of public lectures at 19 universities in Sudan

over the course of a four-day campaign to raise awareness about OWSD fellowships and other opportunities. Speakers shared their personal success stories — and challenges — with more than 1200 students during 2-hour presentations. The campaign was held from 8-12 October.

Nashwa Eassa, OWSD Vice President for the Arab region, played an important role in coordinating and executing the events. "The OWSD 25th Anniversary celebrations in Sudan were a great opportunity to highlight the organization's role in promoting women in science and to address their role in the development," she said. "I believe women have a vital role to play in advancing technologies, developing communities and accelerating change."



OWSD Vice President for the Arab Region Nashwa Eassa on International Day of the Girl, Khartoum, October 11



Participants in the OWSD Sudan Scientific Skills workshop in Khartoum



OWSD Zimbabwe National Chapter members celebrating the launch of their National Chapter in November 2018.

OWSD AWARDS

Launched in 2012, the OWSD-Elsevier Foundation Awards for Early Career Women Scientists reward and encourage women working and living in developing countries who are in the early stages of their scientific careers, having often overcome great challenges to achieve research excellence. Awardees must have made a demonstrable impact on the research environment, both at a regional and international level, and be within ten years of receiving their PhD.

The awards are given to five scientists each year, one from each of the four OWSD regions plus one additional candidate from any of these regions. The eligible scientific disciplines rotate on a three-year cycle between the biological sciences, engineering and technology, and the physical sciences.

Each award winner receives a cash prize of USD 5,000 and is sponsored to attend the annual meeting of the American Association for the Advancement of Science (AAAS). The winners are presented with their awards at a special networking ceremony, and have the possibility to attend workshops and sessions at the AAAS meeting, visit local laboratories and institutions, and attend a celebratory dinner organized by the Elsevier Foundation.

The awards have an important impact on local research cultures. Previous winners say the awards have had a powerful effect, enhancing the visibility of their past work and creating new opportunities for the future. The awardees are also inspiring role models for young women in science.



2018 award winners Silvia González Pérez, Germaine Djuidje-Kenmoe, Hasibun Naher, and Dawn Iona Fox. Not pictured: Witri Wahyu Lestari.

2018 AWARD WINNERS

The 2018 OWSD-Elsevier Foundation Awards were given in the physical sciences: chemistry, mathematics, and physics. The five winners were announced on February 15, 2018 at the AAAS meeting in Austin, Texas. They are:



GERMAINE DJUIDJE KENMOE

CAMEROON (SUB-SAHARAN AFRICA)

PHYSICS: For her work on mechanics and the study of friction-and-wear processes on the molecular level, which have the potential for important applications in the area of energy efficiency.

DAWN IONA FOX

GUYANA (LATIN AMERICA AND THE CARIBBEAN)

ENVIRONMENTAL AND MATERIAL CHEMISTRY: For her research on converting local waste products into value-added materials to solve environmental problems. Her current work is focused on improving drinking water quality for vulnerable communities and during water-stress events such as floods, storms and hurricanes.



SILVIA GONZÁLEZ PÉREZ

ECUADOR (LATIN AMERICA AND THE CARIBBEAN)

THEORETICAL AND COMPUTATIONAL CHEMISTRY: For her research on heterogeneous catalysis in metal, bimetals, nanotubes and oxides. She performs molecular modelling of potential new materials that can be synthesized or purified from natural products.

WITRI WAHYU LESTARI

INDONESIA (EAST AND SOUTHEAST ASIA & THE PACIFIC)

ORGANOMETALLIC AND CO-ORDINATION CHEMISTRY: For her research on the synthesis of Metal-Organic Frameworks whose structures have widespread potential applications in areas such as molecular magnets, gas separation and storage, selective drug synthesis and delivery and environmental protection.



HASIBUN NAHER

BANGLADESH (CENTRAL AND SOUTH ASIA)

APPLIED MATHEMATICS: For her work in nonlinear partial differential equations. Her significant academic contributions to this field have included her most recent work on tsunami simulation and her research on travelling waves.



2018 OWSD-Elsevier Foundation Award winners in Austin, Texas

AWARD CEREMONY

Four of the five awardees were able to attend the AAAS annual meeting in Austin, Texas from 14-17 February 2018. The presentation of the awards took place during a special breakfast for minority and women scientists and engineers. Speakers during the ceremony were: Seema Kumar, Vice President of Innovation, Global Health and Policy Communication at Johnson & Johnson; Rush Holt, CEO of AAAS and Executive Publisher of *Science*; and Shirley Malcom, Head of Education & Human Resources at AAAS. They emphasized the importance of recognizing women's contributions to science. Yann Schemm, Director of the Elsevier Foundation, and Atya Kapley, OWSD Vice President for the Asia-Pacific region, also described the impact of such awards on early career scientists in developing countries as well as the need to promote leadership in women scientists. Each of the awardees presented her research; Witri Wahyu Lestari from Indonesia participated via Skype.



Two private donors, Gilbert Omenn and Martha Darling, pledged an additional USD 2,500 to each awardee. This is the fourth year that they have made such a donation.

In addition to the award ceremony, the awardees also had several opportunities during the 4-day conference to network with diverse groups of scientists, funders, entrepreneurs, policy leaders, publishers and the media. These included a visit to the IC2 Institute at the University of Texas at Austin, an interdisciplinary research unit that houses the university's incubator and works to advance entrepreneurial activities. Awardees met with the Institute's director Gregory Pogue as well as programme manager Aprille Busch, and learned about the institute's programmes to train young researchers in market research and commercial product development. The awardees also had valuable networking opportunities at a luncheon with the Austin chapter of the Association for Women in Science (AWIS), and at an Elsevier dinner where they were recognized by Brad Fenwick, Senior Vice President for Global Strategic Alliances, who hosted the dinner.



“ Since my childhood I have always thought about how to motivate female students in STEM so that they can have prosperous lives in developing countries. I hope this award helps me to fulfill my dream. ”

HASIBUN NAHER
2018 OWSD-ELSEVIER FOUNDATION AWARD WINNER

SPOTLIGHT ON: SILVIA GONZÁLEZ PÉREZ



Growing up in Mexico, chemist Silvia González Pérez was fascinated by chemistry, interested in how it could explain the varying properties and behaviors of different materials and answer the question that was always on her mind: *Why does it do that?*

She was drawn to computational chemistry, which combines theoretical chemistry with computer simulations to obtain a clearer understanding of the structures and properties of molecules and solids. During her PhD at the Universitat de Barcelona in Spain, under Prof. Francesc Illas Riera, she learned to apply techniques of quantum chemistry and computational methods while studying decontamination reactions.

After completing her PhD, Dr. González Pérez accepted a position at the Universidad Técnica Particular de Loja in Ecuador, where she is an

Assistant Professor of Physical Chemistry. She and her research team work using Quantum Quantitative Structure-Activity Relationships/Quantitative Structure Properties Relationships (QSAR/QSPR), a technique that establishes a mathematical link between a material's chemical structure and its biological activity or chemical properties. Understanding these links allows researchers to use molecular modelling to synthesize potential new substances from naturally occurring ones. Dr. González Pérez is focused specifically on using the technique to understand heterogeneous catalysis in metals, bimetallics, nanotubes, and oxides.

Theoretical and computational chemistry methods are not yet well developed in Ecuador, with only a handful of research teams working in the field. Dr. González Pérez and her colleagues, however, persuaded their university to purchase the country's first high-performance computer, with the processing power and specialized software (VASP, Gaussian, CRYSTAL) needed for their computations. Along with Drs. César Costa and Javier Torres from Escuela Politécnica Nacional and the Universidad San Francisco de Quito, respectively, Dr. González Pérez also founded the Group for the Experimental and Theoretical Study of Nano Sistemas (GETNano), a national network that supports research collaborations and organizes courses for students in the study of materials. They hope that this will enable them to improve their publication output and put Ecuador more firmly on the map in these fields. Dr. González Pérez has also advocated vocally for Ecuador to institute a national scholarship program for postgraduates

in order to keep talented young scientists from leaving the country. She hopes that winning the OWSD-Elsevier Foundation Award will give her a broader platform for communicating this need.

As an active missionary in the Idente congregation of the Catholic Church for the last 12 years, Dr. González Pérez's passion for science is closely tied to her faith. She believes that science can help to answer spiritual questions as well as material ones. "Humanity works very hard to find the truth," she says, "but the truth is as unlimited as it is amazing."



FINANCIAL SUMMARY

OWSD is funded by three donors. Sida, the Swedish International Development Cooperation Agency, has funded the PhD programme since 1998. In 2018, Canada's International Development Research Center (IDRC) became OWSD's second major donor, with the commitment to fund the Early Career Fellowship. The Elsevier Foundation has funded the OWSD Awards programme since 2012.

Financial income and expenditure for the year 2018 are reported in the tables below.* Expenditure is organized according to programme areas.

INCOME	AMOUNT (USD)
Balance brought forward from 2017	1,813,246.95
Swedish International Development Agency (Sida)	1,405,649.22
International Development Research Centre (IDRC), Canada	596,806.53
Elsevier Foundation, USA	60,000.00
Contributions from OWSD members	216.14
Transfer to reserve fund	(200,000.00)
Interest	131,834.00
TOTAL INCOME	3,807,752.84

EXPENDITURE	AMOUNT (USD)	
	APPROVED BUDGET	SPENT
(1) Increasing women's participation, leadership and influence in science, technology and innovation in low and middle income countries (PhD fellowship programme)		
1.1 Fellowships (PhD)	560,340.00	726,802.80
1.2 Travel (PhD fellows)	68,970.00	56,100.00
1.3 Fellows' presentations/attendance at 25th Anniversary celebrations	217,640.00	199,833.73
1.4 Monitoring	27,410.00	11,139.63
1.5 Travel - Executive Board and staff	22,840.00	3,113.21
1.6 Website/communications	16,500.00	12,326.19
1.7 Staff and office space	355,330.00	303,257.40
1.8 Additional funds for PhD programme received in previous year	158,058.00	90,960.00
1.8.1 Travel (PhD fellows)	16,918.00	10,000.00
1.8.2 Monitoring	24,801.00	24,801.00
1.8.3 Travel - Executive Board and staff	17,452.00	14,841.87

EXPENDITURE	AMOUNT (USD)	
	APPROVED BUDGET	SPENT
1.8.4 Website/communications	6,630.00	6,457.71
1.8.5 Staff and office space	29,940.00	91.29
1.8.6 Other costs for staff and office space	62,317.00	34,768.32
Subtotal for (1)	1,427,088.00	1,403,533.15
(2) Gender in Science, Innovation, Technology and Engineering (GenderInSITE)		
2.1 Steering Committee	21,830.00	00.00
2.2. Regional Focal Points	54,700.00	51,296.90
2.3 Workshops/activities	34,910.00	3,969.93
2.4 Communications	10,900.00	9,046.00
2.5 Travel	10,900.00	3,761.63
2.6 Staff costs	120,560.00	93,871.00
2.7 Additional GenderInSITE funds received in previous year	29,297.00	27,223.53
2.7.1 Workshops/activities	13,945.00	13,848.53
2.7.2 Communications	6,477.00	6,477.00
2.7.3 Travel	6,898.00	6,898.00
2.7.4 Staff costs	1,977.00	00.00
Subtotal for (2)	283,097.00	189,169.17
(3) Additional OWSD and GenderInSITE activities	453,025.00	296,788.60
(4) OWSD-Elsevier Foundation Awards for Early Career Women Scientists in the Developing World	60,000.00	59,998.11
(5) Supporting women's leadership in science, technology and innovation in scientifically and technologically-lagging countries (2017-2021) (Early Career Fellowship programme)		
5.1 Personnel	150,000.00	120,256.53
5.2 Consultants	15,000.00	10,000.00
5.3 Evaluation	25,000.00	546.08
5.4 Equipment	50,000.00	57,584.00
5.5 International travel	15,000.00	00.00
5.6 Training	90,000.00	64,812.78
5.7 Research	190,000.00	159,176.80
5.8 Indirect costs	69,550.00	00.00
5.9 Additional funds received from IDRC in previous year	1,108,620.00	962,476.98
5.9.1 Personnel	118,485.00	117,425.08
5.9.2 Consultants	10,309.00	10,308.97
5.9.3 Evaluation	25,761.00	25,760.36
5.9.4 Equipment	154,525.00	119,561.20
5.9.5 International travel	10,822.00	9,019.65
5.9.6 Training	894.00	894.00
5.9.7 Research	640,764.00	578,305.48
5.9.8 Indirect costs	147,060.00	101,202.24
Subtotal for (6)	1,713,170.00	1,374,853.97
Management costs		16,291.29
TOTAL EXPENDITURE	3,963,380.00	3,340,634.29
Savings on prior years' obligations		511,887.73
Excess (shortfall) of income over expenditure		979,006.28

*The budget shown also contains income and expenditure for GenderInSITE, a partner programme of OWSD that is budgeted under the OWSD programme for administrative purposes.

OPERATIONAL STRUCTURE

OWSD is a programme unit of UNESCO, the United Nations Educational, Scientific and Cultural Organization, and is administered under TWAS, the World Academy of Sciences.

EXECUTIVE BOARD

OWSD is governed by an Executive Board which is elected at each General Assembly, held every four years. The Executive Board includes a President (from any of the four OWSD regions), four Vice Presidents (one from each region), and four Regional Members (one from each region), plus the immediate past President. The current Executive Board was elected at the 5th General Assembly in Kuwait in 2016. Currently there is no Regional Member for Latin America and the Caribbean.

PRESIDENT

Jennifer A. Thomson, South Africa

VICE PRESIDENTS

Nashwa Eassa, Sudan (*Arab region*)

Atya Kapley, India (*Asia-Pacific region*)

Olubukola Oluranti Babalola, Nigeria (*Africa region*)

Jana Rodríguez Hertz, Uruguay (*Latin America and the Caribbean region*)

REGIONAL MEMBERS

Esi Awuah, Ghana (*Africa region*)

Hasin Anupama Azhari, Bangladesh (*Asia-Pacific region*)

Huda Basaleem, Yemen (*Arab region*)

IMMEDIATE PAST PRESIDENT

Fang Xin, China

SECRETARIAT

The Secretariat of OWSD is hosted on the campus of the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy.

Tonya Blowers - **Programme Coordinator**

Evgenia Markvardt - **Associate Programme Manager**

Lucia Fanicchi - **External Relations**

Tanja Bole - **Fellowships**

Erika Hrvatic - **Fellowships**

Marina Juricev - **Fellowships**

Zabeeh Ullah Sahil - **Fellowships**

Erin Johnson - **Communications**

Fiona Dakin - **GenderInSITE Assistant**



Members of the OWSD Executive Board at the annual meeting in New Delhi.

OWSD is grateful to the following donors for their generous support of OWSD programmes in 2018:

Swedish International Development Cooperation Agency (Sida)

PhD fellowship programme and Secretariat support



International Development Research Centre (IDRC) - Canada

Early Career fellowship programme and Secretariat support



The Elsevier Foundation

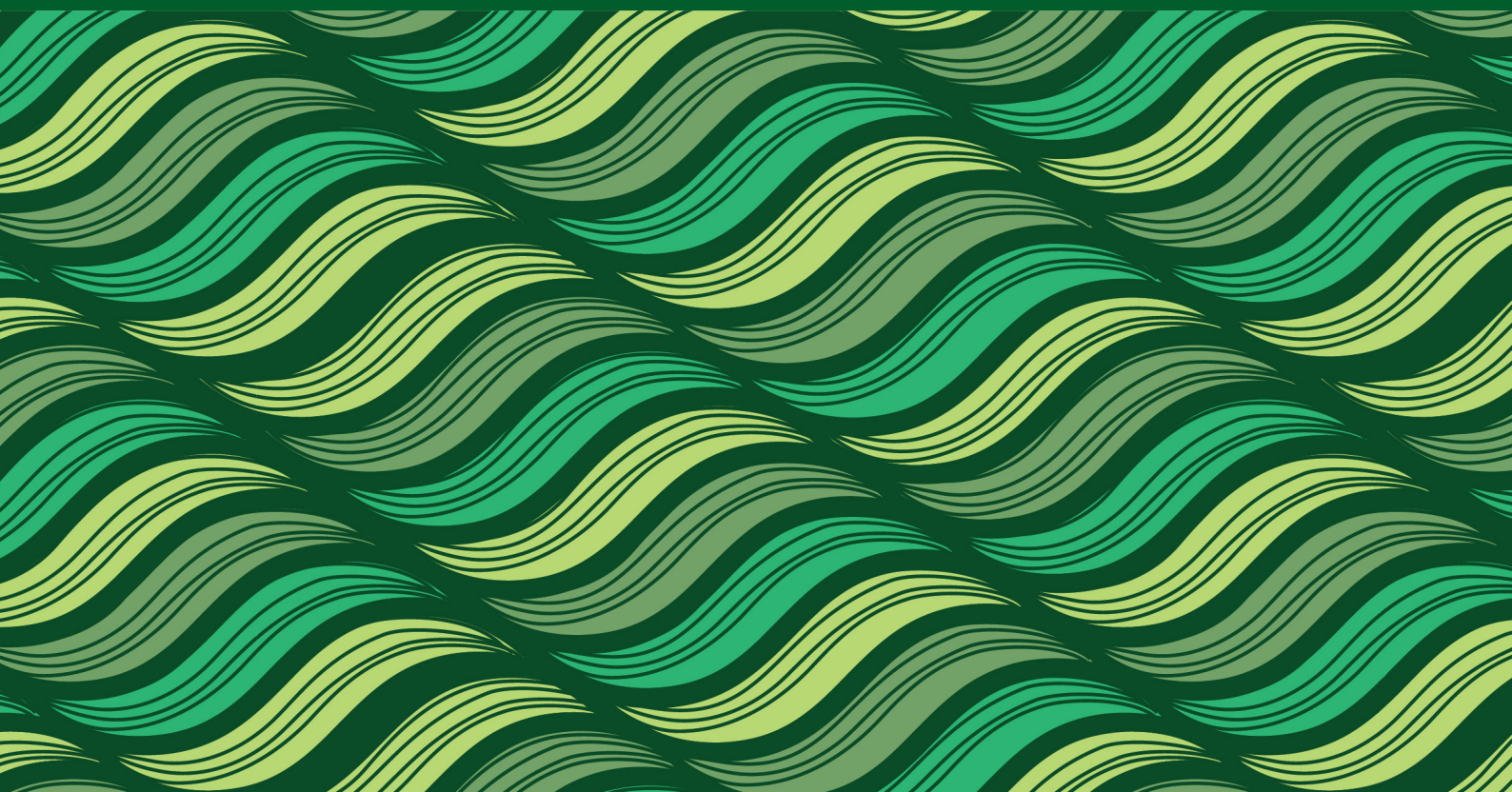
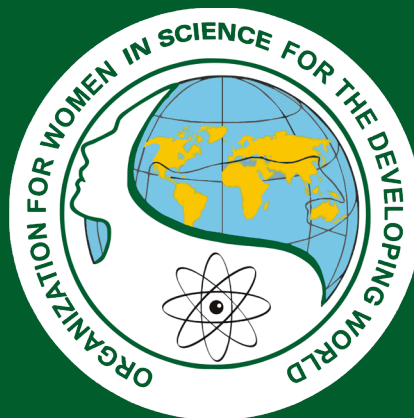
Awards programme

THE ELSEVIER FOUNDATION

This report was written and designed by Erin Johnson, OWSD Communications Administrator, with support from Tonya Blowers, Tanja Bole, Alexandra Cussianovich, Fiona Dakin, Giorgia Danelon, Lucia Fanicchi, Anamaria Golemac Powell, Erika Hrvatic, Marina Juricev, Evgenia Markvardt, and Sahil Zabeeh Ullah.



United Nations
Educational, Scientific and
Cultural Organization



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