ANNUAL REPORT 2020

OWSD

Early Career Fellow Esperance Munganyika (right) investigating passionfruit viruses in Rwanda

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LETTER FROM THE OWSD PRESIDENT

What a year! It started, for me, with sharing the OWSD-Elsevier Foundation award ceremony with our five fantastic winners in Seattle. Little did we know when we left Seattle that the city would be shut down a week later as a result of the COVID-19 pandemic. After Seattle, I attended the OWSD Steering Committee meeting in Trieste, where I departed from the Venice airport. It ended up closing the very next day – close shave!

Among the positive outcomes of the COVID-19 lockdowns around the world was that all OWSD's selection committees had to be held online, and we could therefore involve a far greater diversity of experts to select our 2020 PhD and Early Career fellows. These experts included OWSD Executive Board members, Early Career fellows, PhD alumnae, and awardees.

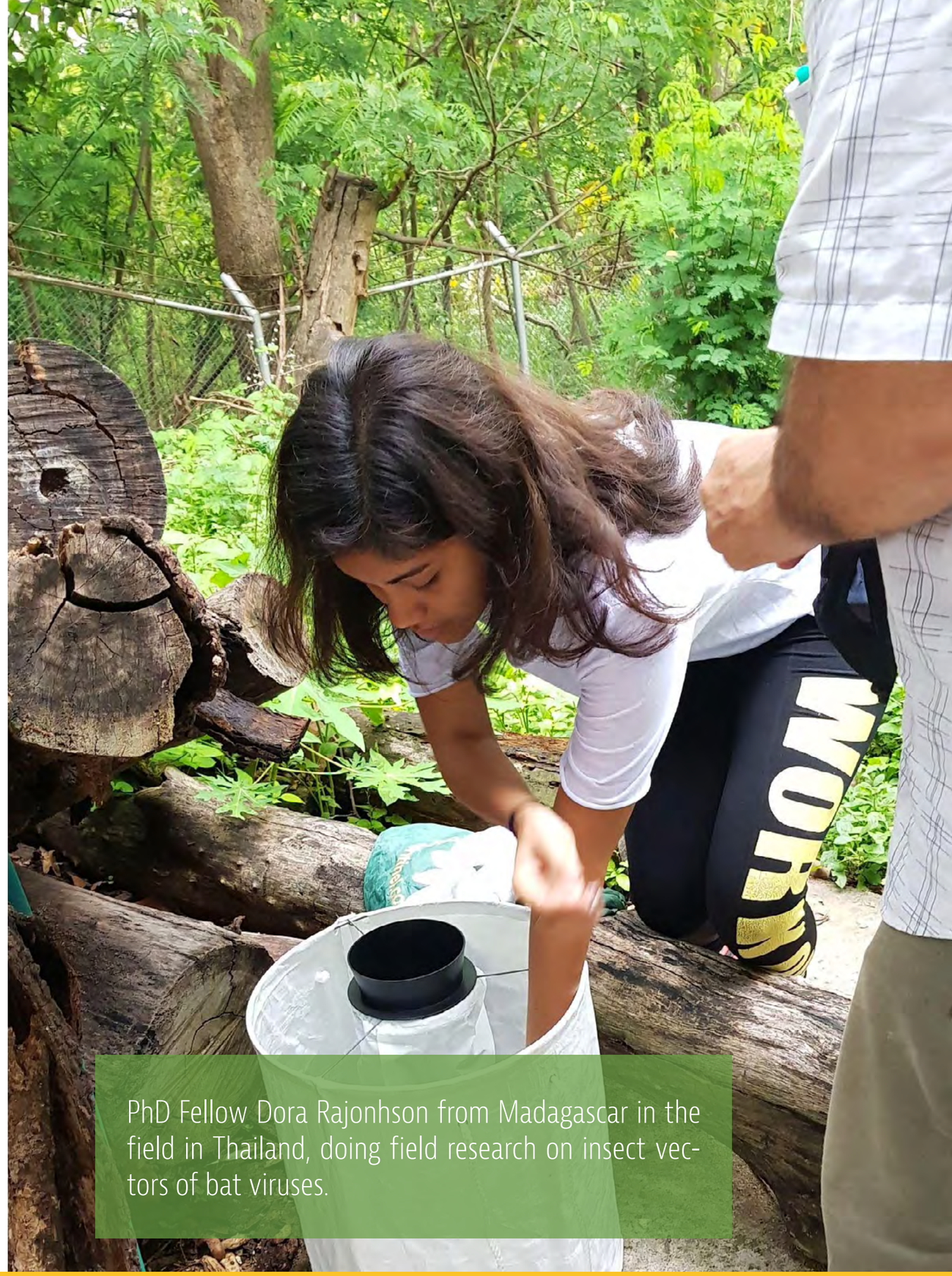
This year we further strengthened our links with our partners AuthorAid, with whom we organized a tailored course on 'Research Writing in the Sciences' for our fellows. I was happy to be invited to share my knowledge about predatory journals and how to avoid them in a presentation for the course.

In October we had a week-long orientation workshop for our new cohort of 2020 Early Career fellows. Again, being online we could involve many experts. My contribution was 'How to support each other as women scientists post-COVID.' Which brings me to the survey that went out to all members and is covered in the body of this report. I was able to give seminars on the findings to a number of online conferences, including in India, Nepal, Honduras, and South Africa, and at UNESCO. The feedback on these presentations showed that our findings were of great value to the audiences involved.

Our staff conducted a much-needed 'reboot' of our membership database to identify those members who were active. Our numbers, previously more than 8,000, took a dive to 4,833, but they rapidly rose to 6,231 by the end of the year.

I am sure you are going to thoroughly enjoy reading this year's Annual Report, not only for its content but also for the wonderful photographs and beautiful setting. I am extremely proud to be a part of this amazing organization!

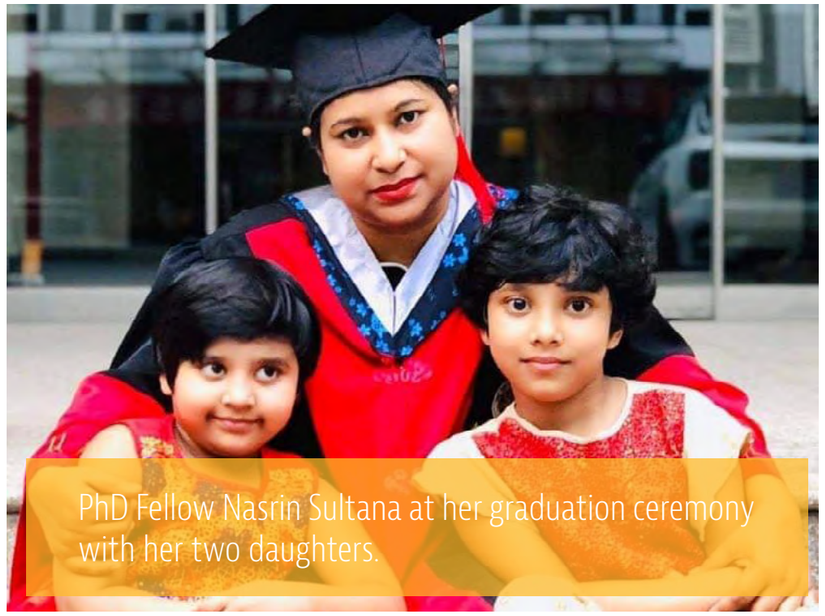
Jennifer Thomson
OWSD President



PhD Fellow Dora Rajonhson from Madagascar in the field in Thailand, doing field research on insect vectors of bat viruses.

OWSD IN 2020: AN OVERVIEW

At the beginning of 2020, nobody could have predicted the worldwide disaster that was just beginning to unfold in China, poised to wreak havoc on societies and economies around the globe and to claim appalling numbers of human lives. The increasingly troublesome headlines from China soon came closer to home for those in other countries, and new words entered our daily vocabulary: pandemic; lockdown; social distancing; quarantine; smartworking; Zoom; Zoom fatigue. When the World Health Organization declared the COVID-19 crisis an official pandemic on March 11, 2020, it became clear that this would be not a momentary interruption to our normal ways of life, but a protracted battle—against an enemy about one-thirtieth the size of a grain of pollen—with fundamental, long-lasting changes to systems and routines we took for granted.



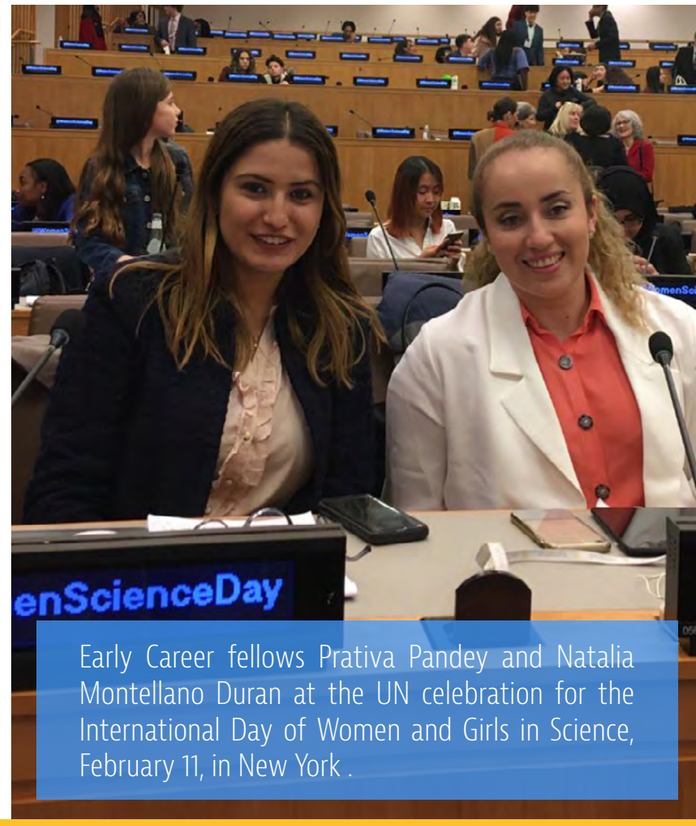
PhD Fellow Nasrin Sultana at her graduation ceremony with her two daughters.

While the OWSD Secretariat is based near what was one of the first epicenters of the COVID-19 pandemic, in northern Italy, rapid action taken on the part of government and institutional officials ensured that secretariat staff were equipped to carry out all necessary activities at home without any disruption to programme continuity. For OWSD's network of women scientists throughout the developing world, however—including our PhD and early career fellows, awardees, and more than 6,000 members—the immediate effects of the pandemic were various and many. It interrupted experiments in progress and halted field work, forcing scientists to find new ways of remote teaching and learning, with little training or support. It prevented them from reaching important milestones: submitting their graduate theses; starting new jobs; traveling to fellowships and residencies. It isolated many of them far from their homes and families, unable to travel—and those who were at home took on a disproportionate share of household labor, childcare, and homeschooling. Overall, the pandemic took an enormous toll on members' mental wellbeing, leading many to feel anxious, overwhelmed, lonely, or unmotivated. These effects are all documented in an OWSD member survey that was conducted in June 2020, with additional surveys of our PhD and early career fellows conducted in April 2020, and with OWSD awardees in June-August 2020 (for more details on the survey see, pages 41-42).

OWSD scientists are nothing if not resilient, however, and during the COVID-19 pandemic, as during many other challenging circumstances, they met adversity with perseverance, purpose, and innovation. Nearly half of the scientists who responded to the OWSD member survey reported being involved in some kind of a response to the pandemic, including more than a quarter who were involved in awareness raising. Other ways members contributed to fighting the pandemic ranged from treating COVID-19 patients directly, to turning over their labs to use as diagnostic clinics, to coordinating 3D printing of ventilators, to creating personal risk-assessment tools, to researching the impact of the pandemic on vulnerable populations, among many more examples that can be read about in the survey. For a closer and more personal look at some scientists' stories, we also profiled 14 individual OWSD members who had been affected by and were responding to the crisis in diverse ways.

Despite the setbacks to our normal ways of functioning, OWSD managed many accomplishments in 2020. We awarded 26 new PhD fellowships, including to candidates in Afghanistan and Nicaragua for the first time in OWSD's history, and saw 23 fellows join the ranks of PhD graduates. Twenty-three Early Career fellowships were also awarded, including to 10 women scientists from least developed countries. From March to April, we conducted an update to our membership database to remove inactive members; while this initially dropped the number of OWSD members on record from 8680 to 4830, the difference is already being quickly made up by a record number of new membership applications (1850), with a proliferation of new members in Latin America, as well as in other countries thanks to the efforts of new National Chapters in Brazil, Guatemala, Honduras, Malawi, Mozambique, Nepal, Palestine, and Senegal. By the end of 2020, we had already reached 6230 active members. And in February, we were lucky to be able to recognize the five winners of the 2020 OWSD-Elsevier Foundation Awards in person at the annual meeting of the American Association for the Advancement of Science, in Seattle, Washington, before global travel was halted.

If 2020 showed anything, it was that science, and scientists, are absolutely essential in identifying, characterizing and resolving the major challenges that face the world today. Today it is virologists and epidemiologists who may be credited (and rightfully so) with saving the day, but as we've seen from the OWSD membership, scientists from every discipline can and have contributed their efforts to this collective endeavour, from computer scientists using big data to predict infectious disease outbreaks, to chemists developing sanitizing products, to agricultural scientists working to safeguard the availability of food in COVID-19-stricken countries. The immense and complex nature of 21st century challenges—climate change, biodiversity loss, deforestation, energy, food, and water security—requires a diversity of expertise and ideas—and this means diversity on every level. It is more important than ever to make sure that scientists from the Global South are participating in international decision making processes, and that they have the support and the resources they need to respond to local problems at the local level. And it is crucial that *women* scientists are equally involved; we cannot afford to lose out on the brainpower of half of the world's population, nor the unique perspectives and concerns they bring to the table. Investing in women scientists means investing in a more secure, prosperous, and fair future.



Early Career fellows Prativa Pandey and Natalia Montellano Duran at the UN celebration for the International Day of Women and Girls in Science, February 11, in New York .

OWSD PHD FELLOWSHIPS

OWSD's flagship PhD fellowship programme continued for its 23rd year in 2020, awarding 27 new fellowships to women from the developing world to pursue PhD research at host institutions throughout the Global South. Despite the application period coinciding with the start of lockdowns in many countries due to the COVID-19 pandemic, the number of applicants has continued to grow. In addition, 30 fellows were able to complete their fellowships, and graduated with their PhDs. OWSD at the end of 2020 had a total of 312 PhD graduates.

The PhD fellowships, awarded since 1998, promote 'South-to-South' mobility. Fellows have the option of completing either a full-time or 'sandwich' fellowship, to undergo research at host institutes. The fellowship covers full funding for the PhD fellows' monthly stipends when on site, return travel, visa and health insurance costs. Tuition and registration fees are negotiated with the host institute. All funding for the PhD fellowship programme is provided by the Swedish International Development Cooperation Agency (Sida).

In 2020...

176 eligible applications

27 fellowships awarded

30 graduates

Of the 524 PhD fellows awarded since the start of the programme*, 165 are new or ongoing in 2020; 312 have graduated and are now OWSD fellowship alumnae.

PhD APPLICATIONS

The 2020 Call for Applications for the OWSD PhD Fellowships was open for 4 months (February 3-May 30), extended beyond the usual 2 months due to the COVID-19 crisis. For those applicants who could not access their institutes in time to obtain required documentation, the OWSD Secretariat provided for the first time a self-certification form. A total of 176 eligible applications were received. Of these, 129 were shortlisted, and 47 recommended for funding. The share of recommended applications selected by the expert reviewers has increased significantly in the last several years, indicating a higher quality of applications overall.

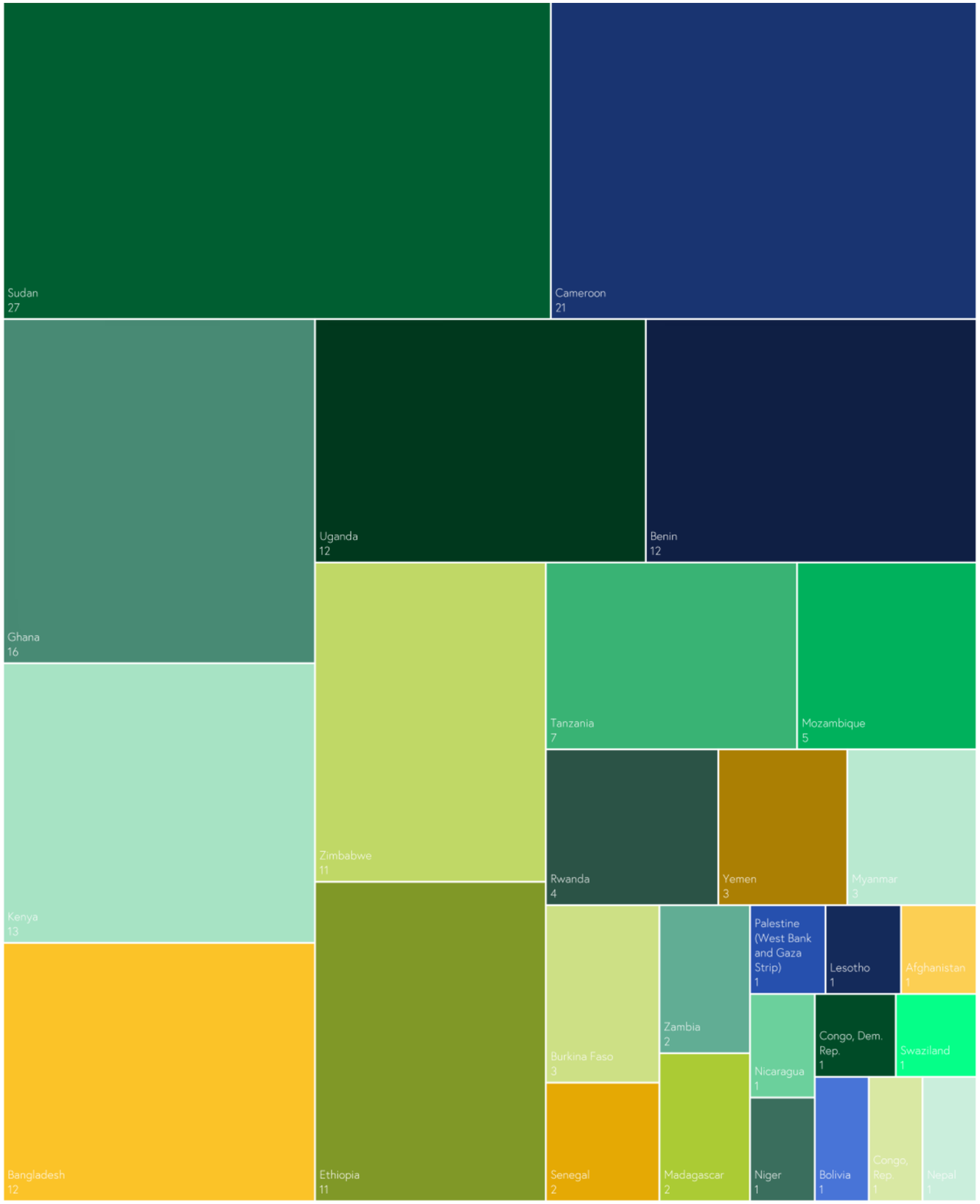
Where from? Applications were received from 33 countries; 59% came from 21 Least Developed Countries (LDCs). The highest number of applications came from Sudan, with 27 applications. Cameroon had the second highest number, with 21, followed by Ghana (16), Kenya (13), Bangladesh, Benin, and Uganda (12 each). The very first application was received from Nicaragua since it became an eligible country in 2017.

Where to? Applicants selected host institutes in 21 different countries in the Global South. South Africa continues to be the most popular host country for applicants by a wide margin, selected by near-

*The number of fellows awarded does count those who have dropped out, but does not count those who cancelled their fellowships before signing a final award agreement.

2016 PhD Fellow Yee Yee Myint in the lab, researching whether a species of tiny wasps can be used to control damaging agricultural pests in Myanmar.

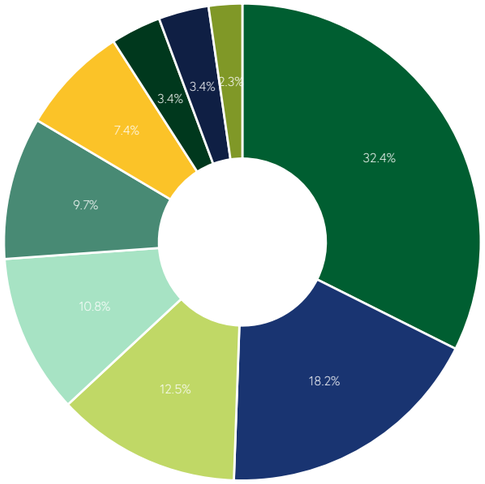
2020 PhD Fellowship applications by country



ly half (48%) of applicants. Malaysia is also very popular, with 20% of applicants. There was a dropoff in the number of applicants selecting host institutes in China (3% compared to 10% in 2019 and 9% in 2018). Latin American countries, on the other hand, are growing in popularity; Brazil was selected by 5% of applicants (compared to 2% in 2019 and 3% in 2018), and Mexico was selected by 2 applicants for the first time since 2011.

Which STEM subjects? Agricultural sciences continue to be the most popular disciplines among applicants, accounting for about a third (32%) of applications. Medical and health sciences are also quite popular, with 18% of applicants, followed by chemical sciences (13%). Applications in engineering remained higher than in previous years after rising significantly in 2019, remaining at 11% of applicants. While still making up a small share of the total, the number of applicants in computing and information technology—a field where women are particularly underrepresented—continued to grow, from only one application in 2018 to four in 2019 and 6 (3% of the total) in 2020. The share of applicants in mathematics (3%) and physics (7%), also traditionally male dominated fields, remained roughly the same as previous years.

2020 PhD Fellowship applications by discipline



- Agricultural Sciences
- Medical & Health Sciences, including Neurosciences
- Chemical Sciences
- Engineering Sciences
- Biological Systems & Organisms; Structural, Cell & Molecular Biology
- Physics
- Computing and Information Technology
- Mathematical Sciences
- Astronomy, Space & Earth Sciences

2020 PhD Fellow Elina Maharjan from Nepal will study the combined effect of biopesticides on crop pests, at the Universiti Putra Malaysia.

PhD AWARDS

Due to the restrictions imposed by the COVID-19 lockdown in Italy and globally, the selection committee met online for the first time in OWSD's history, in July 2020. This was an opportunity to continue to diversify the pool of reviewers, by inviting OWSD executive board members as well as OWSD-Elsevier Foundation awardees. The total number of reviewers for the 2020 selection (34) was more than double the number in 2019 (14); 83% of reviewers were women, and 60% were based in the Global South.

Following the selection committee's recommendations, 27 women were selected for the 2020 PhD fellowship, 17 full-time fellows and 10 sandwich fellows. The 2020 fellows include the first ever awardees from Afghanistan and Nicaragua; the fellow from Nicaragua is also the second fellow from Latin America and the Caribbean, following the selection of the first fellow from Bolivia in 2019.

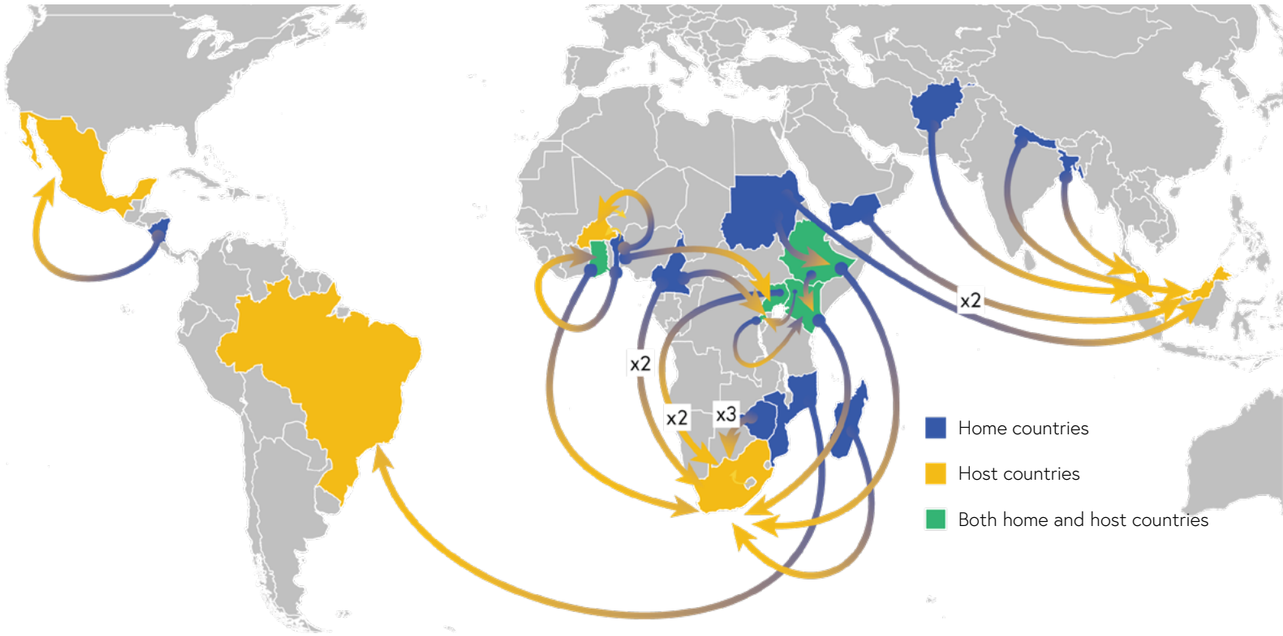
Where from? The awardees came from 16 countries: Afghanistan (1) Bangladesh (1); Benin (3); Cameroon (3); Ethiopia (2); Ghana (1); Kenya (2); Madagascar (1); Mozambique (1); Nepal (1); Nicaragua (1); Rwanda (1); Sudan (3); Uganda (2); Yemen (1); and Zimbabwe (3). Seventeen, or 63%, of the awardees came from Least Developed Countries.

Where to? Consistent with previous years, South Africa was the most popular host country, with 11 out of the 27 fellows (41%) traveling there for their PhD studies; this is a slight reduction from 2019, when over half of fellows selected South Africa. Malaysia was the second most popular destination, with 6 fellows, followed by Kenya (2) and Rwanda (2). Brazil, Burkina Faso, Ethiopia, Ghana, Mexico and Uganda will host one fellow each. Over half of the host countries selected are considered science- and technology-lagging countries (STLCs), meaning that hosting an OWSD fellow should be beneficial for capacity building for both the fellow and the host institute.

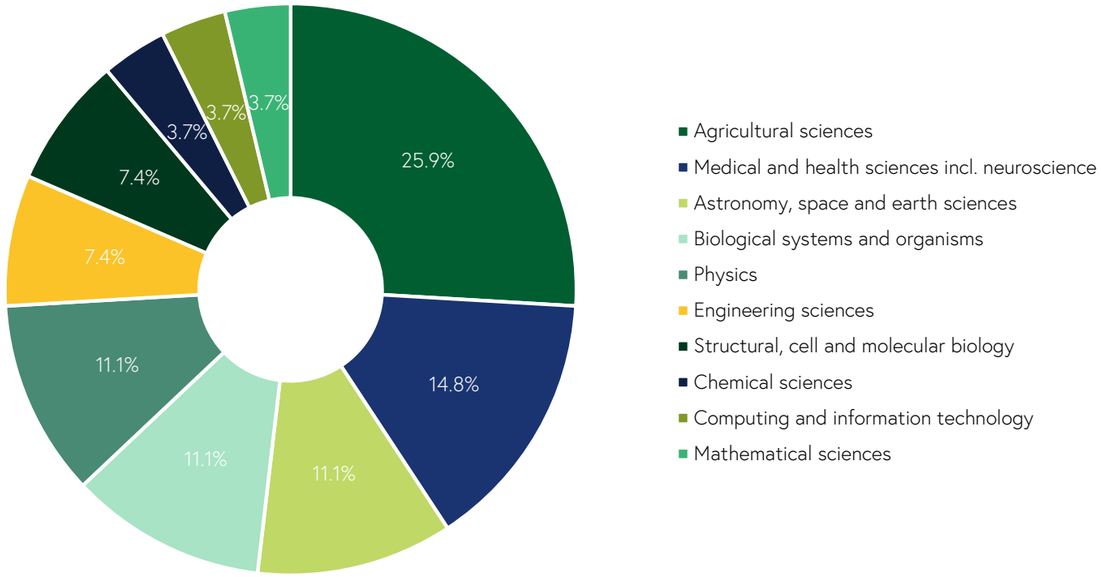
In which STEM subjects? Just over a quarter of fellowships (26%, or 7 out of 27) were awarded in the agricultural sciences, historically the most popular discipline for applicants. Four fellowships (15%) were awarded in the medical & health sciences, and three (11%) each in astronomy, space & earth sciences, biological system & organisms, and physics. Fellowships were also given in the fields of engineering sciences (2), structural, cell & molecular biology (2), chemical sciences (1), computing & information technology (1), and mathematical sciences (1). The fellowship in computing & information technology is the second OWSD PhD fellowship awarded in this field; the first was awarded in 2019.

2020 PhD Fellowship awards by country

2020 PhD Fellowship awardees: home and host countries



2020 PhD Fellowship awards by discipline



2020 OWSD PhD Fellows

Name	Nationality	Study scheme	Host institute	Host country	Project title
Abeho, Dianah Rose	Uganda	Full-time	University of Cape Town	South Africa	Automated UAV-based cadastral mapping for customary land in Uganda
Al-Masawa, Maimonah Eissa Sheikh	Yemen	Full-time	Universiti Kebangsaan Malaysia	Malaysia	The effect of human umbilical cord mesenchymal stem cells-eerived exosome (UC-MSC-Exo) and nano formulation on atopic dermatitis
Assan, Belthasara	Ghana	Full-time	University of Johannesburg	South Africa	Modelling zoonotic infection: the case of Buruli ulcer in Ghana
Dai, Emilienne Houevo	Benin	Sandwich	University Joseph Ki-Zerbo	Burkina Faso	Domestication of the bush banana *Uvaria chamae P. Beauv.*: insights from ethnobotany, biochemical, and eco-phenotypic assessment in Benin
Deguenon, Sèna Donalde Dolorès M.	Benin	Sandwich	University of Cape Coast	Ghana	Climate risks and social, economic and environmental vulnerability of the coastal zone of Benin
Elnoor Mohammed Abdalla, Hussna	Sudan	Full-time	Universiti Putra Malaysia	Malaysia	Digital imaging and signal processing
Gatsi, Nyepudzai Charsline	Zimbabwe	Full-time	University of the Witwatersrand	South Africa	Optimization of gallium oxide (Ga2O3) nanomaterials for gas sensing applications and the development of a sensitive, efficient and low-cost gas sensor that operates at low temperature
Gebeyehu, Desta Mulu	Ethiopia	Sandwich	Kaimosi Friends University College	Kenya	Production and optimization of bioethanol gel fuel, briquette fuel, and biofertilizer from selected agricultural wastes and water hyacinth (*Eichhornia crassipes*) around Bahir Dar, Northern Ethiopia, and Western Kenya
Ahuefa, Golda Faridah M. B.	Benin	Sandwich	Makerere University	Uganda	Wild relatives of cultivated leafy vegetables of *Solanum* in West Africa: biodiversity, distribution, conservation gaps and adaptation
Kenmogne, Vanelle Larissa	Cameroon	Full-time	Council for Scientific and Industrial Research	South Africa	Drug repurposing for cancer precision medicine: High-throughput drug screening as an integrative precision medicine platform in drug repurposing for South African cancer patient cohort
Kouemo, Rosmaelle	Cameroon	Full-time	ICTP - East African Institute for Fundamental Research (EAIFR) for the University of Rwanda	Rwanda	Investigation of the transport properties of many-body systems for the disorder potential
Magagoum, Suzanne Hippolite	Cameroon	Full-time	University of Cape Town	South Africa	Targeted photodynamic therapy of melanotransferrin positive skin cancers
Maharjan, Elina	Nepal	Sandwich	Universiti Putra Malaysia	Malaysia	Evaluation of combined effect of biopesticides on crop pests
Mpenda, Matabishi Adelphine	Rwanda	Sandwich	International Livestock Research Institute	Kenya	Investigation of exposure levels of aflatoxin B1 and hepatitis B status in children with chronic malnutrition in Rwanda

Name	Nationality	Study scheme	Host institute	Host country	Project title
Mugwanda, Kanganwiro	Zimbabwe	Full-time	Council for Scientific and Industrial Research	South Africa	Synthetic circuits and metabolic engineering of a bacterial chassis for probiotics
Mukonowenzou, Nyasha Charity	Zimbabwe	Full-time	Stellenbosch University	South Africa	Human immunodeficiency virus (HIV) mediated cardiovascular diseases onset: exploring the link between immune activation/inflammation and cardiac fibrosis in HIV infected individuals
Murila, Gloria Isendi	Kenya	Sandwich	ICTP - East African Institute for Fundamental Research (EAIFR) for the University of Rwanda	Rwanda	AB-INITIO study of V2O5.nH2O and WO3.nH2O; 2D materials for electrochemical energy storage application
Mutua, Elizabeth Ndunge	Kenya	Sandwich	University of Cape Town	South Africa	A deep learning model for neonatal postprandial hypoglycemia screening, early symptoms detection and treatment
Nambooze, Jennifer	Uganda	Full-time	University of the Free State	South Africa	Isolation and characterization of anticancer compounds and antioxidant compounds from selected plants (*Prunus Africana*, *Annona muricate* and *Elaeodendron buchananii*) in Uganda
Nhampossa, Julieta Augusto	Mozambique	Full-time	Federal University of Rio Grande do Sul	Brazil	Optimization of water allocation under physical restrictions
Raselimanana, Miary	Madagascar	Full-time	University of Johannesburg	South Africa	Species' adaptation in human-dominated landscapes: Insights from dwarf chameleons (genus *Bradypodion*)
Roshan, Fatema	Afghanistan	Full-time	Universiti Putra Malaysia	Malaysia	Assessments of different management strategies on productivity of pastures in western Big Pamir, Wakhan district, Badakhshan province, Afghanistan using geospatial technologies
Woldekidan, Haregewoin Bezu	Ethiopia	Sandwich	Council for Scientific and Industrial Research	South Africa	Aptamer-based detection of AURKA gene for diagnosis of endometrial cancer
Yasseen Gafar Osman, Nadia	Sudan	Full-time	Universiti Putra Malaysia	Malaysia	Exploring metabolite biomarkers associated with bioherbicidal activity of *Gluconacetobacter spp* against *Striga hermonthica* and metabolite reprogramming to control *Striga* Infestation
Yousof Yassin Kambal, Sumaya	Sudan	Sandwich	International Livestock Research Institute	Ethiopia	Characterization and Identification of Candidate Polymorphisms for Environmental Adaptation in African Cattle
Zambrana Areas, Xochilt Esther	Nicaragua	Full-time	National Autonomous University of Mexico	Mexico	Geophysical Modeling in the Pacific Margin of Nicaragua: A Contribution to the Tectonics of the Nicaraguan Territory.
Zisha, Shishita Zahan	Bangladesh	Full-time	Universiti Putra Malaysia	Malaysia	The influence of coronavirus as an indicator in sewage wastewater treatment plant: Effect and impact to human and environment

CONTINUING PhD FELLOWS

In 2020, OWSD had 165 active PhD fellows, including those newly awarded. The COVID-19 pandemic caused significant disruptions to the great majority of these students; in a survey carried out in May 2020, 74% of fellows said they expected their research to be delayed. Responding with as much flexibility as possible to requirements that varied from region to region, the OWSD Secretariat supported the fellows' requests for updated flight tickets, emergency stipend disbursements, fellowship extension requests, and sometimes, moral support during times of uncertainty. The Secretariat also processed extension requests on a case-by-case basis as fellows approached their original fellowship completion dates. At the end of December 2020, 25 fellowship agreements (14% of all ongoing fellows) had been modified due to COVID-19 related circumstances. The unexpected changes also had a financial cost, including additional funds earmarked for unplanned extensions, new flight tickets, and cancellations.

Given that extended breaks in studies and lack of financial support can have dramatic consequences on female students' progress, in August 2020 OWSD urgently developed and instituted a remote studies policy. The policy allows fellows to receive partial stipend support while continuing to study from home. A small monthly disbursement is provided in cases where the supervisor confirms that the fellow can continue to make progress at home and that supervision and support can be adequately carried out online. By the end of 2020, six fellows had taken up this special arrangement. The remote study allowance is subtracted from the already allocated budget for each fellow.

DOROTHY NGAJILO

2017 PHD FELLOW, TANZANIA

Currently completing a full-time fellowship at the University of Cape Town in South Africa, Dorothy Ngajilo is studying occupational exposure and associated health risks among aquaculture workers. Like many fellows, she had to postpone her field research during the COVID-19 pandemic, working with her supervisor to develop a plan to work from home on literature reviews and pending publications.

HUSSNA ELNOOR

2020 PHD FELLOW, SUDAN

Starting a full-time fellowship at the Universiti Putra Malaysia, Hussa Elnoor hopes to develop a better method to locate and classify brain tumors from MRI brain scans, using a method based on artificial intelligence systems.

By the end of 2020, many fellows were liaising with OWSD to travel back to their host institutes as countries and institutes set up clearer protocols and operational arrangements regarding COVID-19. However, the impact of the 2020 interruptions in fellows' studies will likely be more long-term and become clearer in 2021 and beyond.

Travel grant

Active fellows can also access a grant to travel to conferences, workshops or other trainings. Given that international travel was limited in 2020 and many major scientific events were cancelled, fellows were not able to benefit from the grant as they have in past years. However, 4 fellows did manage to attend conferences In January-February 2020, in Brazil, Gabon, Kenya, and Singapore. Once it became clear that travel restrictions would remain in place for an indefinite period and many scientific events had already been successfully transferred online, the Secretariat approved the use of the international travel funds to cover virtual event participation as well as regional training activities.

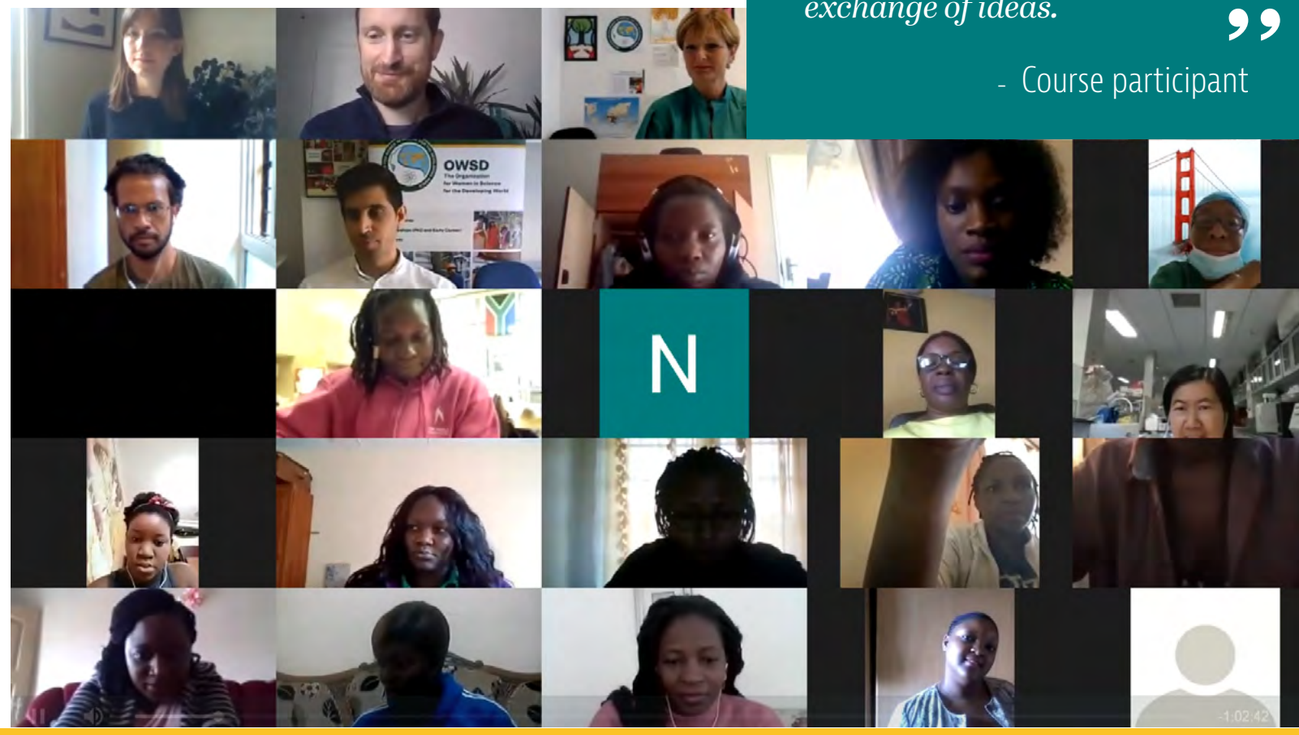
AuthorAID research writing course

As part of the PhD fellowship programme, OWSD organizes regular workshops for fellows to improve their scientific career and leadership skills. Typically, the PhD workshops are organized on a rotating basis in one of the four OWSD regions (Africa, the Arab region, Asia-Pacific, and Latin America and the Caribbean). While international travel and in-person gatherings were not possible in 2020 due to the COVID-19 pandemic, OWSD fellows were instead able to benefit from OWSD's long-standing relationship with the organization AuthorAid to offer a more specialized online course to all PhD fellows on Research Writing in the Sciences, supplemented with a special training section developed only for OWSD fellows.

The five-week course covered topics including literature review, research ethics, writing a research paper, and working towards journal publication. In addition, the OWSD fellows that registered for the course had access to a private "OWSD Classroom" where they received additional support from the facilitators and were able to virtually meet other fellows. Five more live sessions covered topics including predatory journals, the publishing landscape, and writing grant proposals.

In total, 65 OWSD fellows participated in the online course, and 80% of them successfully completed the entire course. Participants reported a substantial increase in their confidence levels across the topics covered by the course. Moreover, the course fell at a time when many fellows felt isolated due to the worldwide lockdowns. Having a connection with the OWSD network through the course offered a means to stay motivated and continue learning even during challenging circumstances.

> *"This course specifically for OWSD fellows brought us together, where we have started working on collaboration, providing peer-to-peer support and exchange of ideas."*
>
> - Course participant



PhD GRADUATES

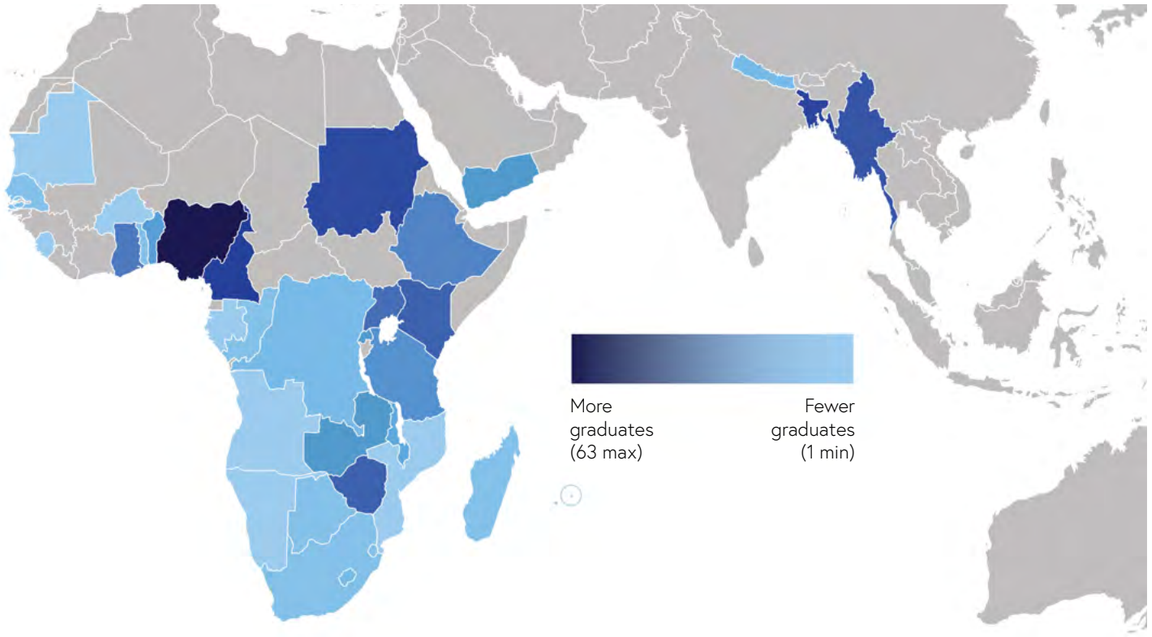
Despite setbacks due to COVID-19, 30 women graduated from the OWSD fellowship programme with their PhDs in 2020, making a total of 312 graduates from the programme since 1998.

Where from? The 2020 PhD graduates came from 12 countries: Zimbabwe (6 fellows); Cameroon (5); Ghana (4); Rwanda (3); 2 each from Bangladesh, Myanmar, and Sudan; and 1 each from the Democratic Republic of Congo, Malawi, Nigeria, Togo, Uganda, and Zambia. All together, OWSD PhD graduates originate from 34 countries across Africa and Asia: Nigeria (63); Cameroon (31); Bangladesh (30); Sudan (29); Myanmar (21); Kenya (18); Zimbabwe (18); Uganda (14); Ghana (12); Ethiopia (10); Tanzania (8); Benin (7); Malawi (5); Rwanda (5); Yemen (5); Zambia (5); Democratic Republic of Congo (3); Lesotho (3); Nepal (3); Botswana (2); Republic of Congo (2); eSwatini, Kingdom of (2); Madagascar (2); Senegal (2); and Togo (2). Countries with a single graduate are Angola, Burkina Faso, Gabon, Mauritania, Mauritius, Mozambique, Namibia, and Sierra Leone.

In which STEM subjects? The 2020 PhD graduates received their PhDs in the following fields: agricultural sciences (10); medical and health sciences (including neuroscience) (5); biological systems and organisms (4); engineering sciences (4); physics (4); chemical sciences (2); and astronomy, space and earth sciences (1).

Among all 312 OWSD PhD graduates, the most popular disciplines are agricultural sciences (22%) and structural, cell and molecular biology (20%). Chemical sciences as well as biological systems & organisms each account for 14% of graduates, while the medical and health sciences (including neuroscience) account for 11%. Smaller numbers of fellows graduated in physics (9%), mathematical sciences (6%), engineering sciences (3%), and astronomy, space and earth sciences (2%).

PhD Fellowship graduates by nationality, all-time



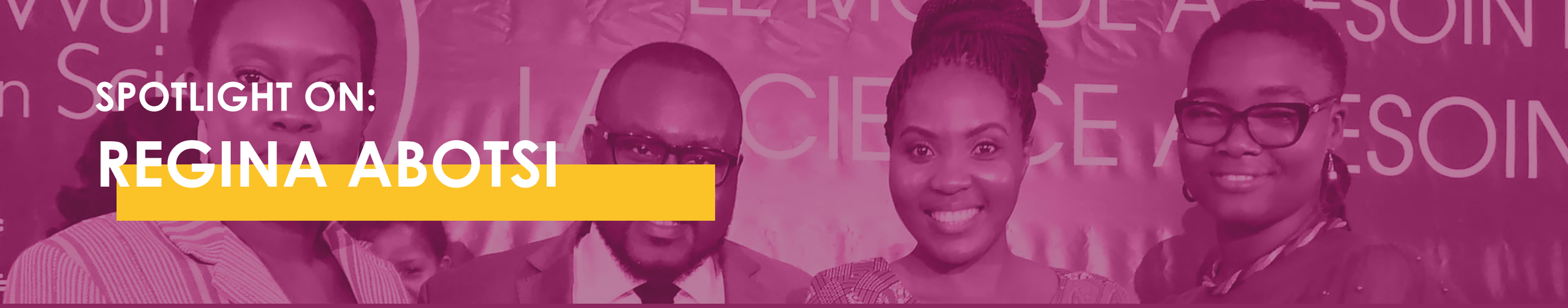
*Before 2017, the eligible countries for OWSD fellowships were all Least Developed Countries plus sub-Saharan African countries. From 2017, eligibility is based on a new list of scientifically and technologically lagging countries; therefore, some countries are no longer eligible for fellowships.

PhD fellow Nothando Dunjana from Zimbabwe celebrates her graduation from the University of KwaZulu Natal, South Africa

2020 OWSD PhD Graduates

Name	Nationality	Fell. year	PhD awarded from	Title of PhD thesis
Abdalla, Ishtiag	Sudan	2013	University of Pretoria, South Africa	Evolution and recent speciation in two disparate endemic South African insect genera: Macroderes (Coleoptera: Scarabaeidae) and Nemopterella (Neuroptera: Nemopteridae)
Agyei-Amponsah, Joyce	Ghana	2015	University of Pretoria, South Africa	Sensory, rheology, tribology and shelflife of reduced fat mayonnaise-type emulsions formulated with lipid-modified maize starch as fat replacer
Amoudji, Adjovi Djifa	Togo	2015	Université de Lomé, Togo	Evaluation of the effectiveness of malaria diagnosis tools, prevention and antivector control strategies and the level of resistance of malaria vectors to insecticides in Togo
Ayensu, Jessica	Ghana	2015	Kwame Nkrumah University of Science and Technology, Ghana	Development, acceptability and potential nutritional impact of insect fortified biscuits in pregnant women in ashanti region, Ghana
Bella Nke, Bertille Edith	Cameroon	2014	Université de Dschang, Cameroon	Structural analysis of plutonic and mylonitic rocks of the Tikar plain (Manchi-Mbakop-Magba-Bitou sector) western Cameroon domain: contribution of field data, ASM, microstructures and OPR of quartz
Ciza Azine, Pascaline	Dem. Republic of Congo	2016	Université de Dschang, Cameroon	Evaluation of some flavor enhancers as sources of monosodium glutamate for growth activation and organoleptic quality in broiler chickens
Djuidje Kouomou, Peguy Flora	Cameroon	2013	University of Yaounde I, Cameroon	Contribution of actinobacteria (actinomycetes) in the biological fight against *Pythium myriotylum*, the agent responsible for root rot of macabo (*Xanthosoma sagittifolium L. Schott*)
Dunjana, Nothando	Zimbabwe	2014	University of KwaZulu Natal, South Africa	Exploring the potential of tobacco (*Nicotiana tabacum 1*) waste-based organic amendments for fertility management of sandy soils in maize-tobacco smallholder systems of Zimbabwe.
Ikuzwe, Alice	Rwanda	2014	University of Pretoria, South Africa	Energy savings and maintenance optimization of energy-efficient lighting retrofit projects incorporating lumen degradation
Ineza, Claire	Rwanda	2010	Stellenbosch University, South Africa	Synthesis and use of novel ligands for the selective extraction of cobalt from other base metal ions
Iyanda-Joel, Wisdom Oluwayemi	Nigeria	2015	Covenant University, Nigeria	Phytochemical, antibacterial and toxicological studies of fruit-skin and leaf extracts of *Annona muricata linnaeus* (soursop)
Khin Aye Myint	Myanmar	2015	Universiti Putra Malaysia, Malaysia	Genetic diversity of MPOB-Senegal oil palm germplasm based on quantitative traits and microsatellite markers
Mangadze, Tinotenda	Zimbabwe	2015	Rhodes University, South Africa	Ecological assessment of a temperate river system using biomonitoring techniques: a case study of the Bloukrans river system, South Africa
Maware, Catherine	Zimbabwe	2015	University of Pretoria, South Africa	Lean Manufacturing for quality and performance improvement in Zimbabwean industries
Mezoh, Genevieve	Cameroon	2014	University of the Witwatersrand, South Africa	Investigation into the effect of HIV viral proteins on endothelial function in the HIV-Infected population
Munthali, Maggie Golie	Malawi	2014	University of Pretoria, South Africa	Analysis of land use and land cover change dynamics and its implications on natural resources in Dedza district, Malawi
Mutseiwa-Mugwagwa, Lindleen Runyararo	Zimbabwe	2016	Stellenbosch University, South Africa	Fractionation of agro-waste to produce biopolymers and bioactive compounds for active food packaging
Muvunzi, Rumbidzai	Zimbabwe	2014	Stellenbosch University, South Africa	Application of additive manufacturing for improved thermal management of hot sheet metal forming tools
Mwewa, Chilufya	Zambia	2014	University of Cape Town, South Africa	Observation of the electroweak production of two same-sign *W* bosons in proton-proton collisions with the ATLAS detector
Namirembe, Esther	Uganda	2014	University of Cape Town, South Africa	E-learning in universities in Uganda: Predictors of successful adoption
Nartey, Adwoa Padiki	Ghana	2015	University of Ghana, Ghana	Isolation and characterisation of a new bioactive lipopeptide homologues from the novel Ghanaian *Bacillus sp.* strain de2b
Niyibituronsa, Marguerite	Rwanda	2017	Jomo Kenyatta University of Science and Technology, Kenya	Effect of post-harvest handling on mycotoxin levels in soybeans from Rwanda and processing effects on nutritional value and acceptability of soymilk
Salah Elsheikh, Samar	Sudan	2014	University of Cape Town, South Africa	Integration of multi-omic data and neuroimaging characteristics in studying brain related diseases
Shultana, Rakiba	Bangladesh	2015	Universiti Putra Malaysia, Malaysia	Effect of salt-tolerant plant growth-promoting rhizobacteria (pgpr) inoculation on crop growth, biochemical properties and yield of rice
Sultana, Nasrin	Bangladesh	2013	University of the Chinese Academy of Sciences, China	Population dynamics of active aerobic methane-oxidizing bacteria in paddy soils and their contribution to soil organic carbon accumulation
Temgoua Djouatsa, Diane Estelle	Cameroon	2015	University of Yaounde I, Cameroon	Generation and propagation of rogue waves in optical fibers and chiral media
Tshuma, Piwai	Zimbabwe	2016	University of Johannesburg, South Africa	Catalytic conversion of carbon dioxide to useful products using novel meta-organic frameworks (MOFs)
Wah Wah Lwin	Myanmar	2012	University of the Chinese Academy of Sciences, China	QTL mapping and functional dissection for spikelet number per panicle in rice
Williams, Portia Adade	Ghana	2016	University of Cape Town, South Africa	An integrated approach to climate vulnerability and adaptation assessment of smallholder production systems: Evidence from horticultural production in Ghana
Yetchom Fondjo, Jeanne	Cameroon	2016	University of Douala, Cameroon	Ecology and taxonomy of Acridomorpha (Orthoptera: Acrididia) of the forest zone of the Littoral region of Cameroon

2020 OWSD PhD Graduates



SPOTLIGHT ON:
REGINA ABOTSI

Regina Abotsi knew since her time as an undergraduate student at the Kwame Nkrumah University of Science and Technology (KNUST) in Ghana that she wanted to study pharmacy. "I have had a long-held fascination for pharmaceutical drugs in general," she says. The more she learned, the more she became focused on the issue of antibiotic resistance, a looming problem worldwide but especially in Ghana, which like the rest of Africa, she explains, "has a paucity of surveillance data on antimicrobial resistance, which is contributing to a poor understanding of the scale of the problem and therefore hampering an effective response." Antibiotic resistance makes formerly simple-to-treat conditions life threatening, and has resulted in the use of expensive and inaccessible antibiotics to resolve infections. "A great number of patients either lose their lives due to infections caused by drug-resistant bacteria or use all their family savings to procure costly alternatives, leaving entire families impoverished."

A desire to better understand the molecular mechanisms behind antibiotic resistance took her abroad, to the University of KwaZulu-Natal in South Africa, for her Master's degree. It was there in 2015, while researching funding options for her PhD, that Regina learned about and successfully applied for the OWSD fellowship. The assistance she received was not purely financial: "When I faced challenges during the initial phases of my research, OWSD stepped in and provided the appropriate support."

Now completing a full-time fellowship at the University of Cape Town, also in South Africa, Regina is researching antibiotic resistance in HIV-infected children with chronic lung disease. CLD is responsible for about 50% of all illness and death in HIV-infected children. Regina and her colleagues have shown that in sub-Saharan Africa, a novel type of CLD known as obliterative bronchiolitis is now present in about a third of all HIV-infected children. As no treatment guidelines currently exist to manage the condition, they proposed to test the effectiveness of an antibiotic called azithromycin in this patient population, via a clinical trial in Malawi and Zimbabwe. One of the aims of the research is to find out if the azithromycin selects for antibiotic resistance in study participants, and how to overcome it. The findings from Regina's research will influence the recommendation of azithromycin as a treatment for CLD in HIV-infected children.

Regina's research has already received international attention; in 2019, she was awarded the prestigious L'Oréal-UNESCO For Women in Science Sub-Saharan Africa Young Talent Award. She hopes to be able to impart the training she has received in detecting resistant microorgainisms, tracing their spread, and carrying out molecular investigations to other scientists back home in Ghana, strengthening surveillance there. After her PhD, Regina plans to find a postdoctoral research position and eventually, to run her own lab at a research institute where she can continue to investigate antibiotic resistance.

Regina Abotsi (left) at the launch of the OWSD Ghana National Chapter in 2018, with (L-R) Theresa Appiah, Mary Assiamah, and Nana Ama Mireku-Gyimah, also OWSD PhD fellows from Ghana.

OWSD EARLY CAREER FELLOWSHIPS

The OWSD Early Career fellowship programme was launched in 2018 with the objective of supporting women scientists in the developing world to lead international level research projects in their home countries. Scientists who go abroad for their PhDs often return to their home countries to find that they are unable to maintain the same level of research that they have been accustomed to, due to lack of funding, infrastructure and other resources. The Early Career fellowship addresses this by providing women scientists with the capacity to establish and equip their own centres of research. The fellowship is offered to women who are within 10 years of their PhD in STEM subjects and who are employed in academic or scientific research institutes in one of the 60 eligible countries. Fellows receive a grant of up to USD 50,000 as well as training in leadership, management, communications and outreach skills. The grant funding is as flexible as possible in order to support fellows to establish environments at their institutions where they can maintain an international standard of research and attract scholars from all over the world to collaborate. Eligible expenses include childcare, research and teaching assistants, and visiting scholars, as well as equipment and consumables, fieldwork expenses, and information resources. An important aspect of the Early Career fellowship programme is innovation and the potential to generate impact on a broader scale; fellows are selected partly on the strength of their proposals to connect with public and private sector partners and convert their research into marketable products.

The third year of the fellowship programme, in 2020, was the last year of the pilot project, funded entirely by IDRC, the Canadian International Development Research Centre. In 2020, 23 fellowships were awarded to women scientists from 15 countries across Africa, the Asia-Pacific, and Latin America and the Caribbean. The new fellows joined the 19 women awarded in 2018 and 2019, making 61 Early Career fellows in total awarded for the 3-year project.

EARLY CAREER APPLICATIONS

The application period for the 2020 Early Career fellowships opened in February. Due to the COVID-19 pandemic, the original application deadline was extended to April 30. A total of 155 eligible applications were received; 22 applications were highly recommended by the OWSD selection committee.

Where from? Applicants came from 29 countries in Africa, the Asia-Pacific region, and Latin America and the Caribbean; the share of applicants from

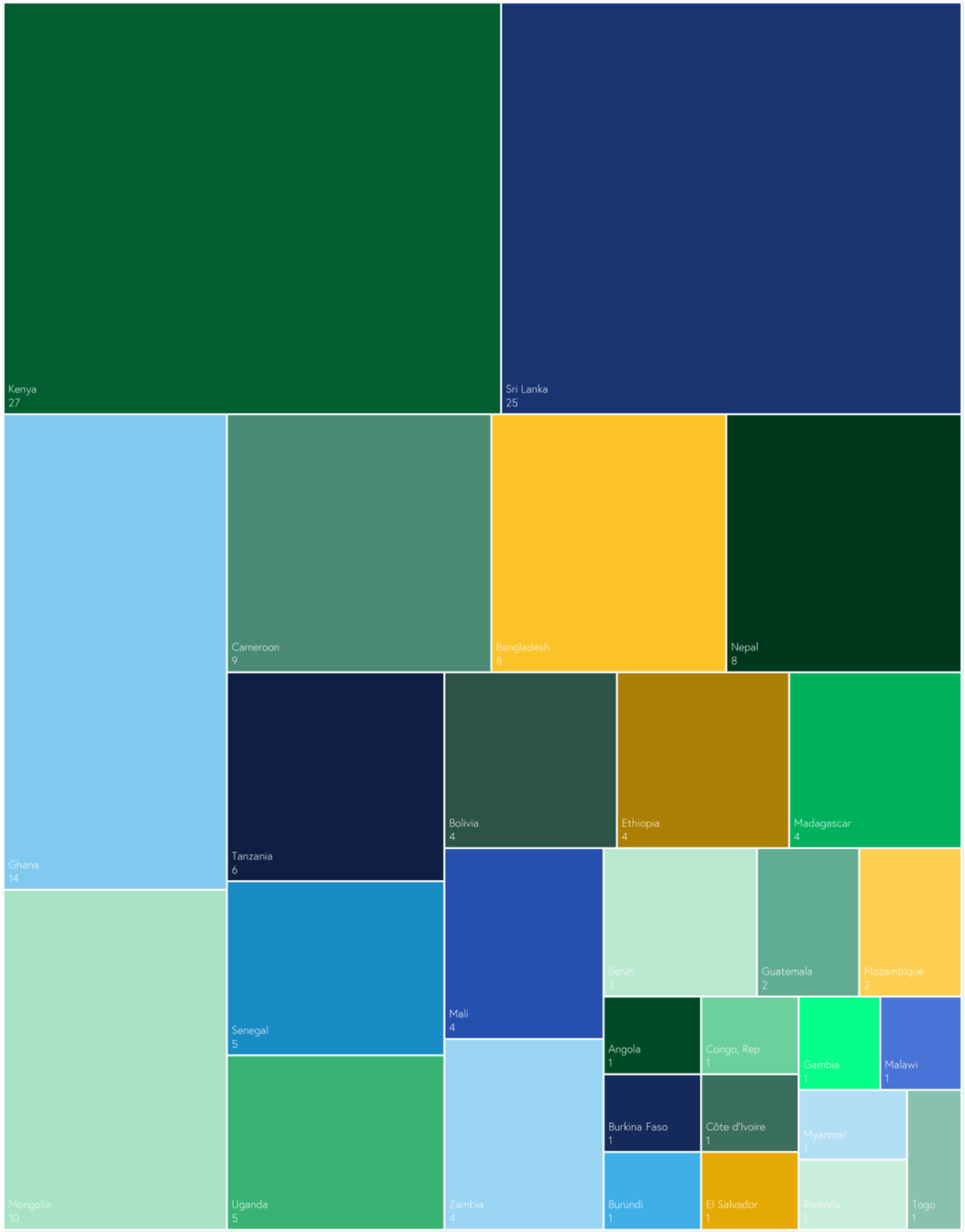
In 2020...

155 eligible applications

23 fellowships awarded

53% of applications from least developed countries

2020 Early Career applications by country



2019 OWSD Early Career fellows from Ghana, from left to right: Mercy Badu, Priscilla Mante, Edem Mahu, Mavis Owureku-Asare. Photo appeared in *Glitz Africa* magazines 'Women of the Year' issue in September 2020. Photo credit: Glitz magazine, photographer Ansah Ken.

each region roughly corresponded with the number of eligible countries in each region. No eligible applications were received from the Arab region, which has only three eligible countries (Djibouti, Palestine, and Sudan). Kenya remained for the third year the country with the highest number of applicants (27). Sri Lanka closely followed with 25 applications. Other countries with high numbers of applications were Ghana (14), Mongolia (10), Cameroon (9), Nepal and Bangladesh (8 each). There were 55 applications received from Least Developed Countries—38% of the total. While Africa remained the region with the highest number of applications, its share of applicants fell significantly, from 71% in 2018 and 72% in 2019 to 63% in 2020. Applications from the Asia Pacific region grew proportionally, from 21% in 2019 to 33.5% in 2020. The share of applications from Latin America and the Caribbean also continued to increase slightly (from 2% in 2018 and 3% in 2019 to 5% in 2020), with one application received from El Salvador for the first time.

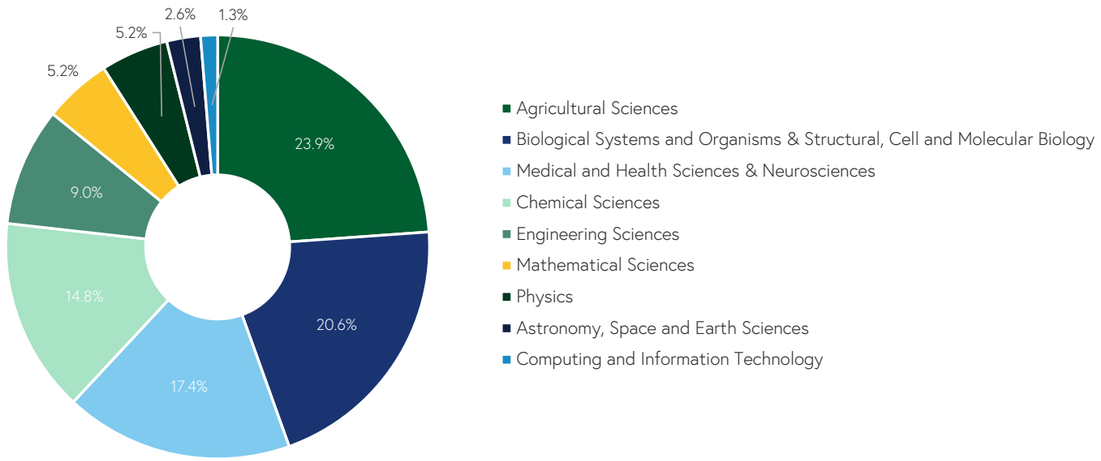
RAQUEL MATAVELE CHISSUMBA

2020 EARLY CAREER FELLOW, MONGOLIA

Dr. Matavele Chissumba is assessing the potential of the moringa tree, Moringa oleifera, to control the exacerbated inflammatory response that occurs in severe cases of COVID-19. Her research will identify potential biomarkers of COVID-19 progression and treatment efficacy that will inform the development of therapeutic and preventive protocols specifically oriented to African populations.

In which STEM subjects? Agricultural sciences remained the most common discipline among Early Career applicants for the third year, though the percentage dropped from 37% of awards in 2018 and 33% in 2019 to slightly less than a quarter, 24%, in 2020. The biological sciences, including structural, cell, and molecular biology, were the second most popular field, with 21% of applications, followed by medical and health sciences, including neuroscience (17%), chemical sciences (15%), and engineering sciences (9%). Eight applications (5% of the

2020 Early Career Fellowship eligible applications by discipline



total) each were received in mathematics and physics, with 4 applications (3%) in astronomy, space and earth sciences, and 2 applications (1%) in computing and information technology.

EARLY CAREER AWARDS

The evaluation and selection of Early Career fellows was conducted entirely online for the first time in 2020, due to restrictions imposed by the COVID-19 pandemic. Seizing the opportunity to expand the pool of reviewers who could therefore participate in the selection committee, the OWSD Secretariat was able to secure at least two reviewers for each eligible application, as well as to engage a high proportion of experts from the Global South. Forty-two reviewers took part in the online selection committee (June 2020), compared to 28 in 2019; a full third of these were from the Global South, and nearly half (47%) were women.

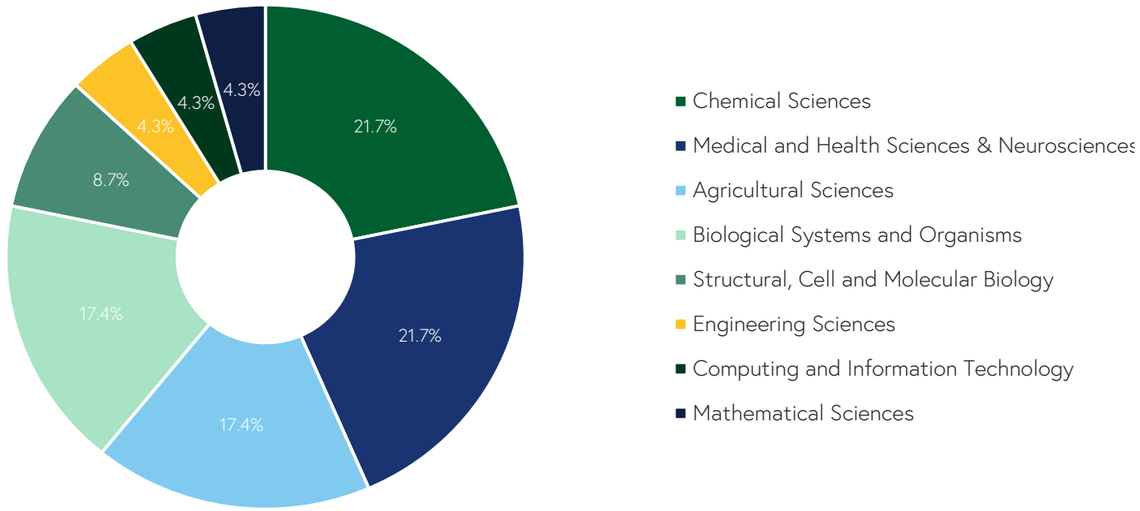
The committee selected 22 women for Early Career fellowships. One additional fellow awarded in 2019 deferred her start date until 2020, making a total of 23 fellows in the 2020 cohort. You can meet all the fellows and read about their individual research projects on pages 29-30.

Where from? The 23 2020 fellows come from 15 countries across the developing world. Around two-thirds are from Africa: six from Kenya, and one each from Cameroon, Ethiopia, Ghana, Malawi, Mozambique, Rwanda, Togo, Uganda, and Zambia. The remaining 8 fellows are from the Asia-Pacific region, with four fellows from Sri Lanka and one each from Bangladesh, Mongolia, Myanmar, and Nepal. The 2020 cohort includes fellows working in five countries previously not represented: Mozambique, Mongolia, Myanmar, Togo, and Zambia.

In which STEM subjects? Five fellowships each were awarded in the chemical sciences and in the medical and health sciences, including neuroscience. Four each were awarded in the agricultural sciences and in biological systems & organisms. Two fellows are working in structural, cell, & molecular biology, and one each in computing & information technology, engineering sciences, and mathematical sciences; the awardee in mathematics is the first Early Career fellow in this field.

> *"I am immensely grateful for this wonderful opportunity to work with such a prestigious organization. I am eagerly looking forward to being mentored and also hope to pay it forward to budding women scientists of the community."*
>
> - Nafisa Islam,
> 2020 Early Career Fellow, Bangladesh

2020 Early Career fellowships by discipline



2020 Early Career fellows meet during the online orientation workshop, October 2020

2020 OWSD Early Career Fellows

NASSIFATOU KOKO TITTIKPINA
Togo

University of Lomé

Conducting quality control of commonly used pharmaceutical products such as antibiotics and antimalarial drugs to detect and eradicate counterfeit drugs.

LILY PAEMKA
Ghana

University of Ghana

Sequencing tumour DNA to characterizie genetic risk factors for breast cancer in Ghanaian women.

ESPERANCE MUNGANYINKA
Rwanda

Rwanda Agriculture and Animal Resources Development Board (RAB)

Characterizing viruses that affect passionfruit (*Passiflora edulis* f. *flavicarpa* Deg.) crops in order to propose appropriate management strategies.

VERONICA ACHIENG OKELLO
Kenya

Machakos University

Developing new analytical methods and nanoscale/nano-enabled materials for environmental remediation and monitoring of water, soil and air pollutants.

JULIAH KHAYELI AKHWALE
Kenya

Jomo Kenyatta University of Agriculture and Technology

Using bacteriophages (bacteria-infecting viruses) to control soft rot of fruits and vegetables caused by certain strains of Erwinia and Pseudomonas bacteria, to mitigate post-harvest losses and enhance food security.

NAUMIH MWENDE NOAH
Kenya

United States International University - Africa

Fabricating low-cost Nanostructured Polyamic Acid water purification filters for water purification and microbial decontamination, to help control water-borne diseases in Kenya.

LINDA DYORISSE NYAMEN
Cameroon

University of Yaounde I

Developing nanocomposite materials with metal sulfides that work using photocatalysis, to improve the removal of organic pollutants (dyes) and harmful microbes from industrial wastewaters.

SYLVIE MUWANGA TEBITENDWA
Uganda

Busitema University

Cultivating microalgae-bacteria flocs—a type of biomass formed from aggregation of aquatic microbes—from high rate algal pond systems, in order to increase production of food for the Nile tilapia fish.

ANASTASIAH NJOKI NGIGI
Kenya

Multimedia University of Kenya

Assessing the human health risks from exposure to antibiotic residues, antibiotic-resistant bacteria and antibiotic resistance genes through the consumption and handling of antibiotic-contaminated poultry food material.

PHYLLIS WAMBUI MUTURI
Kenya

University of Embu

Using of smart sustainable Integrated Pest Management (IPM) strategies to control the fall armyworm moth (*Spodoptera frugiperda*), which threatens food security particularly in drought-prone areas of Kenya.

MERCY AKINYI
Kenya

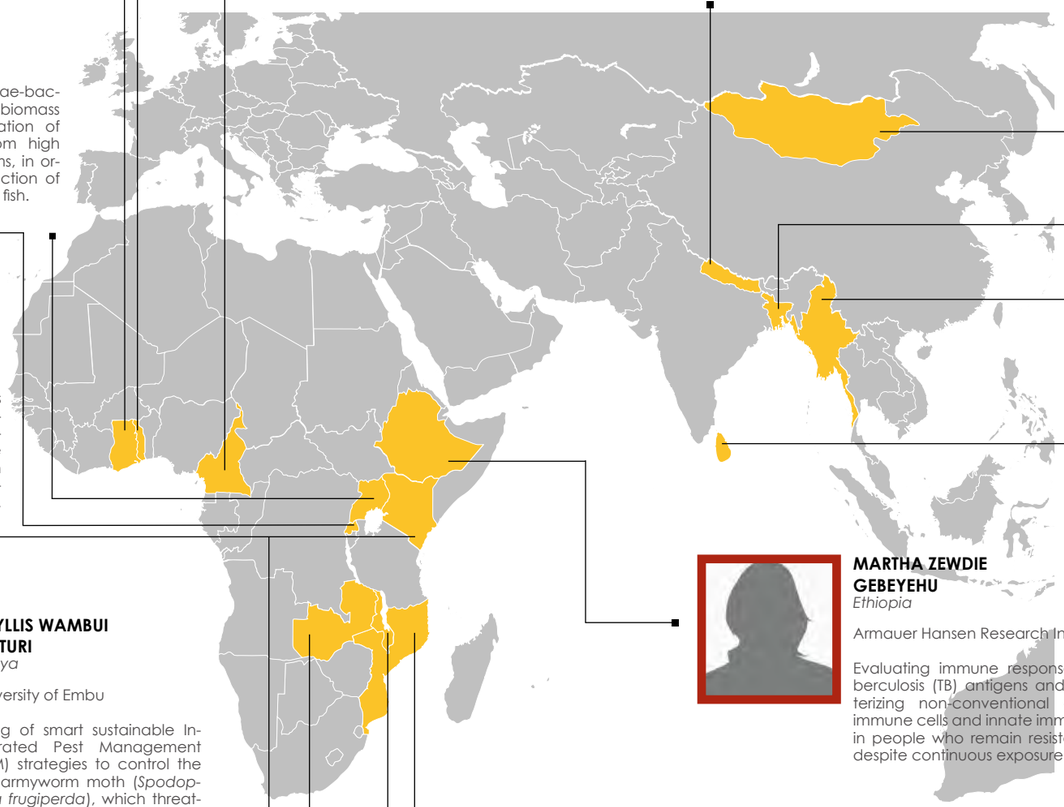
Institute of Primate Research - National Museums of Kenya

Identifying and characterizing zoonotic pathogens (parasites that can be transmitted between animals and humans) in understudied wild populations of non-human primates.

VIOLET KAYAMBA KELLY
Zambia

University of Zambia School of Medicine

Developing a simple, easy-to-use medical device to diagnose individuals with early stomach cancer that can be used in basic outpatient clinics in rural and urban centres, enabling earlier detection and improved patient outcomes.



OYUNCHULUUN YADAMSUREN
Mongolia

Mongolian National University of Education

Developing a multimetric water quality index for Mongolia based on different characteristics of macroinvertebrate species (i.e. insects, worms and mollusks) present in waterways, to form the basis for a principal assessment tool of water quality throughout the country.

JYOTI BHANDARI
Nepal

Tribhuvan University

Documenting ethno-pharmacological knowledge related to Medicinal and Aromatic Plants (MAPs) in Nepal, and validating this knowledge through phytochemical and pharmacological laboratory analysis, to produce recommendations for the effective use of these plants.

MARTHA ZEWDIE GEBEYEHU
Ethiopia

Armauer Hansen Research Institute

Evaluating immune responses to tuberculosis (TB) antigens and characterizing non-conventional adaptive immune cells and innate immune cells in people who remain resistant to TB despite continuous exposure.

RAQUEL JOSÉ MATAVELE CHISSUMBA
Mozambique

Instituto Nacional de Saúde

Assessing the potential of the moringa tree, Moringa oleifera, to control the exacerbated inflammatory response that occurs in severe cases of COVID-19, informing understanding of the processes by which SARS-CoV-2 causes disease in the African context.

JANELISA MUSAYA
Malawi

Kamuzu University of Health Science

Linking information from trypanosomiasis (sleeping sickness) case reports in Malawi with patients' geographical locations, to identify spatial patterns and key geographic and environmental factors that can affect when patients present.

NAFISA ISLAM
Bangladesh

Bangladesh University of Engineering & Technology

Developing a product for accelerated wound healing that is extracted using green technologies from the waste of marine industries, which will be particularly advantageous for diabetic and other immunocompromised people.

THANDA SHWE
Myanmar

Mandalay Technological University

Developing a comprehensive big data management framework on affordable, locally available fog devices, capable of data processing, transfer, storage, and back-up. Her platform will allow Internet of Things and computer vision applications to be executed cheaply using local IT infrastructures, opening the possibilities created by these technologies to the developing world.

HIRUNI HARISCHANDRA
Sri Lanka

University of Sri Jayewardenepura

Developing a reliable, user-friendly diagnostic device for Lymphatic Filariasis (LF - commonly known as elephantiasis) based on extracellular vesiclular (EV) proteins.

PRIYANGA DILINI TALAGALA
Sri Lanka

University of Moratuwa

Tackling key mathematical challenges in the early detection of anomalies in high dimensional streaming data, with immediate applications in cybersecurity, water quality and disease outbreaks.

CHANDIMA ARIYARATHNA HANCHAPOLA APPUHAMILAGE
Sri Lanka

University of Peradeniya

Developing a platform for cost-effective and rapid turnover of rice varieties that combines DNA marker-assisted pre-breeding and selection breeding strategies with computing technology and genetic resources, to develop drought- and salinity-tolerant rice varieties.

DULHARIE THANUJA WIJERATNE
Sri Lanka

The Open University of Sri Lanka

Investigating the frequency, functionality and phenotype of Natural Killer (NK) immune cells isolated from dengue patients to determine their role in increasing protection from dengue infections.

EARLY CAREER WORKSHOPS AND TRAINING

Orientation workshop

Early Career fellows take part in two training workshops over the course of their fellowship. An orientation workshop prepares them for managing their research grants, including training on budgeting and procurement, reporting and data management, and effective networking. Due to the COVID-19 pandemic, in 2020 this orientation workshop was held online for the first time (26-30 October). The second workshop, which usually takes place in the second year of the fellowship, focuses on improving fellows' leadership, management and outreach skills, as well as how to forge links with industry. This workshop, which should have been attended by the 2019 cohort of fellows, was postponed to 2021; alternative training opportunities were offered to the fellows to support their professional development over the course of the year.

During the orientation workshop, working with fellows to understand their IT environments and potential needs, OWSD was able to transform the in-person orientation workshop curriculum into an online format, to ensure the new cohort of fellows is adequately prepared to start their fellowships in early 2021. Test sessions were organized ahead of the workshop, and financial support was offered for internet bundle purchases and childcare support during the workshop.

The workshop was organized in a hybrid and flexible format including live vs. non-live sessions; video vs. text materials; and interactive vs. passive activities. Some sessions were pre-recorded and made available a week prior to the workshop through a file sharing platform. In this way, the fellows could familiarize themselves with the information ahead of the live sessions and make the interactions more productive. Additional materials were made available as presentation slides or reading documents to cater to different types of learners. All live sessions were recorded (with permission) to allow for playback and reference at later stages. Fellows could also post questions offline as well as exchange files and relevant links. Live sessions were scheduled during timeslots that would work for various time zones.

All 23 fellows in the 2020 cohort participated in the workshop. In addition, there were seven external trainers, OWSD Secretariat staff, three OWSD Executive Board members and two Early Career fellows from the 2018 cohort. Besides being content experts, nearly all the speakers were also women scientists from the Global South.

A post-training survey of workshop participants was very positive, with 86% stating that they had a clearer idea of how to fulfill the requirements for the fellowship, 73% who had specific idea(s) they could implement in their research or area of practice, and 69% reporting that the information received was relevant for their work and research. Going forward, the workshop can be replicated online based on this experience and already prepared materials.

Presenters and participants in the orientation workshop for 2020 EC fellows

Other training opportunities

With the postponement of the regional follow-up workshop for 2019 fellows postponed to 2021, OWSD worked with partner organizations to ensure other online training opportunities for fellows from both the 2018 and 2019 cohorts.

The Mawazo Institute and The Conversation Africa Opinion Editorial Writing Training (July 2020)

On July 27, 2020, the Mawazo Institute in partnership with The Conversation Africa hosted a free online training on Opinion Editorial Writing for Early Career Women Researchers. The goal of the course was to train women scientists in writing opinion-based editorials or article pitches that discuss their research and suggest solutions to the complex issues of Africa's development. The training was offered to 20 female researchers, with four places reserved for OWSD Early Career fellows. On completion, participants were offered the unique opportunity to contribute to articles on The Conversation Africa.

Among the OWSD participants, Mercy Badu (2019 cohort) commented that "the training was very informative and an eye opener". Following the training, Dr Badu submitted her pitch for consideration to The Conversation Africa and it was published in November 2020, entitled "Acute poverty affects Ghana's savanna region: how oilseeds could help boost local diets".

INASP-AuthorAid Research Writing in the Sciences MOOC (September-November 2020)

OWSD has a long-standing partnership with AuthorAid, a Sida-funded project of INASP (International Network for the Availability of Scientific Publications). AuthorAid annually runs a free online course, "Research Writing in the Sciences", targeting researchers from developing countries. Given the positive experience of the 2018 cohort that participated in the AuthorAid MOOC in 2019, OWSD also sponsored the 2019 cohort to participate in the 2020 iteration of the training.

AuthorAid took into consideration feedback from OWSD and incorporated a module on grant application writing into the main course content (in 2019, this module was developed on request for the OWSD group specifically). The MOOC was re-named "Research and Proposal Writing in the Sciences" in 2020 and offered specific exercises on grant submission pitches. Based on the feedback from the 2018 cohort, OWSD Secretariat extended the invitation to the AuthorAid course to up to two key team members of each Early Career fellow, so that the support staff working alongside the fellows could receive additional training support in writing. The completion rates were very good for the OWSD group, with 26 out of 38 participants finishing all core modules, 29% higher than that for the general group. OWSD participants reported a 63% increase in confidence in knowledge of the course topics upon the completion of the MOOC.

> *"I am truly grateful for the rare opportunity to learn from other women who are leaders in their own communities around the world."*
>
> - Oyunchuluun Yadamsuren, 2020 Early Career Fellow, Mongolia

CONTINUING EARLY CAREER FELLOWS

In addition to the 23 newly awarded fellows in 2020, there were 38 Early Career fellows in the process of completing their research projects—19 from the 2018 cohort and 19 from the 2019 cohort. The COVID-19 pandemic and the related worldwide university closures had of course a direct impact on the fellows' research timelines.

When OWSD surveyed the Early Career fellows in April 2020, soon after the pandemic was officially declared by the World Health Organization on March 11, it became apparent that access to research facilities was limited (74% of Early Career fellows' universities were closed at that time) and on top of this, working time for many women was severely strained by additional household duties. The Secretariat were therefore prepared to expect requests for extensions to the fellowships. In June 2020, OWSD conducted another survey—this time of the more than 6,000 OWSD members. Two out of three women scientists in the OWSD network reported an "inability to access the lab/office/necessary equipment/field work locations due to a lockdown" and 44% reported "reduced available working hours due to household or care responsibilities". More data from the member survey is available on pages 41-42.

In response to the feedback received in the surveys, the OWSD Secretariat prepared and processed a no-cost extension for each of the 2018 fellows until January 31, 2022. Two fellows, Claire D'Andre Hirwa and Maryse Nkoua-Ngavouka, nevertheless succeeded in completing their fellowships in 2020.

The 2019 fellows, who were ready to start their fellowship projects in January 2020, were also delayed by the pandemic. Several purchase orders for equipment and consumables were stalled as the courier and international delivery prices rose sharply due to the pandemic. The majority of fellows (70%) reported experiencing delays, and 60% expect to request a no-cost extension to complete their activities. The OWSD Secretariat will be tracking their progress in 2021 and will evaluate requests accordingly.

GAMOU FALL

2018 EARLY CAREER FELLOW, SENEGAL

Since receiving the fellowship, virologist Gamou Fall has also received a USD 1.3 million grant from the US National Institutes of Health (NIH), for surveillance of two arboviruses, Rift Valley Fever and Crimean Congo Hemorrhagic Fever viruses, as well as yet unknown viruses in high risk populations in Senegal.

2018 cohort

In spite of the pandemic, the fellows did their best to carry on with their research and work. While much of the needed equipment and many of the consumables were purchased in the first year of the fellowship, most of the fellows (14 out of 19) acquired additional new equipment and/or consumables during this second year to strengthen the capacity of their research units.

So far, the three cohorts of Early Career fellows have placed purchase orders with 61 different companies in 26 countries. Among others, Maryse Dadina Nkoua Ngavouka (Brazzaville, Congo) was able to purchase the NaioAFM Microscope, the only advanced characterization microscope in all central Africa. The microscope has been installed in the laboratory Unité de Recherche en Nanomatériaux et Nanotechnologies (UR2N) located in Brazzaville. Since the purchase, UR2N lab is working on different scientific matters directly affecting Congo in particular and Africa in general, such as the characterization of nanoparticles influencing a successful biorefinery for better biofuel production. According to reports submitted by fellows, each time a fellow purchased new equipment; they were also engaged in conducting or participating in training in the use of that equipment. Some fellows have also performed maintenance of existing equipment.

> *"The EAG setup we acquired through this project is one of 4 of its kind in Africa—and having a team trained on how it is used is helping me establish a research niche faster than I thought."*
>
> - Elizabeth Bandason, 2018 Early Career Fellow, Malawi

NIMANTHI JAYATHILAKA

2018 EARLY CAREER FELLOW, SRI LANKA

Dr. Jayathilaka has won three additional grants since being named an OWSD Early Career fellow, including a USD 235,000 grant from the World Bank for commercialization of value-added by-products and the invention of quality assurance steps for the virgin coconut oil and desiccated coconut oil industries.

The large majority (70-80%) of the 2018 cohort used a portion of their fellowship funds to pay for research assistants (MSc, PhD and post-doctorate students) and 26% paid teaching assistants. Given that this fellowship was designed to support women scientists who often face competing demands for their time and focus from children, the elderly or infirm in their care, it is interesting to note that 15% of fellows also opted to hire family care assistants.

Due to global travel restrictions, fellows' mobility was severely restricted in 2020. Only 5 fellows were able to undertake research visits, either before the pandemic struck (January–March), or within their country or region where movement was permitted. Many visits were postponed to a later date and some were (or will be) conducted virtually. However, travel limitations did not prevent the fellows from maintaining and establishing collaborations—indeed, 18 new collaborators were reported by 11 fellows. Furthermore, 11 fellows participated in training events, the majority of which were conducted online.

After the first year as fellowship holders, the cohort reported relatively few publications (only four articles). Yet, in their second year, the 2018 fellows published the results of their ongoing research directly funded by the fellowship as well as the research from projects that indirectly benefitted from the resources provided by the fellowship. In all, 14 fellows (~80% of the cohort) reported a total of 26 published articles, and a further 18 articles submitted for review plus 9 already accepted. Since the OWSD Early Career fellowship was awarded, 9 fellows have also secured additional new funding through 15 grants (for a total of ~$2,5M) and a further 5 fellows have submitted grant applications.

2019 cohort

The 2019 cohort of Early Career fellows were prepared to start their research projects in January 2020, with all administrative procedures successfully finalized in late 2019 and the advance payments being disbursed in January-February 2020.

Despite many delays in purchasing and delivering equipment due to COVID, 18 purchase orders were successfully processed by the end of 2020, and the items delivered to the institutes. Most (70%) of the 2019 fellows already used their fellowship funds to enhance the capacity of an existing laboratory in 2020, and 40% to establish a new laboratory. Among other examples, with the support from the OWSD Early Career Fellowship, Tista Prasai Joshi (Nepal) was able to purchase a Zeta Potential SZ100Z2 Nanoparticle Analyzer, which is the first of its kind installed in Nepal; with this, she will be able to assess levels of arsenic contamination of groundwater and work towards treatment and mitigation strategies.

Many (50-60%) of the 2019 cohort also used their fellowship funds to pay for research assistants (MSc, PhD and post-doctorate students); 15% paid teaching assistants. Nearly 40% of the fellows resorted to hiring family care assistants. This is likely to be the result of school and childcare service closures during the pandemic.

TISTA PRASAI JOSHI

2019 EARLY CAREER FELLOW, NEPAL

Dr. Prasai Joshi is seen here with Jaishree Sijapati, Faculty Chief, Science Faculty, Nepal Academy of Science and Technology and Naina Byanjankar, Research Assistant under the OWSD Early Career Fellowship. They are pictured with the Zeta Potential SZ100Z2 Nanoparticle Analyzer purchased for her lab, the first such equipment in Nepal.

Only 2 fellows reported being able to attend in-person scientific meetings and events in 2020, while 1 additional fellow was able to attend 3 virtual events; 7 other fellows were scheduled to attend events that were cancelled due to the pandemic. Nonetheless, half of the fellows (9) reported 14 new collaborations with scientists at other institutions (similar to that of the 2018 cohort). Thirteen fellows attended various training events, primarily conducted online.

The 2019 cohort was active when it comes to publishing their results, and reported higher numbers of publications compared to the 2018 cohort after their first year of fellowship. A total of 14 articles were published and a further 12 submitted for review.

Seven 2019 fellows secured additional new funding through 8 projects in 2020 (for a total of ~$0,5M) and a further 5 submitted grant applications. While the grants are on average of smaller amounts that those of the 2018 cohort, it is nonetheless a positive indication of the fellows' career progression at this stage.

> *"As a result of the early career grant, I have become very visible both nationally and internationally. I was able to initiate the setting up of a laboratory which is very key to career development."*
>
> - Edem Mahu,
> 2019 Early Career Fellow, Ghana

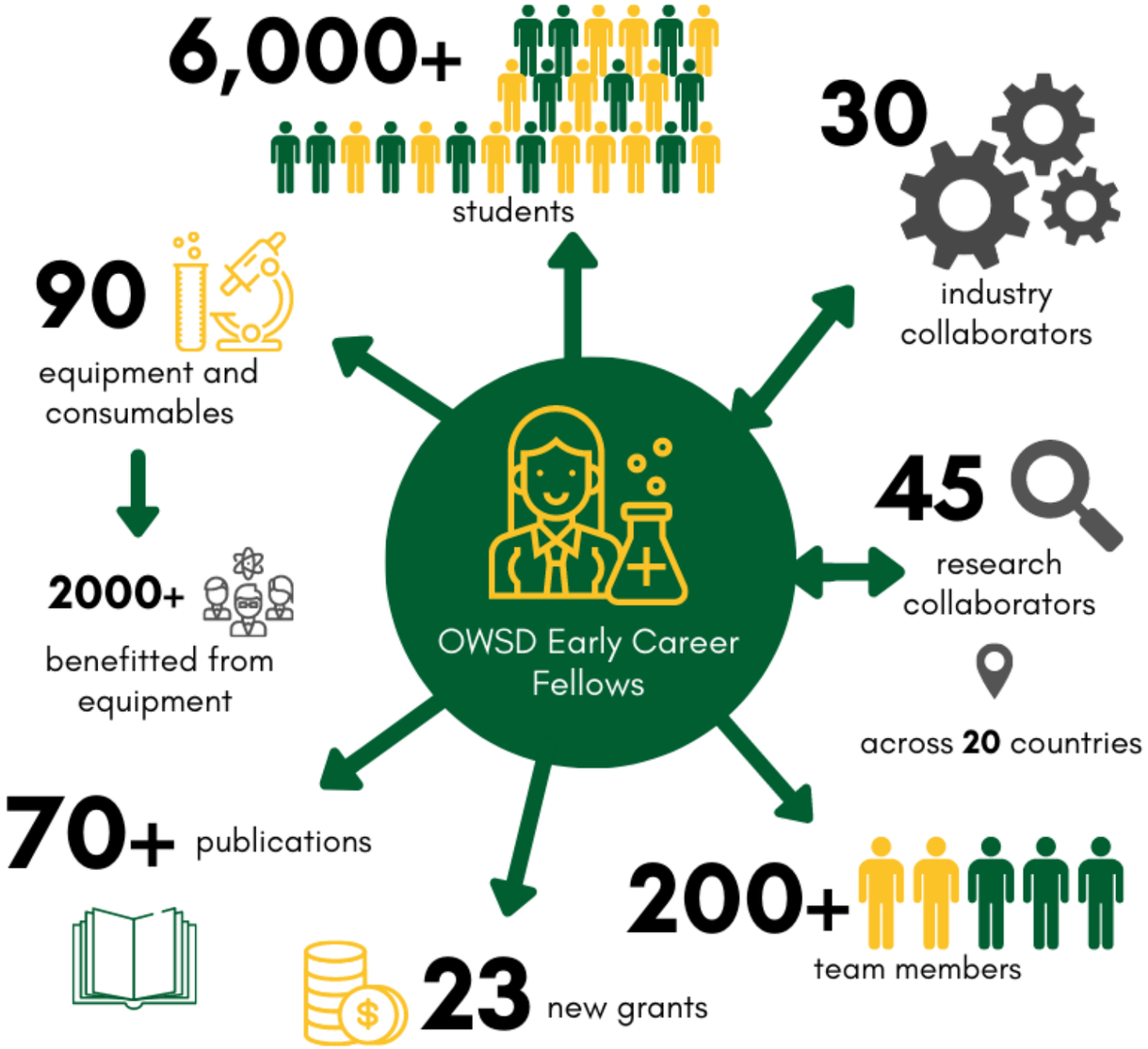
2019 Early Career fellow Edem Mahu investigating nutrient levels due to agricultural runoff in Ghana's Keta Lagoon.

What is the impact of the Early Career fellowship?

The following infographic demonstrates the impact and the cumulative results reported in the progress reports of 2018 and 2019 Early Career Fellows (total 37 fellows) in December 2019 and December 2020.

symbolises female and symbolises male, according to the reported ratio.

- 6,000 students—the total number of students who have directly benefitted from the EC fellows' teaching, lecturing, presentations, or training activities, including elementary and secondary school students, undergraduate and graduate university students
- 30 industry collaborators—non-academic partners with whom the fellows have established links for potential application/development of their research products
- 45 research collaborators—academic partners at other scientific and research institutions
- 200 team members—research team members (including MSc, PhD, post-doctorate students, research and teaching assistants, and lab technicians) funded with the EC fellowship funds



- 23 new grants—new funding opportunities secured in the 2020 reporting period
- 70 publications—published journal articles reported by the fellows and derived based on research results directly and indirectly funded by the EC Fellowship funds (this does not include submitted and accepted publications)
- 90 equipment and consumables—purchase orders processed by the OWSD Secretariat in 2019 and 2020 (this does not include additional items purchased by the fellows' institutes using the fellowship funds)
- 2,000 benefitted from equipment—individuals that were reported benefitting from using the purchased equipment and consumables items for training and research purposes.

SPOTLIGHT ON:
MARYSE NKOUA-NGAVOUKA

Maryse Nkoua Ngavouka didn't always plan to become an experimental physicist. When she was completing her bachelor's degree in physics at the University of Marien Ngouabi in the Republic of Congo – the country's only public university at the time – the only option available to her was theoretical physics; the Republic of Congo lacked the equipment and resources necessary for scientists to pursue experimental branches. It wasn't until her supervisor encouraged her to go abroad for a post-graduate in Italy that Maryse began to consider other options. "Of course the theory is fine, but for what people really need in our country, it's the application. I wanted to directly help with what people need."

Maryse ended up remaining in Italy for another 4 years while completing a PhD. When she finished her PhD, she felt a strong calling to return to her home country. Despite applying for, and receiving, a post-doctoral position in France, "I was thinking about all the other women like me that don't have someone to tell them, ok, you can do that, you can go ahead."

Returning to the same laboratory where she had studied as an undergraduate, Maryse dedicated herself to working on sustainable energy solutions, to power areas of Congo that lack electricity. But she found herself faced with the same issue that had kept her from entering experimental physics as an undergrad—the infrastructure and equipment she needed was practically nonexistent. During a visit to Trieste for a winter course, she heard about the OWSD Early Career fellowship, just being announced. She applied and was awarded the fellowship as part of the first cohort of Early Career fellows in 2018.

With the funding from the Early Career fellowship, Maryse was able to furnish her lab with needed resources—most importantly, with advanced surface characterization equipment for atomic force microscopy, a type of microscopy that uses a mechanical probe to produce extremely high resolution images at the nanoscale. The microscope is the only one of its kind available in sub-Saharan Africa, and has already drawn many collaborators from outside of the Congo to her lab.

The systems she has designed as a result of her research use combinations of affordable, renewable energy sources such as biomass and solar panels to guarantee a sufficient supply of electricity to underserved areas. One of these areas includes M'Bamou island, an island in the Congo River next to the country's capital of Brazzaville. Despite being only a ten minute boat ride from the city, residents of M'Bamou lacked electricity, even for the island's hospital. Maryse and her team were able to install a mini-grid system that supplies energy to the population, including to two small clinical hospitals and one of the schools that were then able to extend classroom learning hours.

Maryse hopes to scale up this solution to areas with energy shortages all over the Congo, but says that political buy-in is essential. "We really would like for the government to try to understand how important it is to link research to industry." The success she and her team had on M'Bamou has been popular, and many officials have indeed been enthusiastic, asking for the mini-grid system to be installed in their own villages. But not everything has been smooth sailing. "There were many challenges, I won't lie. We had a problem of generational differences, just for people to accept the idea, to let us do our work. Or gender, you know – it's a woman, are you sure she knows what she is doing?" This was compounded by technical difficulties; the system prototype failed many of its early tests.

Throughout the difficulties she experienced bringing this project to fruition, it was Maryse's passion for science—and for helping her country—that kept her going. She credits this passion to an inspirational high school physics teacher, and to her family. Her older sister, now a biologist, encouraged her into science while she was still in high school. Their mother, who raised the sisters on her own, was a big supporter of her daughters' dreams as well. "Even though society was leading us to do something else, she always told us to follow what we are passionate about and not worry about what other people thought."

Now, Maryse is paving the way to make sure that younger Congolese scientists can also follow their passions. Since her lab has acquired more of the necessary equipment, they've seen an influx of Master's students in experimental physics—10 in the last year alone, including 2 women—who previously would have had the option only of studying theoretical physics. "People now are excited about the experimental work. They come and we don't even know where to put them!" The lab will need more human resources to train the new students, Maryse says. But in the meantime, she offers words of advice to young scientists starting out on their careers: "People say passion is not that important, but it's something that has really helped me to move forward. The situation here is really challenging, but when you are following your passion, people will see that you are doing something different, and they will help you."

OWSD AND COVID-19

As the COVID-19 pandemic unfolded across the globe in 2020, OWSD felt strongly that it was important to understand the effects it was having, and will have, on women scientists in the developing world. The impacts of the pandemic have been felt by scientists and scholars worldwide, as universities and industries have closed their campuses and standard funding and publishing pipelines have slowed down or shifted priorities. But these impacts are not felt equally by everyone; both institutions and individuals in developing countries often have fewer resources to support remote learning and working, and women often have different responsibilities that make working from home a bigger challenge than for men.

Early Career fellow Winfred Mulwa (Kenya) and students using computational data analysis software to investigate properties of the SARS-CoV-2

To get to the bottom of some of these differences, OWSD in June 2020 asked our network of members to tell us about how their work or studies, their family and home lives, and their mental wellbeing have been affected. The survey was conducted between June 16 and June 26. In total, 1,470 responses were received from women scientists in 85 countries (representing 27% of all OWSD members). The results showed that the pandemic was dramatically affecting OWSD members in all areas of their lives, causing major disruption to their research and education, upending their usual household routines, and causing them high levels of stress and uncertainty. This was true across career levels, geographical regions, and disciplines.

Yet there were also some silver linings to be found among the survey responses. The change in normal routines and absence of a commute for many allowed more flexible work schedules and freed up time for writing proposals or delving deeper into unexplored avenues of research, for working on more intensive projects such as books, or for expanding skills through online courses and webinars. Institutions are expected to be better prepared for remote work or education after the pandemic. The large majority of respondents enjoyed having more time available to spend with their families, and many reported improved relationships. Others found opportunities to forge better connections with their communities or with nature, or simply to enjoy more time alone.

Full results of the survey of OWSD members' on the impacts of the pandemic are available on the OWSD website. We hope that the information gleaned from the survey might help provide decision makers at various levels with insight needed to help them craft responses to the pandemic that account for women scientists' needs and concerns, from university departments to research funding agencies to politicians planning national recovery plans.

Major findings of the OWSD COVID-19 member survey

Work and/or studies

- Two-thirds (67%) of surveyed members were unable to travel to conferences or other important work events due to the pandemic, and over half (57%) were unable to perform experiments or field work.
- 42% of surveyed members lacked necessary equipment needed for effectively working or studying from home (42%), while 41% lacked a reliable internet connection.
- 54% of surveyed members said that they have enjoyed more flexible working hours.

Home and family life

- Over half of surveyed members (52%) reported spending much more time than usual on household chores during the pandemic, and a majority (61%) said that they spent much more time than usual on childcare; on average, respondents indicated that their share of childcare rose from 51% to 66%.
- Surveyed members reported being responsible for 69% of homeschooling required during the pandemic.
- The most commonly reported positive outcome by far on surveyed members' home and family lives was having more time available to spend with their families, selected by 83% of respondents.

Mental wellbeing

- 36% of members surveyed said that the impact of the pandemic on their mental wellbeing was mixed, while 34% said it was either somewhat or severely negatively impacted.
- The economic impact of the pandemic and concern for the health of others were the most widely cited concerns of members surveyed.
- Having more time available to spend with their families and more time available for self-care were the factors most positively contributing to surveyed members' mental wellbeing.

PhD fellow Therese Umuhoza (Rwanda); her research team formed part of Kenya's COVID-19 pandemic response task force.

In addition to the survey of all OWSD members, a previous smaller survey conducted in late March 2020 took a more personal approach, sharing the firsthand accounts of 14 OWSD fellows, awardees, and members who were involved in a response to the pandemic in very different ways. From a Sudanese molecular biologist who led an initiative to make ventilators using 3D printers, to a Sri Lankan biochemistry professor who volunteered her lab for diagnostic testing, to the professors in a Palestinian university who organized a special course on COVID-19 to teach students the principles of epidemiology, these OWSD members applied their knowledge and skills to helping their countries, and the world, rise to the challenges of the pandemic.

Additionally, the OWSD Executive Board shared their perspectives on the COVID-19 pandemic and its implications for research, in their countries and globally, and many OWSD fellows and members authored both scientific and opinion pieces for local and international journals and media publications. Their contributions are collected on a special page on the OWSD website dedicated to the pandemic.

OWSD feels uniquely positioned to obtain and document information on the ongoing effects of the pandemic on women scientists from the developing world, and as such will continue to monitor these effects in 2021 and beyond.

OWSD MEMBERSHIP

OWSD's membership is the foundation of the organization. With more than 6200 active members throughout the Global South as of December 2020, the member network provides a deep sense of community to women scientists, an important factor in their decision to stay in STEM careers. It is a truly global community, spanning 128 countries. Members can connect online through the OWSD website or in person at international and regional OWSD conferences and workshops, to collaborate with, support, and inspire one another. They also have access to opportunities for training, travel, research visits and other funding through announcements shared to international and regional OWSD mailing lists. In many countries, members organize into National Chapters, local affiliations of OWSD that organize activities and events tailored to specific needs in their countries (see pages 49-58).

In 2020, OWSD undertook a 'reboot' of its membership database to identify those members who were active. As paper membership applications were not replaced by online applications until 2014, many records for members registered between 1989 and 2014 were out of date or missing essential information. In addition, over the last several years, changes have been made to the definition and organization of many fields in the member database and the membership categories themselves have been simplified and clarified. In order to make sure that all members' data was current and standardized, the OWSD Secretariat in March 2020 asked all members to log into their profiles on the OWSD website if they wished to be considered active. This process closed on 30 April 2020 and those members who had not logged in since 1 January 2019 were deactivated, with the option to reactivate simply by logging into their profiles.

Following the membership update, a total of 4,833 active members were counted in May 2020, compared to 8,960 at the end of 2019. This difference quickly began to close, however, as OWSD in 2020 registered the highest ever number of membership applications, with 1,852 new members; there was an average of 154 new applications submitted per month, compared to 60 in 2018 and 10 in 2015. By 31 December 2020, OWSD counted 6,231 active members, and an additional 240 Friends of OWSD, women and men from developed and developing countries across all disciplines who are committed to promoting the objectives of OWSD but who are not eligible for the full or affiliate membership categories.

In 2020...

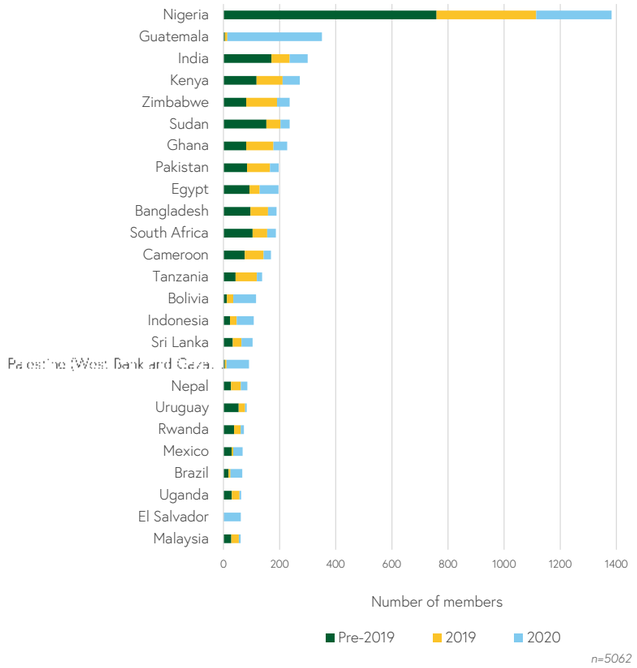
6,231 members of OWSD

1,852 new members

1,251 members from least developed countries

The large majority (87%) are full members, women scientists with a master's degree or higher in the natural sciences or social sciences. The remaining 13% are affiliate members, women from developing countries who have completed a bachelor's degree or equivalent in the sciences. With the update of the membership database, the previous category of associate members (men from developing countries, and women and men from developed countries, who have completed a Masters degree or higher in the natural or social sciences, engineering or related fields) was eliminated, and members in this category were reassigned to their appropriate membership category on a case by case basis.

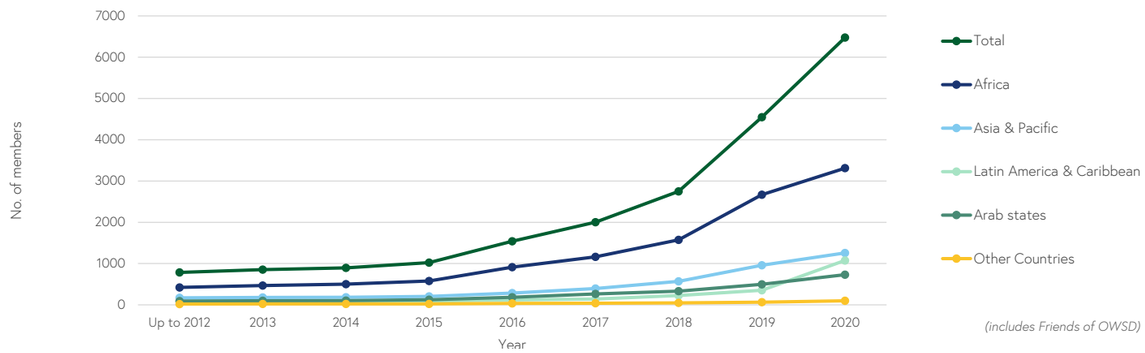
Top 25 countries with highest OWSD membership, by year of membership



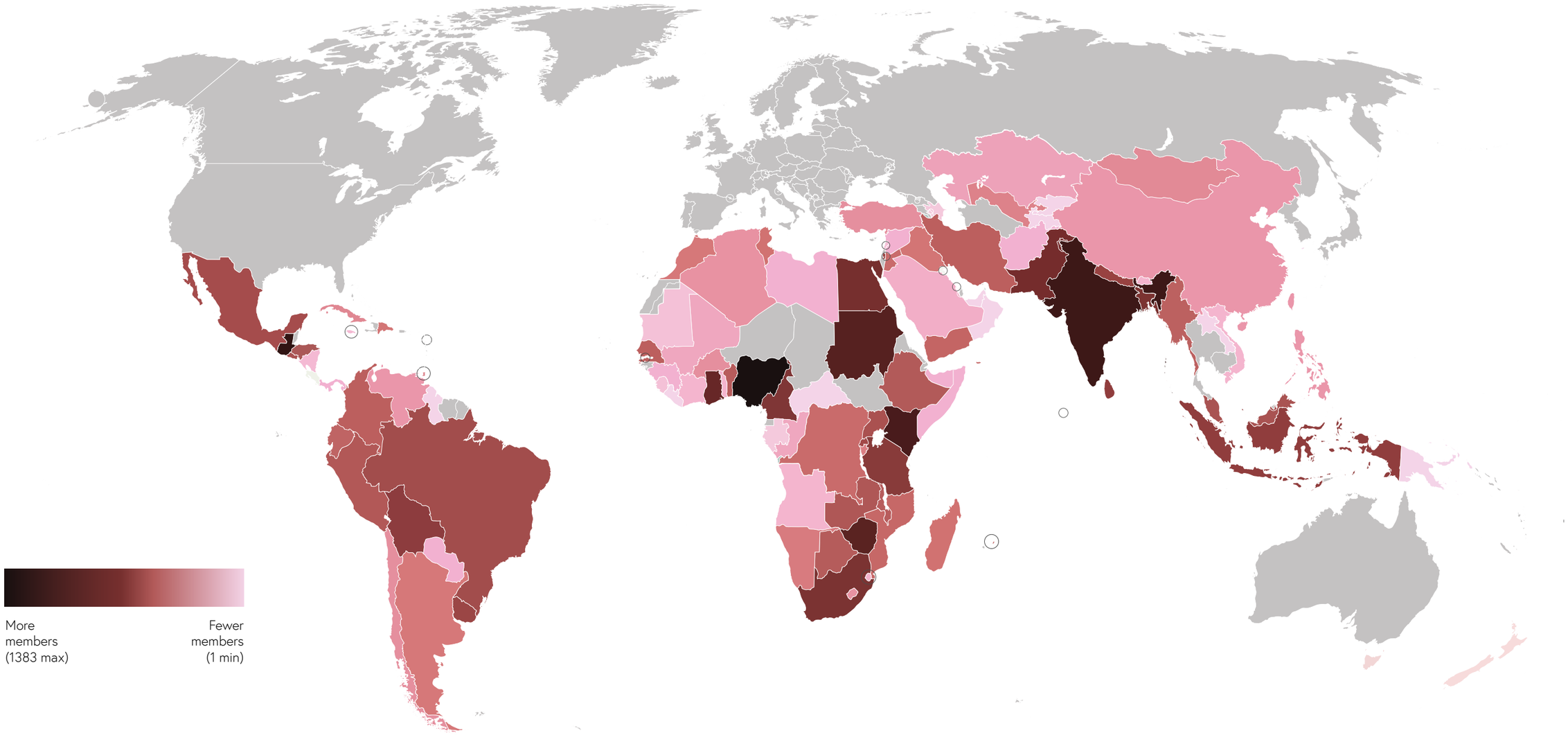
Where from? OWSD members in 2020 come from 101 countries across five continents. Africa is home to just over half (52%) of all OWSD members, with 3261; Asia-Pacific has 1218 members (20%), followed by Latin America and the Caribbean with 1057 members (17%), and the Arab region with 695 (11%). In 2020 for the first time, the numbers of new members from Latin America and Caribbean were higher than any other region, including Africa (which has always had the highest numbers of new and total members). This is certainly due to the rigorous efforts of individuals in the executive committee of the Guatemala National Chapter, who have made strong efforts to establish OWSD in Central America (see pages 57-58). It can also be attributed to the translation of OWSD membership information into Spanish, personalised follow-up by Spanish-speaking Secretariat staff, and the long-term investment by regional Vice President Jana Rodríguez Hertz in spreading the word in the region and connecting personally with National Chapter executive committee members.

Nigeria continues to be the country with the highest number by far (1383) of OWSD members, 22% of the total. Guatemala, which had only 22 members in 2019, overtook India for the second highest number of members in 2020, with 351. India follows with 300 members; next are Kenya (272) and Zimbabwe (236). Sudan, Ghana, Pakistan, Egypt, and Bangladesh make up the rest of the top 10 countries for membership. Least Developed Countries (LDCs) make up 20% of the membership, with 1251 members.

Growth in OWSD membership by region, 2012-2020



OWSD Members by Nationality, 2020



Number of OWSD members per country

AFRICA

Angola: 6
Benin: 40
Botswana: 46
Burkina Faso: 14
Burundi: 19
Cameroon: 169
Central African Rep.: 1
Congo, Dem. Rep.: 30
Congo, Rep.: 8
Côte d'Ivoire: 6
eSwatini: 6
Ethiopia: 51
Gabon: 3
The Gambia: 1
Ghana: 227
Guinea: 2
Kenya: 272
Lesotho: 12
Liberia: 1
Madagascar: 25
Malawi: 39
Mali: 8
Mauritania: 4
Mauritius: 34
Mozambique: 31
Namibia: 21
Nigeria: 1383
Rwanda: 73
Senegal: 38
Sierra Leone: 4
Somalia: 2
South Africa: 187
Tanzania: 138
Togo: 6
Uganda: 63
Zambia: 55
Zimbabwe: 236

ARAB REGION

Algeria: 13
Bahrain: 7
Egypt: 196
Iraq: 24
Jordan: 30
Kuwait: 30
Lebanon: 4
Libya: 2
Morocco: 23
Oman: 1
Palestine (West Bank and Gaza Strip): 91
Saudi Arabia: 7
Sudan: 236
Syria: 2
Tunisia: 25
United Arab Emirates: 1
Yemen: 32

ASIA AND THE PACIFIC

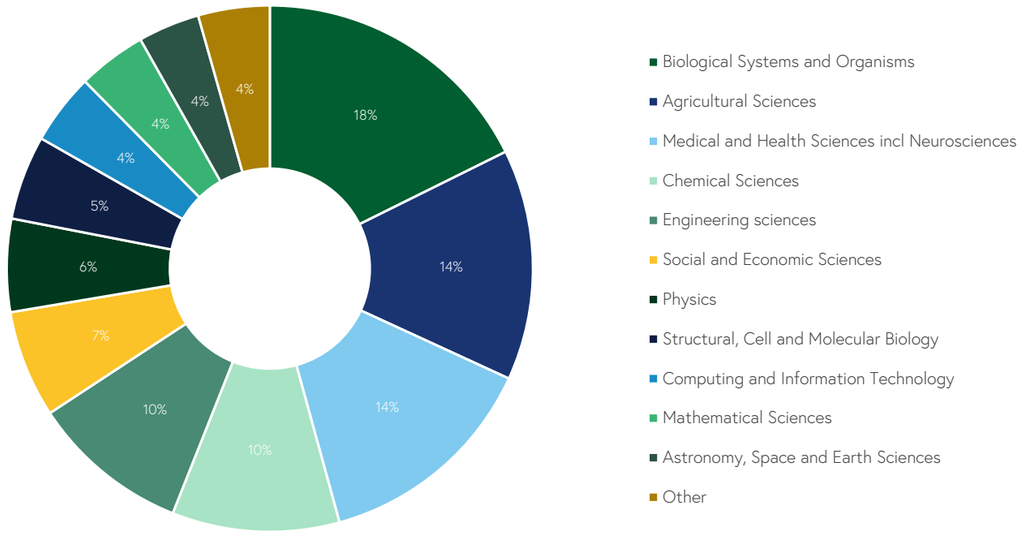
Afghanistan: 2
Azerbaijan: 3
Bangladesh: 189
Bhutan: 6
China: 11
India: 300
Indonesia: 108
Iran, Isl. Rep.:38
Kazakhstan: 9
Kyrgyzstan: 1
Lao PDR: 1
Malaysia: 61
Maldives: 1
Mongolia: 15
Myanmar: 37
Nepal: 85
Pakistan: 197
Papua New Guinea: 1
Philippines: 11
Sri Lanka: 104
Tajikistan: 1
Turkey: 14
Uzbekistan: 17
Vietnam: 6

LATIN AMERICA & THE CARIBBEAN

Antigua and Barbuda: 1
Argentina: 23
Bolivia: 116
Brazil: 67
Chile: 14
Colombia: 38
Costa Rica: 2
Cuba: 16
Dominican Republic: 24
Ecuador: 36
El Salvador: 62
Guatemala: 351
Guyana: 1
Honduras: 61
Jamaica: 5
Mexico: 68
Nicaragua: 5
Panama: 2
Paraguay: 2
Peru: 52
Trinidad and Tobago: 17
Uruguay: 83
Venezuela: 11

In which STEM subjects? OWSD membership is grouped into general categories of research. The most popular is biological systems and organisms (18%), then agricultural sciences (14%) and medical and health sciences (each with 14%), chemical sciences and engineering sciences (each with 10%). The share of members in fields where women have historically been underrepresented (engineering, mathematics, physics, and computing and information technology) has continued to grow steadily, from a collective 20% in 2018 and 21% in 2019 to 24% in 2020. In 2020, the previous categories of 'women, science and development' and 'interdisciplinary' were also removed from the menu of available disciplines, and members in these categories were individually reassigned to the most appropriate other disciplines. Members in the category of 'other' were also encouraged, though not required, to choose the most appropriate discipline among the other options.

OWSD members by discipline



BLESSING ODOGWU

OWSD MEMBER, NIGERIA

Dr. Odogwu, a researcher in agricultural technology at the University of Port Harcort, became an OWSD member in February 2020, She was invited by the Port Harcourt branch of the OWSD Nigeria National Chapter to give a presentation as part of a virtual lecture series on 'Wearing Our Gender Lens in Research Design and Development' in March 2020, where she spoke about integrating a gender perspective during the planning, implementation and evaluation of research. In April 2020, she represented OWSD as part of a panel organized by SciDev.net on the gender aspects of the response to the COVID-19 pandemic, 'Should gender analysis be embedded in epidemic responses?'

Members of the OWSD Nepal National Chapter speaking about science to 8th & 9th grade students at Koteshwor, Kathmandu, on the occasion of the International Day of Women and Girls in Science, February 11, 2020.

OWSD NATIONAL CHAPTERS

OWSD National Chapters are groups of at least 20 OWSD members who implement OWSD's objectives at the national level. Challenges for women scientists vary largely from country to country, and so solutions must be developed with the local context in mind. National Chapters can identify the specific needs of women scientists and the barriers that prevent girls and women from embarking on STEM careers. They address these issues by organizing a range of activities, including outreach, mentoring, capacity building, and leadership training. National Chapters collaborate with the OWSD Secretariat, with the regional representatives of the OWSD Executive Board, and with other OWSD National Chapters regionally and internationally.

In 2020...

35 active OWSD National Chapters

8 new National Chapters launched

Despite the pandemic, OWSD added 8 new National Chapters in 2020, making 35 active chapters worldwide. More than half (19) of all chapters have been established in 2019 or 2020. The new National Chapters launched in 2020 include three in Latin America and the Caribbean (Brazil, Guatemala, and Honduras). The first two chapters in the region, Peru and Uruguay, were launched in 2019. The other new National Chapters established in 2020 are in Malawi, Mozambique, and Senegal in Africa, Palestine in the Arab region, and Nepal in the Asia Pacific region.

Other active National Chapters are in Bangladesh, Botswana, Cameroon, China, Egypt, Ghana, India, Indonesia, Jordan, Kenya, Malaysia, Mauritius, Myanmar, Namibia, Nigeria, Pakistan, Rwanda, South Africa, Sri Lanka, Sudan, Tanzania, Turkey, Yemen, Zambia, and Zimbabwe.

Members of the OWSD Peru National Chapter at their launch in February 2020.

SYNERGIES BETWEEN OWSD PROGRAMMES

The presence of a National Chapter is often tied to high numbers of OWSD PhD and Early Career fellows and/or awardees in the country. Many alumnae are involved with the organization of National Chapters and participate on chapters' executive committees; in Bangladesh, Kenya, Myanmar, and Tanzania, for example, nearly all of the chapters' executive committee members are OWSD alumnae. Several chapters are headed by OWSD fellows and awardees (including 2 Early Career fellows, 2 OWSD-Elsevier Foundation awardees and 2 PhD fellowship alumnae who are Chairs in Indonesia, Malawi, Mauritius, Myanmar, Nepal, and Palestine). This correlation suggests that individuals sponsored by OWSD have an impact on the presence and success of women scientists in their countries, multiplying the impact of OWSD funding far beyond the initial investment. It is also evidence of a mutually beneficial opportunity: talented early career women scientists gain experience of leadership and mechanisms of power and influence in a structure that is highly accessible to them, while National Chapters benefit from their close knowledge of OWSD programmes and commitment to supporting the chapter. Numbers of applications for the two OWSD fellowship programmes also show a strong correlation between the nationality of applicants and the presence of National Chapters in those countries. For example, among the top ten countries for applications to the OWSD PhD Fellowship Programme, 7 of those countries—including the top 5—have a National Chapter. The same holds for the OWSD Early Career fellowship pogramme; 12 of the top 20 countries submitting applications are home to National Chapters.

NATIONAL CHAPTER ACTIVITIES

OWSD National Chapters adapted to the challenges imposed by the COVID-19 pandemic with remarkable innovation and versatility. Despite not being able to meet in person for most of the year, National Chapters reported at least 86 meetings held, almost double the number held in 2019. National Chapter members responded to the crisis by quickly developing and using digital tools to develop a sense of community, share best practices and and organise online webinars, presentations and resource sessions.

Activities undertaken by the National Chapters in 2020 included membership campaigns, webinar series for members, information sessions and discussions in response to the pandemic, STEM outreach in schools, youth camps for girls in STEM, training on digital communication and IT tools, celebrations for the International Day of Women in Science (February 11) and International Women's day (March 8), support to OWSD fellowship applicants and recipients, creation of national databases of women scientists, sharing of best practices through the OWSD website, fundraising, and collaboration between chapters. Some of their specific activities can be found on pages 53-55.

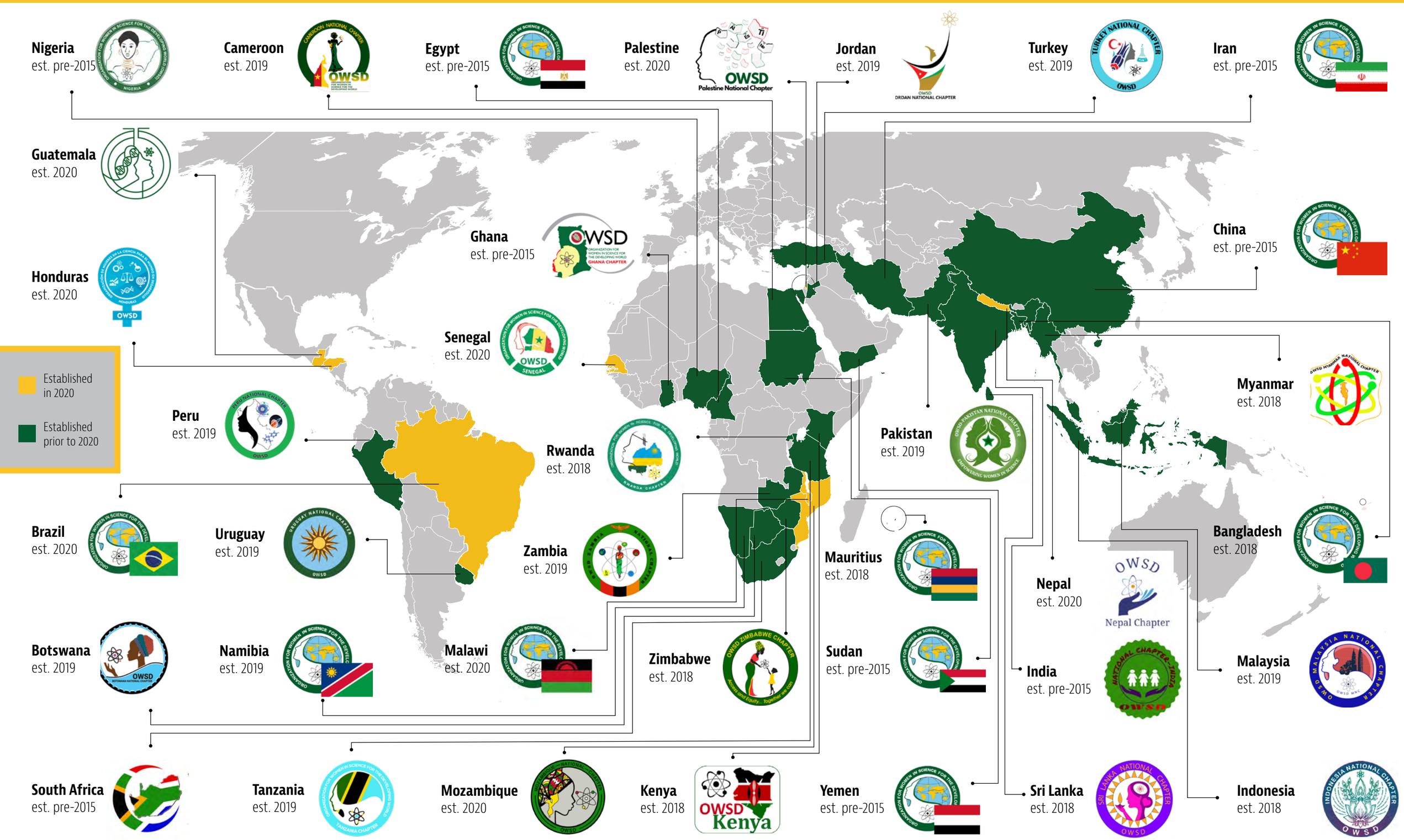
The OWSD Palestine executive committee meets online in June 2020.

OWSD VISIONS

OWSD has often relied on visual storytelling through film to tell the stories of women scientists worldwide and to make their scientific research more accessible to the public. With travel made impossible due to the COVID-19 pandemic, OWSD sought a new approach to filmmaking in 2020, by empowering a group of audio-visual storytellers identified by select National Chapters to interview and film local women scientists.

National Chapters in Cameroon, Guatemala, Sri Lanka and Zimbabwe were the first to take part in the OWSD Visions training, which began in October 2020. From October through December, OWSD video consultant Nicole Leghissa worked with the National Chapters to select the filmmakers to be trained, and then conducted online tutorials as well as one-on-one conversations with each chapter to identify the best candidates for their stories, draft the scripts, and organize film shoots on location. The final videos, edited with Leghissa's help, will be released in 2021. It is expected that more trainings with additional National Chapters will also be rolled out in 2021. By developing their storytelling skills, OWSD hopes to develop a network of local media professionals who can act as communications resources and reference points for National Chapters, supporting them to disseminate accounts of the work being undertaken by women scientists in their communities.

OWSD National Chapters



The OWSD National Chapters did not let COVID-19 slow them down, seizing the opportunity to reach both their own members and women scientists in other countries with online activities including webinars, lecture series, panel discussions, workshops and training sessions, and celebrations. Some National Chapters were also lucky enough to be able to meet in person before lockdowns took effect, for launch events, school outreach, and rallies. Here we highlight a few of the dozens of activities executed by the National Chapters in 2020.

ARAB REGION

Members from the National Chapters of Egypt, Jordan, Palestine, Sudan, and Yemen came together to coordinate their participation in the first ever online Arab Science Week (August 15-23, 2020). Spearheaded by Rana Dajani, Chair of the Jordan National Chapter and President of the Society for Advancement of Science and Technology in the Arab World, OWSD members in the region organized a panel as part of the event, on 'The Efforts of OWSD in Promoting Women Scientists in the Arab World.' Participating on the panel were Huda Basaleem and Rokhsana Ismail (Yemen), Sokyna Alqatawnah (Jordan), Mervat Foda (Egypt), Amira Shaheen (Palestine), and Mai Hassan (Sudan).

BANGLADESH

In recognition of the International Day of Women and Girls in Science, February 11, the OWSD Bangladesh National Chapter organized a series of five celebratory events at universities and scientific institutes across the country. These events included an open discussion on 'I Am Generation Equality: Realizing Women's Rights' at the Bangladesh University of Health Sciences, with around 50 faculty members and students participating, and rallies at four other institutes: the Bangladesh Rice Research Institute, Bangladesh Agricultural University, Rajshahi University, and the Bangladesh Atomic Energy Commission. More than 350 people (mostly women, but including men) participated in the rallies.

GHANA

The OWSD Ghana National Chapter sought to help members respond to the challenges presented by the COVID-19 pandemic, with a series of four webinars from August 11-21, 2020 on 'Sustaining Research During the Pandemic'. Specific topics covered in the webinars included 'Grantsmanship: Getting the Basics Right', 'Sustaining Your Research Pace', and 'Collaboration and Teamwork: Galvanising a Research Team in a Time of Crisis.' The series offered insights from more than 30 speakers , including some of Ghana's most prominent scientists and several members of the OWSD Ghana National Chapter, including OWSD PhD and Early Career Fellows, Awardees, and alumnae. More than 200 participants joined each webinar from all over the world (56 countries in total), and feedback was overwhelmingly positive, with participants saying the webinars were "very insightful," "fascinating", and "inspiring and eye-opening".

KENYA

The OWSD Kenya National Chapter hosted their first webinar on August 4, 2020, with OWSD Vice President for the Africa region, Olubukola Oluranti Babalola, presenting to members on the subject of project management. The webinar attracted the largest number of members to one meeting since the National Chapter was launched in 2018, demonstrating the potential for virtual technologies to bridge physical distances.

NEPAL

The OWSD Nepal National Chapter launched a series of science sensitization programmes to demonstrate to schoolchildren the importance of scientific education. The first visit was held in February 2020 to correspond with the International Day of Women and Girls in Science, with National Chapter members presenting at Koteshowr Mahadev public school in Kathmandu. The Nepal National Chapter also focused on women's and girls' education in the literacy month of September, with a series of three webinars. The first two webinars addressed the effects of the COVID-19 pandemic on girls' education in Nepal, while the third looked at the effects on college and university level students.

NIGERIA

The OWSD Nigeria Port Harcourt Branch was launched on February 11, 2020, to coincide with the International Day of Women and Girls in Science. The celebratory occasion included a presentation from OWSD Vice President for Africa, Olubukola Oluranti Babalola. The Branch went on to organise a series of 15 popular webinars, each of which was written up and published on the OWSD website. Talks included 'Ethics in Science through the Lens of COVID-19 Pandemic'; 'The Secret to Being an Influencer

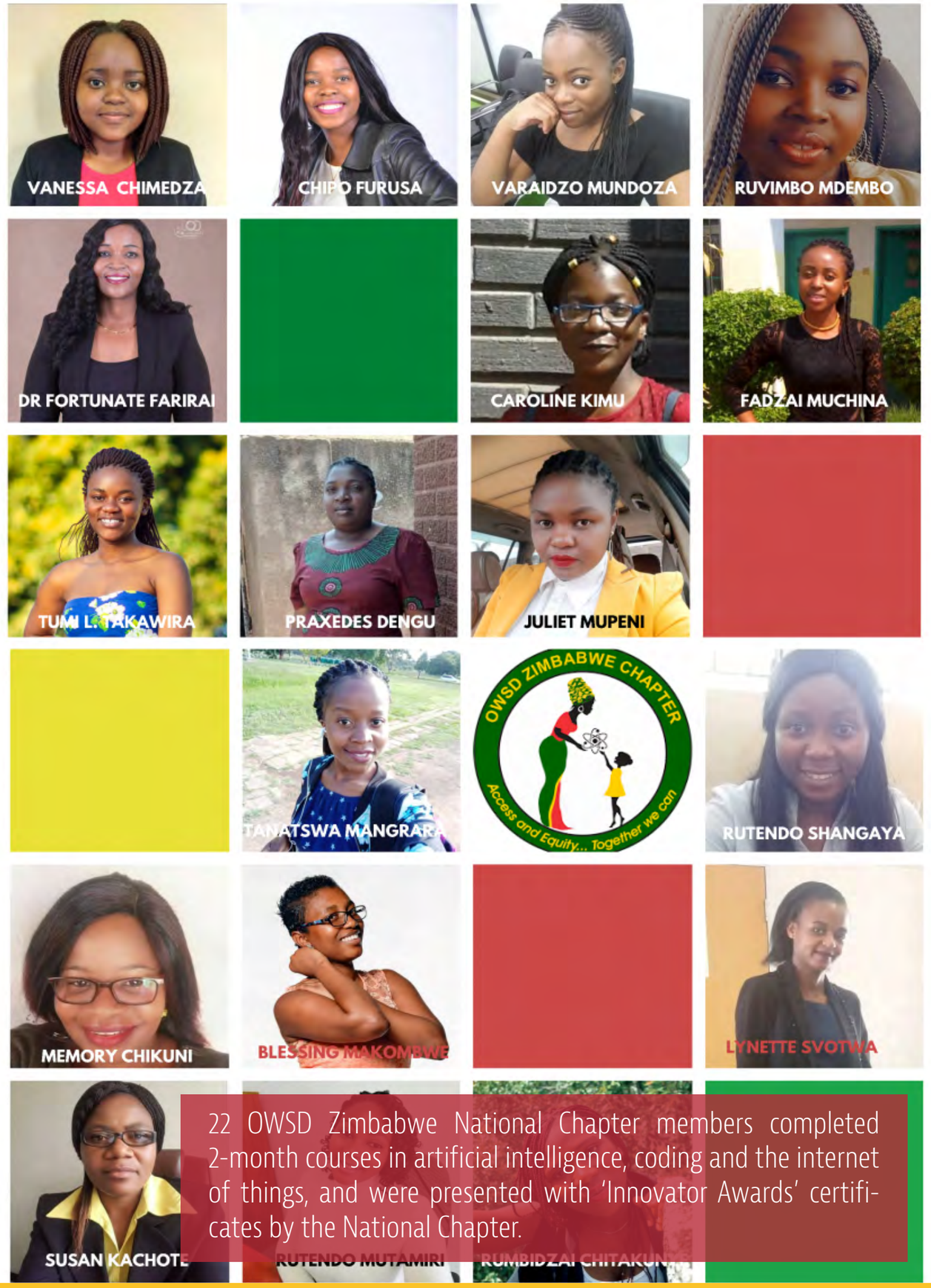
as a Science Leader'; 'Understanding and Utilizing Research Collaborations to Enhance Performance and Visibility of Women Scientists'; 'Developing Self-Confidence and Assertiveness in Academia'; 'Women in Startups and Entrepreneurship'; 'Imposter Syndrome with Women in Science'; and 'Archiving: a Useful Tool for Science and Scientists.'

PAKISTAN

The OWSD Pakistan National Chapter in February 2020 continued its lecture series on 'Science and Technology for Sustainable development of Pakistan' (initiated in 2019) with two lectures to raise awareness for heart disease, corresponding with National Wear Red Day; one lecture focused on heart disease in women, while the other discussed diet and exercise as means of heart disease prevention. They continued the lecture series in March 2020 with another two lectures on '"Gender Sensitive Sciences and Technology: A Way Forward', and 'Challenges for Young Women Embarking on a Career in Science.'

ZIMBABWE

The OWSD Zimbabwe National Chapter was one of the most proactive about seizing the opportunities created by the proliferation of online events and resources following the advent of COVID-related lockdowns. From August-September 2020, they encouraged chapter members to join a new Women Tech Developer Network, to enrol together in free online courses offered by IBM Digital Nation Africa on emerging technologies such as coding, artificial intelligence and Internet of Things. National Chapter member Tofara L. Chokera coordinated the network and facilitated enrolment in the courses; 28 members successfully completed the 'Explorer' stage of the training and 22 received 'Innovator' awards. The Zimbabwe National Chapter also utilized an existing, widely-used mobile app, WhatsApp, to keep members engaged during the pandemic, organizing a series of 19 'Science Talks' from May to September 2020 that members could easily participate in from their mobile phones. To help other chapters or members interested in organizing similar events, the Zimbabwe chapter also published guidelines for WhatsApp talks on the OWSD website, highlighting the advantages of the platform, challenges, and lessons learned.



22 OWSD Zimbabwe National Chapter members completed 2-month courses in artificial intelligence, coding and the internet of things, and were presented with 'Innovator Awards' certificates by the National Chapter.

SPOTLIGHT ON:

OWSD GUATEMALA NATIONAL CHAPTER

OWSD GUATEMALA
Organization for Women in Science for the Developing World

To say that the OWSD Guatemala National Chapter was established in 2020 would be selling it short. The chapter, which was approved in March 2020, began with 53 members. By the end of 2020, it counted 351 members, more than any other chapter besides Nigeria, plus 15 additional Friends of OWSD (women and men who are no eligible for OWSD membership but who are committed to promoting the objectives of OWSD). The Guatemala National Chapter, which was the 6th in Latin America and the Caribbean (LAC), galvanized interest in and support for OWSD not only within Guatemala, but throughout all of Central America and in the LAC region as a whole.

The Guatemala National Chapter's executive committee was motivated to organize the chapter by what they perceived as an urgent need for networks to support women scientists in the country. Scientists are already scarce in Guatemala. As of 2017, the number of full-time researchers was barely 27 per million inhabitants, a figure 16 times lower than the average for Latin America; and while women actually make up slightly more than half of researchers (53.2% in 2015, according to UNESCO), there remain strong disparities in the opportunities available to women and to men. Guatemala ranks 113 out of 153 economies on the World Bank's 2020 Global Gender Gap Index, and the national chapter's executive committee said that "women face exclusion when trying to advance their presence in positions traditionally occupied by men," including leadership positions and top research posts in scientific institutions.

The new national chapter sought to bring together women scientists already working in Guatemala, and to educate and inspire the next generation of girls who might be interested in entering STEM careers. In working towards the former, they faced the immediate challenge of being unable to meet in person, as their launch coincided with the onset of the COVID-19 pandemic. Executive commitee members nevertheless held an energetic membership drive throughout 2020, utilizing various social media platforms (Twitter, Facebook, Instagram, YouTube, and LinkedIn) as well as word of mouth. To help them reach more Guatemalan women scientists, they also partnered with the Guatemalan National Academy of Medical, Physical and Natural Sciences and with related organizations and initiatives including Voces Expertas (a project of GK Ecuador), the Institute for Women at the University of San Carlos of Guatemala, Women Who Code, the Online Learning Initiative, and the Gender Scan initiative.

Chair Kleinsy Bonilla presents OWSD on Guatemalan national TV channel Guatevisión.

To encourage women's and girls' interest in STEM subjects and careers, the national chapter again relied on social media to help them reach wider audiences. A dedicated communications team of 10 members developed and implemented a strategy that included such projects as 'Ask a Scientist', in which 25 women scientists—all members of the national chapter—were profiled online, giving young girls and boys the opportunity to pose questions about their research that were then answered in a series of short videos. The national chapter also took part in organizing, together with the National Secretariat of Science and Technology (Senacyt), a nationwide drawing and art-based competition for children, youth and adults around the theme of nanoscience and nanotechnology.


Executive committee member Susana Arrechea and other women scientists speaking to Guatemalan girls about STEM.

The executive committee were led in their efforts by Chair Kleinsy Bonilla, a social scientist working in the area of science and technology capacity building in the developing world, with a particular interest in how science diplomacy can help developing nations advance together. To this end, another important activity of the Guatemala National Chapter in 2020 was the beginning of the organization of a first conference in Central America for women in science. This conference, planned for early 2021, would bring together OWSD chapters in the region to discuss shared challenges and establish a strong network for cooperation. The Guatemala National Chapter thus hopes that they will be able to pave the way forward not only for women scientists in their own country, but to invigorate and coordinate networks to support women in STEM across Latin America.

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) in the USA. 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.

2020 AWARD WINNERS

The 2020 OWSD-Elsevier Foundation Awards were given in the fields of engineering, innovation and technology. The five winners were: Susana Arrechea (Guatemala); Champika Ellawala Kankanamge (Sri Lanka); Chao Charity Mbogo (Kenya); Samia Subrina (Bangladesh); and Fathiah Zakham (Yemen). Read more about them on pages 61-62.

The five winners attended the AAAS annual conference in Seattle, Washington (USA), from February 11-16, and presented their research at the Minority and Women Scientists and Engineers Networking Breakfast on February 16, where they received their awards. The awardees had the opportunity to attend many different sessions at the AAAS Conference, including keynote speeches by AAAS President Steven Chu and by Bill Gates, as well as other sessions in their fields of interest. While in Seattle they visited the headquarters of the Bill and Melinda Gates Foundation, for a networking luncheon with Gates Foundation programme officers involved with gender aspects of agricultural research and development, as well as a tour of the foundation. They also attended the Elsevier networking dinner, where they were presented as guests of honour and had the opportunity to network with influential leaders in science, science publishing and science policy. Additionally, the awardees attended a networking lunch with the AAAS Committee on Opportunities in Science. The winners developed excellent international contacts and benefitted from extensive national and international media coverage. As in previous years, private donors Martha Darling and Gil Omenn also generously awarded each awardee an additional USD 2,500 on top of their USD 5,000 from the Elsevier Foundation.

> *"This award acts as a strong reminder and challenge to me to never stop holding the ladder up for others."*
>
> - CHAO MBOGO,
> 2020 OWSD-Elsevier Foundation Award winner, Kenya

2020 Award winners Chao Mbogo, Susana Arrechea, and Fathiah Zakham preparing for the award ceremony in Seattle.

The 2020 OWSD-Elsevier Foundation Award winners at Pike Place Market in Seattle.

PRIOR WINNERS

Between June and July 2020, the OWSD Secretariat asked prior OWSD-Elsevier Foundation Award winners to respond to a comprehensive questionnaire on the impact the awards have had on their careers. The survey elicited a good response, completed by 25 out of 40 awardees. The respondents reported that the award scheme (prize money, visibility at a major international science conference, associated events and visits, media coverage and follow up invitations to travel and present) had a significant impact on their individual careers.

The survey also included questions on awardees' involvement with responses to the COVID-19 pandemic. Many of the awardees said that they were involved with various initiatives, including: a presentation on 'Gender based violence: a neglected pandemic during COVID-19 in the Arab World' (Amira Shaheen, 2019 awardee - Palestine); research on anti-COVID-19 drug candidates (Leni Ritmaleni - 2014 awardee, Indonesia); commentary on the impact of the pandemic on maternal, newborn and child health in low-income and middle-income countries (Uduak Okomo, 2019 awardee - The Gambia); recommendations to the Minister of Health about health innovations in response to COVID-19 (Dionicia Gamboa, 2013 winner - Peru); a hackathon on COVID-19, #hackthecrisisNigeria (Rabia Sa'id, 2015 awardee - Nigeria); and air quality monitoring during lockdown (Tista Prasai Joshi, 2019 winner - Nepal).

> *"The impact on my career and professional development has been amazing. I've become more competitive at grants, I have been invited to sit on WHO expert committees and Research Funding Boards and review panels, I've had some high impact publications and I am now collaborating with many more people."*
>
> - UDUAK OKOMO,
> 2019 OWSD-EF Award winner, The Gambia

2020 OWSD-ELSEVIER FOUNDATION AWARDEES

SUSANA ARRECHEA

Guatemala (Latin America & Caribbean)

Affiliated Professor,
School of Chemical Engineering
University San Carlos of Guatemala

CHEMICAL ENGINEERING & NANOTECHNOLOGY:
For her work on the potential industrial and environmental applications of materials such as nanoparticles, nanotubes, and graphene, which can be employed in creating more sustainable building materials, in water treatment, and in solar devices and other renewable energy solutions. In addition to contributing to the development of nanotechnology in Guatemala, Dr. Arrechea is also involved in improving solar electrification, connectivity, and digital and STEM literacy in schools in rural Guatemala, in partnership with New Sun Road and Microsoft.

CHAMPIKA ELLAWALA KANKANAMGE

Sri Lanka (Asia-Pacific)

Senior Lecturer,
Department of Civil and Environmental Engineering
University of Ruhuna
Matara, Sri Lanka

ENVIRONMENTAL ENGINEERING:
For her work on ecosystem conservation and pollution control. Dr. Ellawala Kankanamge's current research efforts are focused on controlling invasive macrophytes (aquatic plants) in river ecosystems, by restoring shade and encouraging the natural resistance of native plants to invasive species. By understanding the behavior of aquatic plants in response to changes in environmental conditions, her research will help to control ecosystem degradation. born and child mortality.

CHAO CHARITY MBOGO

Kenya (Africa)

Dean and Researcher/Lecturer,
School of Science and Technology
Kenya Methodist University
Nairobi, Kenya

COMPUTER SCIENCE:
For her work supporting students in resource-constrained environments to learn to program using mobile devices. Computer programming is a core course in most IT-related degrees. The ubiquity of mobile phones makes them valuable tools for students to practice programming on their phones. However, limitations of mobile phones, such as small screens and small keypads, impede their use as typical programming environments. Dr. Mbogo is designing supporting techniques to enable learning of computer programming on

SAMIA SUBRINA

Bangladesh (Asia-Pacific)

Professor,
Dept. of Electrical & Electronic Eng.
Bangladesh University of Engineering & Technology
Dhaka, Bangladesh

ELECTRONIC ENGINEERING & NANOTECHNOLOGY:
For her work on the modeling of thermal and electronic transport in nanoscale materials and the applications of these materials in nanoscale devices. Dr. Subrina is particularly interested in nanomaterials with high thermal conductivity, such as graphene (a form of carbon), that make it useful in heat mitigation. Fast, high-performance electronic devices tend to suffer from overheating, which causes performance degradation and shortens the life of the devices. Use of high heat-carrying materials in electronic device design can provide a solution to this issue.

FATHIAH ZAKHAM

Yemen (Arab region)

Assistant researcher,
Faculty of Medicine and Health Sciences
Hodeidah University
Hodeidah, Yemen

BIOENGINEERING & MICROBIOLOGY:
For her work applying biotechnology and bioengineering to the diagnosis and management of tuberculosis and other emerging infectious diseases. Dr. Zakham's main goal is to develop rapid, accurate and cheap tools for the detection of the causal agent of tuberculosis and the control of drug-resistance TB strains, which are dramatically increasing, especially in low and middle income countries. Conventional culture methods for laboratory diagnosis and drug resistance testing require several weeks; the molecular approach is a good alternative in poor infrastructure settings.

2020 OWSD-Elsevier Foundation awardees Fathiah Zakham (Yemen), Champika Ellawala Kankanamge (Sri Lanka), Samia Subrina (Bangladesh), Chao Mbogo (Kenya), and Susana Arrechea (Guatemala) at the AAAS meeting in Seattle, February 2020.

SPOTLIGHT ON:
CHAO CHARITY MBOGO

Growing up, Chao Mbogo didn't dream of becoming a computer scientist; computers weren't common in her southwestern Kenya town of Migori. She was, however, passionate about mathematics from a young age, which led her to enrol in a Maths and Computer Science undergraduate programme at Kenya Methodist University (KMU), but it was computer programming that ended up capturing her interest. She followed this passion to the University of Oxford (UK), where she completed an MSc in computer science in 2007, and then to the University of Cape Town (South Africa), where she received her PhD in 2015.

While Chao loved the research and especially the innovation component of computer programming, she felt called upon from the start of her career to dedicate herself to teaching, attributing this in part to being the daughter of a lecturer. When she returned to KMU following her PhD, first as a lecturer, then as Head of the Computer Science Department and more recently as Dean of the School of Science and Technology, it was important to her to focus as much on educating others as on her own research. Fortunately, it wasn't an either/or decision—Chao's PhD research centered around developing innovative ways to teach computer programming in resource-limited settings, an ambition she was able to continue at KMU.

Her approach to teaching computer programming focuses on using something most students already have—mobile phones or other mobile devices. Mobile phones may be used for programming in areas where computers are not easily available, but limitations such as small screens and small keypads make it difficult to practice. Chao's research finds ways to circumvent these limitations. She is working with a user interface engineer to develop an app that she believes could support learning for young Kenyan programmers that, like her as a student, don't have access to computers.

In her position as Dean of the School of Science and Technology, Chao also recognized the need for students to build competencies beyond the technical side of programming, in order to prepare for successful careers in STEM fields. In 2016, she conducted a survey of students to understand their needs in terms of mentorship, and came away with a series of personal and professional skills students wished to develop, such as self-confidence, interviewing, writing successful scholarship applications, and community engagement. These formed the basis of the mentorship programme, KamiLimu, which she launched informally in 2017. KamiLimu is a free mentorship programme to help Kenyan computer science students beyond classroom learning. Over 8 months, KamiLimu mentees follow a structured training to prepare them for work environments, including courses on negotiation, public speaking, personal branding, and other skills. KamiLimu has trained 205 students from 24 universities in Kenya, in six cohorts of mentees, and have won numerous awards and recognition for their work, including the Quarts-Wharton Reimagine Education Gold Award in 2020, the Zuri Award in 2018, and the AnitaB.org Pass-it-on Award in 2017.

"Being a scientist in Kenya means that we face various challenges, such as limited resources and limited representation of women," said Chao. "But spaces that are provided such as that by OWSD and the Elsevier Foundation constantly remind us that we are able to come to such a space and form new collaborations and even learn new skills, that we can then take back home and impart on our communities, so that they are able to solve some of our most pressing socio-economic challenges. That is why I believe that one of the greatest privileges of being a scientist is that we have the ability to hold the ladder up for others, and in so doing, build skills and change lives."

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 2020 are reported in the tables below.* Expenditure is organized according to programme areas.

INCOME[1]	AMOUNT (USD)
Balance brought forward from 2019	1,157,373.80
International Development Research Centre (IDRC), Canada	1,383,224.28
Swedish International Development Agency (Sida)	1,328,390.13
Elsevier Foundation, USA	85,600.00
Contributions from OWSD members	1,585.25
Interest	88,104.00
TOTAL INCOME	**4,044,277.46**

EXPENDITURE	AMOUNT (USD)		
	APPROVED BUDGET	REVISED 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)	1,880,000.00	1,880,000.00	823,816.41
1.2 Travel (PhD fellows)	213,000.00	213,000.00	79,223.00
1.3 Regional workshop/General Assembly	136,000.00	136,000.00	
1.4 Monitoring	50,000.00	50,000.00	
1.5 Travel - Executive Board and staff	40,000.00	18,800.00	
1.6 Website/communications	47,000.00	47,000.00	8,937.07
1.7 Staff and office space	650,000.00	650,000.00	343,215.08
1.8 Additional funds received in previous year	178,070.85	178,070.85	121,628.73
Subtotal for (1)	3,194,070.85	3,172,870.85	1,376,820.29
(2) Supporting women's leadership in science, technology and innovation in scientifically and technologically-lagging countries (Early Career Fellowship programme)			
2.1 Personnel	686,400.00	686,400.00	166,096.12
2.2 Consultants	31,191.00	31,191.00	
2.3 Evaluation	70,294.00	70,294.00	
2.4 Research and equipment	1,104,000.00	1,104,000.00	1,038,735.34
2.5 International travel	35,000.00	35,000.00	
2.6 Training	181,600.00	181,600.00	1,810.00
2.7 Indirect costs	286,115.00	286,115.00	6,127.58
2.8 Additional funds received from IDRC in previous year	178,070.85	178,070.85	121,628.73
Subtotal for (2)	2,773,182.02	2,773,182.02	1,523,598.59
(3) Gender in Science, Innovation, Technology and Engineering (GenderInSITE)			
3.1 Steering Committee	17,500.00	18,680.25	7,257.76
3.2. Regional Focal Points	30,000.00	30,000.00	30,000.00
3.3 Workshops/activities	18,507.07	22,418.68	22,137.36
3.4 Communications	1,200.00	2,904.98	2,849.93
3.5 Travel	15,653.00	5,500.53	5,500.53
3.6 Staff costs	50,000.00	62,052.56	61,428.77
Subtotal for (3)	148,218.75	148,218.75	39,711.80
(4) OWSD-Elsevier Foundation Awards for Early Career Women Scientists in the Developing World			
4.1 Awards	79,350.75	79,350.75	30,532.71
4.2 Alumnae Programme	33,868.00	33,868.00	
4.3 Community building	15,000.00	15,000.00	
4.4.Staff costs	20,000.00	20,000.00	9,179.09
Subtotal for (4)	148,218.75	148,218.75	39,711.80
(5) Additional core activities			
5.1 Fellowships PhD funds	265,000.00	325,000.00	213,217.31
5.2 Staff costs	100,000.00	120,000.00	94,609.47
5.3 ICTP services	120,000.00	120,000.00	29,987.97
5.4 General Assembly	25,000.00	45,000.00	
Subtotal for (5)	510,000.00	610,000.00	337,814.75
Management costs	46,075.00	53,075.00	26,426.88
TOTAL EXPENDITURE	**6,804,406.69**	**6,898,903.62**	**3,433,546.66**
Savings on prior years' obligations			583,585,65
Excess (shortfall) of income over expenditure			1,194,316.45

RESERVE FUND[2]	AMOUNT (USD)
Amount available at the beginning of the period	200,000.00
Transfer from OWSD account	
End of service entitlements	
Reserve Fund balance end of period	200,000.00

*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.

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

2. The purpose of the Reserve Fund is to cover the end of service entitlements of OWSD Staff.

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.

OWSD is governed by an Executive Board which is elected at each General Assembly, held every four years. In 2020 the Executive Board meeting was held entirely virtually and split across three consecutive days (November 24-26). All current Executive Board members attended the meeting. The Executive Board includes a President (from any of the four OWSD regions in the developing world), 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.

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

OWSD Executive Board members in their November 2020 meeting.

EXECUTIVE BOARD

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

Tonya Blowers - **Coordinator**
Evgenia Markvardt - **Programme Manager**
Alexandra Cussianovich - **Membership & Awards**
Fiona Dakin - **National Chapters/GenderInSITE**
Lucia Fanicchi - **External Relations**
Erin Johnson - **Communications**
Tanja Bole - **Fellowships**
Giorgia Danelon - **Fellowships**
Erika Hrvatic - **Fellowships**
Marina Juricev - **Fellowships**
Zabeeh Ullah Sahil - **Fellowships**

ICTP campus, Trieste, Italy

OWSD is grateful to the following donors for their generous support of OWSD programmes in 2019:

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

OWSD additionally thanks the following private donors who contributed to our programmes in 2020:

Elizabeth Cundy
+ five anonymous donors

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