



AN OWSD SURVEY
March-April 2020

RESPONDING TO COVID-19: WOMEN SCIENTISTS FROM DEVELOPING COUNTRIES TELL THEIR STORIES

MARCH 2020

APRIL 2020

TIME AND DATE

FOREWORD



“ These amazing stories need to be read by as wide an audience as possible: they are examples of the extraordinary versatility of women scientists from the developing world. ”

On reading the accounts of the responses by the OWSD members presented here to the COVID-19 crises in their countries, my first reaction was one of profound gratitude and respect for their extraordinary fortitude in the face of this pandemic. Not only are many members turning their research priorities around to help their countries deal with the multitude of problems facing them, but they are also reaching out to their communities on a personal level to keep them informed and to enable them to help themselves. Take, as an example, the gynaecologist from Nepal who is using a video to advise pregnant women how to deal with problems due to the closure of non-emergency health facilities. Or the way in which our members in Palestine developed a course for graduate students presenting the latest information on COVID-19, including the molecular genetics of the SARS-CoV2 virus and the clinical presentation of the disease as well as how to model an epidemic, the principles of outbreak management and how to collect data from trustworthy sources.

My second reaction was the realization that I should not be surprised by the ingenuity and resourcefulness of these women scientists because they are, after all, OWSD members! Take, for example, the way in which the Director General of the Kuwait Institute for Scientific Research (and former Vice-President of OWSD for the Arab Region) has reassigned parts of the institute to research on hospital contamination, the presence of COVID-19 in sewers, and the use of drones for surveillance data.

And consider the praise given by a member from Sri Lanka to her government that, due to its prompt containment actions, the widespread screening her lab has put in

place to cope with the pandemic will, in all likelihood, not be required.

A number of our members have worked extensively on other viral infections such as Rift Valley Fever in Senegal and respiratory viruses in Rwanda and Yemen, and they are now adapting their expertise towards helping develop diagnostic tools and possibly even therapeutic agents for the current coronavirus outbreak.

In addition, a scientist in Sudan is studying how the virus can jump from animals to humans and whether this knowledge can lead to diagnostic markers.

My final reaction was that these amazing stories need to be read by as wide an audience as possible to help them to understand the extraordinary versatility of our women scientists. I therefore hope that all who read this will disseminate it as widely as possible to instil hope and confidence that together we can overcome the current problems and learn how best to deal with others that may arise in the future.

A handwritten signature in black ink that reads "JA Thomson". The signature is fluid and cursive.

Jennifer Thomson
OWSD President
Professor Emeritus,
Department of Molecular and Cell Biology,
University of Cape Town, South Africa

Preface

Soon after the first patient was diagnosed with COVID-19 in Wuhan, China in late 2019, large outbreaks of the disease quickly followed in China, Italy, Spain, the United States and many other countries primarily in Europe and East Asia. While these epicentres dominated media and public attention, it soon became clear that the effects of the pandemic would be felt around the world — and perhaps more so, or at least differently — in the developing world.

In late March, the Secretariat at the Organization for Women in Science for the Developing World (OWSD) surveyed our network of thousands of woman scientists living and working in developing countries, to ask them how they, their research and their countries have been affected by the COVID-19 pandemic. The responses we received paint a sobering picture; developing countries often lack the public health resources of wealthier nations and risk incalculably large losses of life if infections are not controlled. The national-level shutdowns put in place to control the spread of the virus will leave millions of people in informal economies, surviving on day-to-day incomes, vulnerable to hunger and malnutrition. For the scientists themselves, the closure of universities and other institutions has put a halt to ongoing research projects, redirected funding and staff focus, and suspended regular academic activities such as publishing papers and submitting grant proposals.

But the responses also drive home the fact that scientists, at heart, are problem solvers— and that with a combination of expertise, initiative and imagination, they can find solutions even in the most challenging circumstances. From a Sudanese molecular biologist who is leading an initiative to make ventilators using 3D printers, to a Sri Lankan biochemistry professor who has 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, OWSD members are applying their knowledge and skills to helping their countries, and the world, rise to this challenge. There is reason for hope, too, as policymakers, governments and the general population become acutely aware of the importance of science; as some members recount, in this global adversity there is an opportunity to push for greater investments in research and in public health.

We hope you will see in the responses here the same reason for optimism that we do: that human ingenuity and the dedication of inspiring individuals like these women scientists from developing countries will help us to solve this, like other, challenges.

– OWSD Secretariat
Trieste, Italy, April 2020

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PLEASE NOTE: Number of COVID-19 cases cited in the text were current as of the date the responses were received. For more updated numbers, please refer to the resources at the back of this document.



RANIA MOHAMED HASSAN BALEELA

SUDAN

Rania Mohamed Hassan Baleela is Assistant Professor of Population Genetics and Deputy Dean of Academic Affairs in the Faculty of Science at the University of Khartoum, Sudan. She is the Royal Society of Tropical Medicine and Hygiene Sudan country ambassador, and has been an OWSD member since 2017.

How has your country been affected so far by the coronavirus pandemic?

In Sudan, we have had five confirmed cases so far, and one of them has passed away. This is the most critical time as the incubation period for those who were in contact with the patient who has died is ending. However, our surveillance system for infections is very weak; I expect the real number of infected people to be higher than five.

How have your own individual research and your institution been affected?

My institution, the University of Khartoum, has closed its doors [as of March 14] to all except hospital and affiliated personnel. This is crucial to flatten the curve of infection, as the number of students and employees is about 20,000. Closing up the university was a wise precaution.

How does your research relate to this pandemic?

I am a pathogen molecular biologist and population geneticist, so my research is at the core of this and other potential pandemics. As a population geneticist, I analyse genome sequences of pathogens. This helps in the efforts to identify possible wild hosts, and to understand the evolutionary pathways by which SARS-CoV2, the causative agent of COVID-19, has jumped from animals to humans for example. This will also help us to predict which viruses or pathogens to monitor and how to control them. Moreover, the type of analysis I do may help in identifying simple diagnostic markers.

How can scientific research help to avoid or mitigate such crises?

We need to identify possible pathogens that can jump from animals to humans, and to model the anticipated effects and means of protection. This can be done by screening wild animals in proximity to humans. From my previous work on bats for example, I saw that bats seem to provide a good environment for pathogens. The problem with bats is that they both fly, and they are mammals. This makes

them prime reservoirs or intermediate sylvatic animals for several pathogens. My research project on bats was carried out under a small grant from the Sudanese Ministry of Higher Education, which unfortunately did not get continued funding. Scientific research should focus on/ and benefit from:

1. Laboratory-based identification and genotyping of potential pathogens
2. Community-based work to positively change attitudes and cultural habits (e.g.

on how to refrain from eating wild animals/bush meat or from using wild animals in traditional medicine)

3. Most importantly, we need to inform and work with politicians and decision makers to understand that nature and wild animals need to be protected, and that forests need not to be cut for wood or for agriculture. We need to respect mother earth.

“

We need to identify possible pathogens that can jump from animals to humans, and to model the anticipated effects and means of protection.

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Have you or your research team been involved in a response to the pandemic in any way?

Currently, I am the head of the research team of the Sudanese crisis management task force, a volunteer group working in synchronization with the Sudanese Ministry of Health. I am also involved in a research group developing a Sudanese open-source ventilator, under the Higher Emergency Committee to combat COVID-19. Sudanese hospitals and health facilities have very limited numbers of ventilators – fewer than 600 in the entire country – which becomes catastrophic in such a pandemic. This led me to search for possible solutions. Two years ago, I attended a local workshop where we used a 3D printer to manufacture a functioning fluores-

... RANIA MOHAMED HASSAN BALEELA

SUDAN

cent microscope from scratch. We used Raspberry Pi for automation and a regular PC screen for visualisation. We were able to provide our microscope with ultraviolet light and all the required parts. So I thought, Why not try the same approach to manufacture a ventilator? I knew the usual production is more complex, but having

at least a basic one is better than nothing. On March 21, I posted a call in several Facebook groups for Sudanese researchers, and engineers and programmers started collaborating on this.

At least three groups are now working on producing ventilators in Sudan. I am a member of all of them. Yesterday, one of the teams,

organized by a group for medical supplies manufacturers, announced and presented their prototype at one of the large industrial facilities in the country. The Sudanese crisis management task force also has a group working on producing a ventilator, and they too announced the completion of a prototype. The team I am most involved with thinks that our prototype will be ready by the end of this week. We are producing open source 3D-printed automated ventilators.

In addition to my work on the crisis management task force and in producing ventilators, I am using my Facebook account to raise awareness on how to protect oneself against acquiring the infection, as many Sudanese people prefer Facebook as a medium for information.

Finally, I am carrying out population genetics and phylogenetics analyses on the virus genome as well, in order to understand its evolutionary pathways and to detect its origin.

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Two years ago, I attended a local workshop where we used a 3D printer to manufacture a functioning fluorescent microscope from scratch... So I thought, Why not try the same approach to manufacture a ventilator?

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Shreyashi Aryal is Assistant Professor in the Department of Obstetrics and Gynecology at the Lumbini Medical College Teaching Hospital, Nepal. She has been an OWSD member since 2019.

How has your country been affected so far by the coronavirus pandemic?

As of March 28, the World Health Organization reported five confirmed cases in Nepal. Since the first cases were in China, Nepal's northern neighbor, people have been fearing an outbreak here too. Though the transmission was expected, there was initially no panic among the people and the government also did not seem to make definitive policies for prevention and management. After the first case was diagnosed on January 25, there started to be fast spreading and more panic. Now we are expecting a rapid rise in the number of cases, and with limited resources, high mortality is expected.

The government has called for a lockdown and people are complying, but the spread of the disease is difficult to control because of a few factors. Nepal has open borders with India, and with businesses shutting down there, migrant workers have entered the country in the thousands, and the screening system at the borders is close to nonexistent. Migrant workers have also been sent home from countries in the Persian Gulf and are advised home quarantine, but many have not complied. Some have escaped from government quarantine sites, and many are afraid to be tested for the virus.

Despite all this, there are only five confirmed cases and this is mainly because of under-diagnosis. There is only one hospital in the capital city Kathmandu with test kits, and they are overburdened. Few other hospitals have been provided test kits, and if more cases are diagnosed, the health system will be severely overwhelmed. With just over 400 ventilators in the whole country, complicated cases will not get critical care. People will die in large numbers.

The most affected by the pandemic are the daily wage workers who struggle to meet their basic needs even without a pandemic. Second most affected are the health care workers; with the government unable to provide personal protective equipment (PPE) to all, health care workers are in an ethical dilemma, whether to treat patients or to save themselves. Third, every middle class family with a working person who is forced to go on unpaid leave is affected.

The lockdown cannot go on forever, and with the spread of the disease yet to multiply, I fear there will be a huge problem for this low-income country.

How have your own individual research and your institution been affected?

I work in a medical college, and all of our academic, clinical and other research activities have been affected by this pandemic. All students, including interns, have been sent home. Some students were sent home in the middle of their examinations, with the remaining exams indefinitely postponed and all their preparation wasted; they are now uncertain when or if they will graduate. Interns were needed in the hospitals, but with the government unable to provide PPE to trainees, they were sent off-duty.

On the clinical side, outpatient departments are closed and people are not able to come to the hospital for their regular medicines. Pregnant women are lacking proper antenatal care, missing routine check-ups and ultrasonography appointments to detect major birth defects. On the front line, health workers are without proper PPE. Locally-made PPE has been arranged with the help of hospital staff and the army, however this is only of the lowest level of protection, and critical care workers are praying that complicated COVID-19 cases will not end up at this center. But that day will certainly come soon, and the health care workers will work without proper PPE, risking their own lives and their families' – and above all, risking the chance of being a carrier and transmitting it to all other patients coming to the hospital.

All research activities, including clinical research, are on halt because clinical du-

“ Health care workers are in an ethical dilemma, whether to treat patients or to save themselves. ”

ties are more critical at this point. All the workforce is required in the field and not at their desks. I was studying the causes of perinatal deaths, and now with only emergency cases, this study is on hold. We are now focusing on data collection in the community. We expect home deliveries to increase during this period and we also expect a rise in birth rate after the pandemic is over. We are now planning to study these aspects.

“ This pandemic has brought us together as a team – a team working together to fight a greater cause. ”

How does your research relate to this pandemic?

Our earlier research was not related to the pandemic, but we have now started a community survey to assess the problems stemming from closure of non-emergency health facilities; we will see the numbers of people missing their regular medica-

tions, people with relapses of health problems or mental illnesses, number of unattended home births, etc. We also plan to see the effects on women regarding pregnancy termination, contraception and infertility.

On the clinical side, our hospital has set up a fever clinic. The staff are working wearing locally-made PPE. An isolation ward has been set up to prepare for the worst, but with the hope that no cases will have to be admitted.

How can scientific research help to avoid or mitigate such crises?

Research is essential to understanding the origin and course of a pandemic, as well as how to manage and prevent it. There have been pandemics in the past and research done at those times has helped us discover ways to prevent and manage new ones. Comparing the patterns of previous and present pandemics can help us find loopholes and fill them. Research at the community level on how it is spread, on people's behavioral patterns that increase transmission, and on methods of preventing those behaviors can help to stop or slow the transmission. Medical research can find drugs or vaccines which will kill the microorganism. Research on the effects of the pandemic on special groups like the elderly, children, newborns, pregnant women or immunocompromised individuals can help focus attention on and minimize mortalities in these groups. Research on people's reaction to the pandemic and how they behave and comply with mitigation measures can help us understand the human reaction to pandemics. National-level research and surveys can help compare the effectiveness of various policies across countries. It is important also to make sure that quality research is accessible during a pandemic, so that we can encourage scientists to work and contribute more.

Have you or your research team been involved in a response to the pandemic in any way?

We are a team of OB/GYN specialists, and though we have been adversely affected in many ways, this pandemic has brought us together as a team – a team working together to fight a greater cause. Besides our emergency duties in the hospital, which we are doing with the risk of acquiring the infection at any time, we have managed to do something for our patients. We have prepared a [short video](#) in our local language which provides information for pregnant women, urging them to stay home and explaining the conditions under which they should come to the hospital during this pandemic (which exclude check-ups, family planning and abortion services, and infertility treatment). It has quick information on what to do if a pregnant woman has fever. This video has been targeted to women in suburbs and rural areas who are not aware of the health effects of the-COVID 19 infection.

As a team leader, I have also published an [article](#) regarding pregnancy and COVID-19 in English, giving information on the effects of infection during and after pregnancy. And as mentioned previously, we have written proposals for community surveys and plan to start the data collection soon.

Doctors play an important role in public awareness, so with our combined efforts we hope that we can help pregnant women in this time of chaos.





THERESE UMUHOZA

RWANDA/KENYA

Therese Umohoza is originally from Rwanda and is currently completing her PhD at the Institute of Tropical and Infectious Diseases in Nairobi, Kenya. Her PhD research focuses on the epidemiology of selected human respiratory viruses. She is a 2015 OWSD PhD Fellow.

How has your country been affected so far by the coronavirus pandemic?

The COVID-19 pandemic began to affect Kenya in early 2020. First it disrupted the economy and supply chains, which can be felt at all levels, particularly in the fluctuation of prices on the market. There was apprehension about importing cases from the COVID-19 epicentre in Wuhan, which forced Kenya to suspend its main flights to and from China. Kenya confirmed its first case of COVID-19 on March 14; this triggered societal alarm and the government called to close all public gatherings. Within the span of a week, the country has confirmed 15 new cases, and 363 contacts have been traced. This comes after the country intensified control measures by closing all schools (including universities), banning social activities and urging people to work from home where possible. The country has also closed the international airport – no flights in or out until further notice. The livelihoods and social and cultural lives of Kenyans are interrupted, as in many other countries experiencing the COVID-19 pandemic. The social effects are alarming as measures are being tightened. There is a lot of misinformation and myths about the COVID-19 pandemic that might result in community mistrust in Kenya. The response could face a major challenge if any community resistance occurs.

How have your own individual research and your institution been affected?

Several activities of my research are on hold until further notice, and others have been postponed. In November 2019, I submitted two manuscripts to a journal for peer review; it was expected that I would have at least the response from the journal within three months. In mid-February, we sent a gentle follow-up and received a notification that there was a challenge in finding editors and reviewers. After a week, another notification came to inform us that the invited editor is not available and the journal is in the process of inviting a second editor. The editors and reviewers who assess submitted manuscripts for this journal require expertise in respiratory viruses and epidemiology; I realised that there is a shortage of these professionals due to the COVID-19 pandemic unfolding. This applies as well to the supervision of my research project. At the beginning of March, I shared a third

manuscript with my mentors, but none had time to look at it. At the moment, given the priority required for the outbreak response, it is nearly impossible to have a discussion about the epidemiology of other respiratory viruses without overlapping with SARS-CoV2, the causative agent of COVID-19. It is an unfortunate position to be in as a research investigator; there are concurrent and competing priority diseases to investigate, and there is a shortage of specialists. The pandemic has deviated the research focus, efforts and resources for many medical institutions and centres, including the Kenya Medical Research Institute/Center of Virus Research (KEMRI/CVR), where I am doing another research project under the surveillance programme for influenza and other respiratory viruses. It is critical to spare time for research on subjects other than COVID-19. However, it is good that this situation has brought a lot of attention to the research of infectious diseases, particularly respiratory infections.

“ There are concurrent and competing priority diseases to investigate, and there is a shortage of specialists. ”

How does your research relate to this pandemic?

My research interests focus on viral infectious diseases of human and/or animal health concern. I operate within a One Health approach [a strategy for public health that emphasizes the use of collaborative knowledge and inputs from various disciplines and sectors to inform policies, programmes and research]. I am currently conducting an investigation on the epidemiology of respiratory viruses in Kenya. Essentially, I look at the prevalence, distribution, risk factors and seasonalities for major pathogens including influenza viruses, respiratory syncytial virus, parainfluenza

... THERESE UMUHOZA

RWANDA/KENYA

enza, and adenoviruses. None of these viruses belongs to the family of coronavirus. However, all these viruses infect the same host – humans – and circulate in the same populations and environments. According to my latest research, respiratory syncytial virus is coming into its season at the same time as this COVID-19 pandemic. COVID-19 is still unfolding in Kenya; we don't know much about the epidemiological outcomes of co-circulation or co-infections for these viruses with SARS-CoV2. There are grey areas to investigate as we carry on with the response during this pandemic.

How can scientific research help to avoid or mitigate such crises?

Scientific evidence translated appropriately and ethically into policy could be effective to mitigate such crises. There are large gaps in scientific evidence for interventions that are being considered to mitigate this COVID-19 crisis. Many countries are struggling to find a better model to control and suppress the spread of SARS-CoV2. Despite the fact that it is a novel virus and an urgent situation, both

non-pharmaceutical and pharmaceutical interventions should be rigorously investigated prior to deployment. Policies that are implemented must draw from scientific evidence. A simple example is the use of a face mask to control the transmission of SARS-CoV2. There is a debate on who should use the mask (health workers only, or the general population?) and what type (medically approved or homemade?). Scientific investigation into such basic questions could guide policy, not only for this COVID-19 pandemic but for similar crises both present and the future. In addition, there are more complex policy-driven interventions which must be based on scientific evidence, including immunization and treatment.

“ We don't know much about the co-circulation of SARS CoV2 with other respiratory viruses. There are grey areas to investigate. ”

Have you or your research team been involved in a response to the pandemic in any way?

The research team I operate with in Kenya forms a part of the COVID-19 pandemic response task force, and is providing expertise in the diagnostics of SARS-CoV2. The team has carried out surveillance of influenza and other respiratory viruses since 2006, and responded to several outbreaks. This includes the major 2009 outbreak triggered by the influenza virus subtype A/H1N1 [swine flu], and other sporadic outbreaks from the various spectrum of respiratory viruses. During the 2009 H1N1 pandemic, the team contributed significantly to the region of the East African Community (EAC) and the Seychelles, by offering diagnostic training for the states' task force. Currently, it is part of the COVID-19 task force at KEMRI, with the lead responsibility for COVID-19 diagnostics and research investigations. These are carried out by personnel broadly trained in virology, laboratory technology, molecular biology, bioinformatics, and epidemiology. Within the team, I primarily conduct investigation in the epidemiological context. In the region, I am a Rwandan nominee to join the East Africa Health Research Commission (EAHRC), a group of young researchers investigating COVID-19. For the global community, I am also providing support as a moderator for the Program for Monitoring Emerging Diseases (ProMED-mail), a surveillance tool for early detection of emerging diseases, at the International Society for Infectious Diseases.





NIMANTHI JAYATHILAKA

SRI LANKA

Nimanthi Jayathilaka is a Professor in the Department of Chemistry at the University of Kelaniya, Sri Lanka, and a 2018 OWSD Early Career Fellow. Her research focuses on identifying early markers of the severity of dengue fever.

How has your country been affected so far by the coronavirus pandemic?

There have been 77 confirmed cases of COVID-19 in Sri Lanka since the first patient was reported at the beginning of March. School closures, a work-from-home order and finally an island-wide curfew were imposed to control the spread of the infection. The consequences of the disruption to day-to-day life and interruption of business, after the spread of the disease is under control, are yet to be seen. The prompt action taken by the government is expected to effectively curb the spread of the disease. The enforced curfew is the most effective way to impose quarantine, and is the best mode of action for a developing nation like Sri Lanka, since the country is not equipped for mass testing or the intensive therapy required. The fallout from a widely spread infection would be larger than the fallout from shutting down industries and businesses.

How have your own individual research and your institution been affected?

Laboratory activities have been halted since day 20 following the first reported case. We will seek special permission to enter the lab to feed the research animals if the curfew continues.

How does your research relate to this pandemic?

My research is not on the coronavirus, however, I study dengue fever which is also caused by an RNA virus. The dengue virus is not as infectious as COVID-19 since the disease is mosquito-borne. Yet, during an outbreak of dengue the hospitals' resources are pushed to the limit. In my work, I have found early molecular markers that can help to predict severe cases of the disease, which may help hospitals to better utilize their resources during an outbreak and mitigate the disease mortality. I am also striving to develop methods to detect such molecular markers in resource-limited settings. Such tools will also be widely applicable in diagnosis and testing for other infectious diseases like COVID-19, at low cost in order to facilitate large-scale screening and avoid spread of the disease.

How can scientific research help to avoid or mitigate such crises?

Scientific institutes and research should be coordinated with national efforts to mitigate such crises. For example, the test kit available for COVID-19 screening is based on the test kit developed by the Centers for Disease Control and Prevention in the U.S. after it was validated independently by several research laboratories. The test is widely available for everyone around the world. Similar systems should be in place in other countries as part of their disease control strategy. In Sri Lanka, while the prompt and decisive actions by the government should be effective in curbing the spread of the disease, if we were to face an outbreak there is no system in place for large-scale testing. The centers that do have access to the test did not ensure that other university or private centers with capacity for testing were prepared, as part of a disease prevention plan. As a developing nation, there are a limited number of machines available for testing, and we are dependent on reagents and consumables manufactured in other countries, as well as for ventilators required for severe cases.

Therefore, it would have been more effective if we had had a national strategy in place to utilize the available university and private sector research centers for testing during a pandemic. Additionally, while a new test is not needed, there are cost-cutting measures that could have been explored in preparation.

For example, testing is done on RNA that is extracted from clinical specimens, however, extraction costs as much as the test. Therefore, researchers should have been brought in to test whether the testing can be performed without extraction.

Have you or your research team been involved in a response to the pandemic in any way?

We have volunteered our services in the event that large-scale testing is required. However, due to prompt action taken by the government to limit the spread of the disease, we believe such widespread screening will not be necessary. Since, as already stated, no system is in place to utilize a national grid of research laboratories for screening, it is unlikely that our team will be called into action at the moment. However, we believe that a system to utilize all available resources in the event of an outbreak should be in place for future events of this magnitude.

“ Scientific institutes and research should be coordinated with national efforts to mitigate such crises. ”



SAMIRA OMAR

KUWAIT

Samira Omar is Director General and Principal Research Scientist at the Kuwait Institute for Scientific Research (KISR). She has been an OWSD member since 1992, and was OWSD Vice President for the Arab region from 2010-2014.

How has your country been affected so far by the coronavirus pandemic?

Since the World Health Organization (WHO) announced the pandemic disease COVID-19, and even before it was officially announced in early March, Kuwait took immediate measures to contain the virus, including public isolation. All public education and university systems were closed, the whole country was placed on a 13-hour curfew, and all other services came to a halt except necessary ones. As per WHO records dated March 28, Kuwait with a population of more than 4 million has had 235 cases of COVID-19, who were mostly travelers returning to Kuwait who had caught the disease from the countries they were traveling in, such as the UK, Italy, France, and China. The government established a quarantine as per WHO recommendations to host travelers arriving in Kuwait for 14 days in isolation in hotels. Sick individuals were hospitalized immediately and were isolated until fully recovered. Up to this date, Kuwait has had zero deaths from COVID-19 and 64 recoveries.

How have your own individual research and your institution been affected?

The Kuwait Institute for Scientific Research (KISR), along with many governmental organizations were given a temporary break from work until further notice. However, our staff at KISR continued to work on urgent matters. Although KISR doesn't work on health-related R&D, KISR researchers took initiative to embark on urgent research studies in relation to COVID-19. The Biotechnology Program, Nanotechnology Program, Techno-economic Division and Information Technology/Geographic Information System (GIS) Program, to name a few, spearheaded this effort.

How does your research relate to this pandemic?

Although, again, KISR does not normally work on health-related R&D, as mentioned previously many research programmes and divisions at KISR took immediate action to launch research studies in relation to COVID-19. Examples of these research projects include: assessing the extent of air contamination in hospitals where patients with COVID-19 are treated; analyzing the presence of COVID-19

in sewers; developing advanced materials for virus-clear surfaces; using drones for surveillance data acquisition; developing an interactive COVID-19 platform; building mobile applications for triaging patients and reducing the spread of COVID-19; strategic economic assessment and interpretation; strategic planning for food and water security; and many other research projects.

How can scientific research help to avoid or mitigate such crises?

His Highness the Amir of Kuwait directed that USD 33 million be allocated urgently for R&D on coronavirus. The funds will be administered by the Kuwait Foundation for the Advancement of Sciences (KFAS). KISR will be a beneficiary of this fund if the above suggested projects and other related ones are approved, and will also use its own resources as additional funding. Results of the studies will be provided to the concerned authorities and will be published for international access. KISR R&D is diversified in many fields, which makes it possible to contribute to developing research projects relating to the implication of the disease on the economy, food security, water resources, environmental impacts and others.

Have you or your research team been involved in a response to the pandemic in any way?

KISR researchers have been interviewed on TV and in other media, and as the Director General I have also expressed KISR's technical support to other governmental organizations. KISR has also provided an internet link to scientific publications relating to COVID-19 that can be used as a reliable source of information.

“ KISR is diversified in many fields, which makes it possible to contribute to developing research projects relating to the implication of the disease on the economy, food security, water resources, environmental impacts and others. ”



MAHFUZA TALUKDER FLOWRA

BANGLADESH/INDONESIA

Mahfuza Talukder Flowra is currently pursuing research on implementation science as a Fellow of the World Health Organization's Special Programme for Research and Training in Tropical Diseases (TDR), based at Gadjah Mada University, Indonesia. Before her current affiliation, Dr. Flowra worked in the field of vaccinology at the Infectious Diseases Division of the International Centre for Diarrhoeal Disease Research, Bangladesh. She has been an OWSD member since 2017.

How has your country been affected so far by the coronavirus pandemic?

My country, Bangladesh, is highly prone to the pandemic. As of March 23, the government had announced a total of 33 cases (25 still active) with 3 deaths. Due to the high density of the population and less public awareness coupled with a lack of resources, it will be devastating in the coming days. The media and general public believe that the active cases are far beyond what has been declared, as there is no provision for testing except for suspected cases who have had a history of foreign travel.

How have your own individual research and your institution been affected?

I am currently collecting data for a study to detect the barriers of multidrug-resistant tuberculosis at the community level in Bangladesh, as part of my thesis for a master's degree in Implementation Science under the WHO TDR Fellowship scheme. The study area is far from my residence (120 km). Now the country is undergoing full lockdown, and my research has been severely affected. There is no public transport and people are prohibited to go outside until further orders. I had to stop working even before the lockdown as I could not obtain the proper personal protective equipment (PPE), and it is not easy or acceptable to interview rural people wearing this type of equipment. Moreover, the study population is already a vulnerable group for infection, and the coronavirus will only add to this. I was also scheduled to travel to my institute to discuss the study findings so far with my study team, but this has been halted. All university activities have been restricted on campus since March 23, and communication is only online. Both Indonesia and Bangladesh are facing a rise in community transmission of COVID-19 at this moment.

How does your research relate to this pandemic?

I work on multidrug-resistant tuberculosis, which is a group who are highly at risk of being affected and can also act as super spreaders due to their diseased status and compromised immune systems.

How can scientific research help to avoid or mitigate such crises?

Scientific research can help in various areas:

- Awareness raising, educating people about health and hand washing practices
- Performance of clinical trials of new drugs/vaccines
- Investigation of outbreaks and contact tracing, isolation and quarantine
- Geospatial mapping of cases, research on comorbidity conditions and utilization of digital health for emergency communication
- Identification of gaps and barriers in current health systems to mitigate future epidemics.

Have you or your research team been involved in a response to the pandemic in any way?

One of our research team members has drafted a manuscript on "Evaluation of preventive, supportive and awareness building measures among international students in China in response to COVID-19: A structural equation modeling approach." The paper is based on the initiatives taken by the Chinese government and local authorities for the foreign students in China during the outbreak, to build their trust and make them aware of the situation and encourage healthy behaviors.





NOUAR QUTOB-HUSSEIN AND SHAHENAZ NAJJAR PALESTINE

Nouar Qutob-Hussein is Assistant Professor of Molecular Genetics and Gene Toxicology and Head of the Department of Health Sciences at Arab American University, Palestine. Shahenaz Najjar is Assistant Professor of Health Informatics in the same department. They have both been OWSD members since 2020.

How has your country been affected so far by the coronavirus pandemic?

The COVID-19 pandemic has affected Palestine at different levels. Palestine has had to rely on prevention because of concerns about limited resources for care to the affected individuals.

On March 5, President Mahmood Abbas declared a period of emergency after seven Palestinians tested positive for the virus in Bethlehem. In his efforts to fight the coronavirus, Palestinian Prime Minister Mohammad Shtayieh has closed educational institutions, tourist sites, mosques and churches, and parks for the duration of one month. On March 18, he declared a curfew obliging people to stay in isolation except in cases of emergency, to maintain social distancing and stop the spread of the virus. Similar to other countries, citizens are concerned about the stresses imposed on the health system and the shortage of essential supplies in hospitals and pharmacies across the country.

Regular updates on the pandemic are provided by the Palestinian Ministry of Health with up-to-date number of confirmed cases. As of March 31, out of the 6605 total samples tested, 116 confirmed cases were reported, among which 18 recovered and 1 died due to complications. Social media platforms, especially Facebook, have been facilitating the dissemination of information about COVID-19 and preventive measures, but at the same time have contributed to the spread of misinformation before many platforms started to take strict measures against this.

How have your own individual research and your institution been affected?

The Arab American University had to join in fighting coronavirus by shutting its doors. However, the university has to ensure the continuity of the academic semester and has provided good alternatives to the traditional classroom-based teaching, by adopting e-learning systems that use different platforms and communication channels for live and interactive lectures. Students have been engaged in e-learning since the decision was made to shut down educational institutions. At the under-

graduate level, the engagement of students has been more challenging compared to the graduate level, where the number of students enrolled in courses is smaller and the students' acceptance and readiness for online learning is more apparent.

It's also noteworthy to mention that at the Faculty of Graduate Studies in which both of us work, disruptions to the progress of graduate students in the midst of their thesis work were inevitable. Data collection as well as wet lab experiments were put on hold, which may cause unpredictable delays in the completion of work and graduation.

How does your research relate to this pandemic?

Nouar Qutob: I have a long-standing interest in molecular genetics. My research is focused on integrating genetics with the functional investigation of mutations to study cancer. I use high-throughput sequencing to identify mutations that may be involved in tumorigenesis, and somatic cell gene knockouts to disable individual genes in cancer cells to study their role in cancer development. Specifically, I am now looking at genes that are mutated in the Palestinian population. My experience has strengthened my conviction to pursue personalized medicine, in which the biology of diseases is investigated using genomic tools and patients' conditions are managed by tailoring treatment to their personal genomic attributes.



... NOUAR QUTOB-HUSSEIN AND SHAHENAZ NAJJAR

PALESTINE

Shahenaz Najjar: I am a specialist on health informatics and health policy. Health informatics is a field that uses information technology to organize and analyze health data to improve healthcare outcomes. Generally, health informatics deals with the resources, devices and methods utilized for storage, retrieval, and use of information in health and medicine. It improves the efficiency and effectiveness of care by improving the collection of patient data, making it more available to clinicians and researchers for clinical decision making, and making it easier to analyze data and disseminate the results. These results can be later used for future cycles of improvement, preventive care and decision making.

In the case of COVID-19, data extracted from electronic health records and health information systems (from primary, secondary, or tertiary healthcare sectors) can be very helpful to make decisions about costs or resource allocation (human or financial). At the level of the patient-physician relationship, there are some available clinical decision support systems (health informatics tools) that filter and analyze clinical and administrative data to help prepare diagnoses or predict medical events such as drug interactions. This information will contribute to the decisions

How can scientific research help to avoid or mitigate such crises?

Scientific findings and knowledge on COVID-19 would help in the development of vaccines and in designing robust and faster tests that can be made more widely available. Scientific research can also help in implementing health policies and strategies that support our capacity to respond to such pandemics in the future. Moreover, making scientific findings accessible can contribute to improving scientific literacy and education at all levels of society. Sharing science-based best practices in times like these can be very helpful in mitigating the impact of such crises. Finally, scientific data can be helpful in predicting the evolution of the virus and preparing society for the economic and social consequences.

“ At [our Department], we offered a course aimed at teaching graduate students what we know about COVID-19, to help them understand the molecular genetics of the SARS-CoV2 virus as well as the epidemic situation. ”

Have you or your research team been involved in a response to the pandemic in any way?

Nouar Qutob-Hussain: A few graduate students in our Department of Health Sciences are working on population-based studies concerning the pandemic in Palestine, as well as leadership and health policy planning. Additionally, a few researchers from the university are involved in preparing both public-facing and scientific publications on COVID-19 in Palestine.

At the Department of Health Sciences, we offered a course aimed at teaching graduate students what we know about COVID-19, to help them understand the molecular genetics of the SARS-CoV2 virus as well as the epidemic situation: the development of vaccines; the clinical presentation of the disease; how to model an epidemic; principles of outbreak management; and how to collect data from trustworthy sources.

Shahenaz Najjar: I am also teaching a healthcare management course this semester. The final project of that course is on "Leadership and strategic planning and preparedness to face COVID-19 in Palestine". Our students have been divided into teams, and each team will tackle a different aspect of the pandemic, i.e. education, economics, the role of media, the pharmaceutical sector, hospitals, etc.



FATHIAH ZAKHAM

YEMEN/FINLAND



Fathiah Zakham is an Assistant Researcher in the Faculty of Medicine and Health Sciences at the University of Hodeidah, Yemen, and a 2020 OWSD-Elsevier Foundation Awardee. She is currently working at the University of Helsinki under the Institute of International Education Scholar Rescue Fund.

How has your country been affected so far by the coronavirus pandemic?

I am originally from Yemen, which is not yet affected by the new pandemic. Since March 2015, many aviation companies stopped flying to and from Yemen, and we have an economic and political embargo. The United Nations humanitarian relief planes and UN workers come to Yemen from time to time, and the spread of the disease could occur at any time if no special precautions are taken. The World Health Organization has warned our health care officials about the situation, which could be catastrophic in Yemen. Currently, I am staying in Finland, where 523 cases have been documented to date [March 22], with one patient who has passed away.

How have your own individual research and your institution been affected?

Most of the activities at my institution have been suspended due to the quarantine, except for research related to COVID-19, and most of the faculty and staff are working remotely.

How does your research relate to this pandemic?

I am working on emerging infectious diseases; the management of the current pandemic is one of our missions.

How can scientific research help to avoid or mitigate such crises?

Scientific research is the only tool we have to battle against infectious agents. The development of vaccines, antiviral therapies and immunological and molecular studies will help to mitigate the risk of disease spread.

Have you or your research team been involved in a response to the pandemic in any way?

I started working on coronavirus last week. We are testing different antivirals to evaluate their effectiveness against the virus. My group published a recent study, "Serological and molecular findings during SARS-CoV-2 infection: the first case study in Finland, January to February 2020," authored by Haveri et al. in *Eurosurveillance*. Dr. Olli Vapalahti, our supervisor, has been interviewed by many different journalists about the current situation of the pandemic in Finland.



“Scientific research is the only tool we have to battle against infectious agents.”



apies and immunological and molecular studies will help to mitigate the risk of disease spread.



JYOTI SHARMA

INDIA

Jyoti Sharma is a Senior Scientist in the International Bilateral Cooperation Division of the Department of Science and Technology, Ministry of Science & Technology, India. She is an OWSD member since 2015.

How has your country been affected so far by the coronavirus pandemic?

As of March 29, a total of 987 COVID-19 cases have been reported in 27 states/union territories of India. Out of these, 87 have been cured and discharged, 1 has migrated and there have been 25 deaths.

With effect from March 25, India imposed a 21-day nationwide lockdown in the exercise of the powers under the Disaster Management Act of 2005, the largest such exercise in the world, and started to trace contacts of people with the disease. India has suspended all existing visas (except diplomatic, official, UN/international organisation, employment, and project visas) until April 15, as well as suspended international & domestic flights, trains and bus services until April 14.

The 21-day lockdown has paralysed virtually all commerce in the country and has put millions of people out of work, leaving many struggling with basic requirements like food and medicines. Despite India's proactive and pre-emptive response and a 'whole government' approach to responding to the COVID-19 pandemic, this will affect Indian business, trade and the economy in the coming days. However, this pandemic may encourage the nation to revise national programmes for infection prevention and control, to establish rigorous specialist training programmes and appoint dedicated staff to supervise national implementation, to adopt the use of artificial intelligence in the healthcare system, to gear up the Prime Minister's 'Make in India' programme, and overall to invest in more robust public health care capacity.

How have your own individual research and your institution been affected?

I work as a Senior Policy and Grant Manager in the Department of Science and Technology (DST), and am responsible for international Science & Technology (S&T) cooperation. DST is a funding and S&T policy-making agency of the government of India. To find suitable S&T solutions to the challenges posed by COVID-19, DST has established a COVID-19 Task Force. Through our autonomous institutions and statutory bodies, we have done extensive mapping to identify

potential solutions that require R&D support, in three categories: 1) startups with viable products that need facilitation and manufacturing support; 2) market-ready products requiring seed support and 3) solutions already in market but requiring substantial scale-up to augment their manufacturing infrastructure and capabilities.

Calls for Proposals have been launched by the Science & Engineering Research Board, an autonomous institution of the DST, to invite proposals to ramp up national R&D efforts for new anti-virals, vaccines, and affordable diagnostics against COVID-19 and related respiratory viral infections.

Other Calls for Proposals have also been launched by the Technology Development Board, a Statutory Body of DST, to invite entrepreneurs to address the challenges of protection and home-based respiratory interventions for COVID-19 patients. Industries may provide crucial help in this capacity to provide need-based, technologically innovative solutions such as low-cost masks, cost-effective thermal scanning devices, technologies for sanitization of large areas as well as for contactless entry, rapid diagnostic kits, oxygenators, and ventilators.

On March 21, Indian scientists have been given access to collect blood, nasal and throat samples from COVID-19 patients through a memorandum issued by the government's Empowered Committee on COVID-19. This announcement has spurred several research projects related to the sequencing of local COVID-19 strains, the development of diagnostic kits, vaccines and so on.

“ This pandemic may encourage the nation to revise national programmes for infection prevention and control...and to invest in more robust public health care capacity. ”

How does your research relate to this pandemic?

As a policymaker, senior grant manager and science communicator who is responsible for international S&T cooperation, my responsibilities involve facilitating the collaboration of researchers from different countries and bringing them together on common platforms and issues. This will foster joint research on global health challenges – including pandemics – and contribute to avoiding the duplication of research work.

How can scientific research help to avoid or mitigate such crises?

Apart from the development of the right treatments and a vaccine against COVID-19, other responsibilities of the scientific community include making fast and economically viable diagnostic kits, performing epidemiological studies, collecting and evaluating behavior science data, developing of artificial intelligence software, and preparing science-based awareness programmes for the general public, to overcome myths, panic & psychological distress and pass on the right kind of information.

Researchers should also be responsible for sharing their data rapidly. Rapid sharing of data can avoid duplication of research at the global level and may help public health officials to speed up related research in other parts of the world.

Have you or your research team been involved in a response to the pandemic in any way?

Apart from my involvement with the response as Policy and Grant Manager at DST, which I have already described, I am a science communicator and published an [article](#) in *Research Matters*, with my co-author S.K. Varney, to highlight the extreme urgency for social distancing in India to combat the spread of COVID-19.

“ Rapid sharing of data can avoid duplication of research at the global level and may help speed up related research in other parts of the world.

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Gamou Fall is a Research Assistant at the Institut Pasteur de Dakar, Senegal, and a 2018 OWSD Early Career Fellow. Her research focuses on arbovirus-vector interactions, especially in the transmission of Rift Valley fever virus.

How has your country been affected so far by the coronavirus pandemic?

Senegal's Ministry of Health reported, as of 25 March, 86 confirmed cases in 5 out of 14 regions. Out of these confirmed cases, 8 have recovered and been released. As more than 1,000 contacts and travelers coming from affected countries are currently being monitored, the Ministry of Health expects an increase in the number of confirmed cases in the coming weeks.

How have your own individual research and your institution been affected?

As of now, our activities are not yet affected and are continuing as usual. However, discussions are ongoing with the Director General of my institute, the scientists and the human resources department to see how to shut down research activities that are not crucial for a while and to limit the number of persons present in the labs.

is not transmitted by vectors, however, the methods (whole genome sequencing, phylogenetic and genetic diversity analyses) I use for the characterization of viral genetic diversity and its impact on the disease could be relevant for COVID-19. These could allow scientists to identify variants that lead to more or less severe disease.

How can scientific research help to avoid or mitigate such crises?

The development of rapid diagnostic tests could help with early detection of confirmed cases and more efficient responses to stop the transmission. In addition, by developing therapeutics and vaccines, scientific research could help to mitigate the pandemic.

Have you or your research team been involved in a response to the pandemic in any way?

Our Virology department hosts a WHO reference lab for flu and other respiratory viruses, and is at the frontline for the diagnostics of the COVID-19. This respiratory virus group is doing the diagnostics for the whole country, and is also doing sequencing to better understand the circulation dynamics of the virus and existence of particular mutations that could affect virulence.

How does your research relate to this pandemic?

My own research activities are focused on arbovirus and vector interactions, particularly on the capacity of mosquitoes as disease vectors and the role of mosquito saliva proteins, as well as viral genetic diversity, on virus transmission and pathogenicity in vertebrate hosts. These activities are conducted using different

arboviruses including Rift Valley fever virus, an hemorrhagic fever virus, which is one of the priority viruses of the World Health Organisation (WHO). Coronavirus



“ The development of rapid diagnostic tests could help with early detection of confirmed cases and more efficient responses to stop the transmission. ”



AYOJESUTOMI ABIODUN-SOLANKE

NIGERIA

AyoJesutomi Abiodun-Solanke is Lecturer and Researcher at the Federal College of Fisheries and Marine Technology in Lagos, Nigeria. She has been an OWSD member since 2015.

How has your country been affected so far by the coronavirus pandemic?

Nigeria got its first taste of the COVID-19 pandemic on February 27 and nothing has been the same since. The impact has been economic, social, as well as spiritual. Economically, the fact that China is the global nexus of production for most consumer goods became incontrovertible with the shutdown of all its exports. So many goods, construction projects and other indices were immediately put on hold, with attendant inflation, artificial scarcity and immediate increases in commodity prices.

Unfortunately for Nigeria, our economy is singly driven by crude oil, which crashed in price to below \$30/barrel. A few days ago, the Minister of Finance announced that Nigeria will soon go back into a recession. The budget for the year was prepared based on a higher oil price, so the budget and spending will be affected negatively. The immediate impact of this can already be seen in that the Nigerian naira has fallen against the dollar in no small measure since the pandemic started.

This is compounded by the fact that many organizations have started employing measures such as pay cuts to reduce the impact on the progress of their organizations. The lockdown has forced many to restrict their workers to working from home, which has made it impossible for the workers' productivity to be evaluated. Many businesses being medium-scale, they also depend on daily income to survive, so now that their operations are limited their survival is also not certain. Families, being the smallest unit in any society, are also affected. All resources are now being managed so that they can last through the lockdown period. Some state governments are already distributing foodstuffs and other materials to low-income families to reduce the impact of the pandemic. Many activities are slowed down thereby slowing down income as well.

COVID-19 is also affecting the social aspects of our lives. Nigeria being a sociable society is negatively affected by measures such as social distancing and bans on social gatherings. This is already impacting us as many are already falling into depression. Many religious organizations are also now under the lockdown restrictions, with

several now opting for online services which are still alien to many in a country like Nigeria. This is affecting many spiritually, as the belief and foundation of many lives are being affected. The pandemic leaves many confused and wondering what exactly is happening and what attitudes they should adopt now.

How have your own individual research and your institution been affected?

Earlier in the year, I won a research grant from the International Foundation for Science (IFS) which was supposed to start in early April. This has had to be postponed as the reality on the ground now makes this impossible. Much of the equipment to be used, even though it has already been sourced, is yet to arrive because of the different international restrictions. Additionally, many calls for proposals have had to be postponed, which invariably means extended schedules and prolonged research activities. Many international trips, which allow researchers to build capacities and share knowledge and innovations, have had to be cancelled or postponed, leaving researchers uncertain of what to expect and hope for.

As a researcher dealing with living organisms like fish, many production ventures are being disrupted, and on-going research has also had to be suspended or ended abruptly. This is affecting revenue generation directly because many organizations like mine have some revenue generation ventures for sustainable research and teaching.

My institution is also affected by disruption of lectures and other academic activities. The school calendar is already extended as the students have been sent home to reduce the spread of the virus. I have had to improve upon online engagements so my students wouldn't miss too much. My PhD research too is being extended as university lecturers have gone on strike, and other institutions of higher learning have had to close. This means loss of revenue both to individuals working in the institutions and to the institutions themselves, since as the old saying goes, time is money.

“Countries should document what works in situations such as these so that these behaviors can continue afterwards for the benefit of all.”



How does your research relate to this pandemic?

I am currently working on evaluating the performance of different kinds of smoking kilns with various energy sources, in order to identify the most sustainable models. I am also working on the application of various traditional plant materials to seafood preservation; in other words, I am trying to see if there are readily available plant materials, herbs, and traditional preservatives that can help to improve the safety of some common foods, and to build immunity and improve health in a sustainable way.

Fortunately, we are observing some differences in the outcome of COVID-19 in Nigeria when compared to that of other countries in Africa. I believe that when immunity is strong, the virus may not be as damaging, meaning that if immunity can be boosted by good nutrition then there is a relationship between my current research and the current pandemic. I am inspired to do more in the way of improving awareness about the benefits of eating right. I am encouraged to do more as well in the area of utilizing traditional plant materials in food preservation, which I believe can help us to improve safety, well-being, health and most importantly food and nutrition security in Nigeria. I am also an advocate of doing things sustainably, and I believe that other countries should document what works in situations such as these so that these behaviors can continue afterwards for the benefit of all.

How can scientific research help to avoid or mitigate such crises?

Scientific research is the backbone of development anywhere in the world. Research is also very important in all fields of endeavour. Proper documentation of workable methodologies or processes can only be possible with research, cures against pandemics can only be derived from research, and lastly, possible mitigation and prevention measures can

only be developed on a basis of detailed and accurate research. If our studies had been up to date, this pandemic would not have ravaged the world to the degree we are experiencing now, in my opinion. If we had learned how to prevent pandemics like this from experiences of the past, then COVID-19 could have been avoided or at least limited to a local epidemic.

Going forward, if we learn from the current situation then research that has com-



menced as a result of COVID-19 should continue and be followed through on even if most countries get out of this before expected, so that occurrences like this can be prevented in the future.

Also, disease control centres and laboratories that have been built and furnished in many countries in response to this should continue to be maintained afterwards, so as to stand in attack position in case of subsequent pandemics. Additionally, I would like to see research in all fields of preventive medicine be better funded, so that viruses like this one will not shake the whole world as this has done now.

Have you or your research team been involved in a response to the pandemic in any way?

I have various teams, all of which will be influenced by the COVID-19 pandemic. Learning from this experience will guide some of our practices going forward and will also help us stay focused on our objectives.

My research team working on the application of various plant materials in the area of food preservation initially was working on a small group of materials including ginger, garlic, turmeric and orange peel, but now we have decided to expand our research to consider other citrus peels, leaves and herbs. The results of this will be shared widely to improve awareness. I also work with another team which is organizing an 'agritainment' show, which is intended to educate the general populace on the benefits of planting, growing, eating and living naturally, for improved health and food security. The basis of this initiative is sustainable organic agriculture, which will be taught in an entertaining environment to encourage youth participation and improve their take-up of the message.

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Scientific research is the backbone of development anywhere in the world.

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ADRIANA SUAREZ-GONZALEZ

COLOMBIA/CANADA

Adriana Suarez-Gonzalez is originally from Colombia, and is currently working as a Science and Technology Advisor at 10x Genomics in Vancouver, Canada. She has been an OWSD member since 2020.

How has your country been affected so far by the coronavirus pandemic?

At the economic level, the effects of the lockdown [implemented March 25] are astronomical. Colombia is a country that relies on informal work. When people can't go outside to work, they go hungry. We also have a lot of refugees from Venezuela that add to the population at risk. People in these situations live in slums and without proper housing, so protecting the spread of the virus is challenging.

The effects on mental health are also important. Colombians value community and personal contact. Social distancing is really challenging for people, in particular those that are more vulnerable and already isolated such as seniors and people with disabilities.

While other countries like Canada have reserves to inject funding into research to stop the epidemic,

Colombia does not have these type of resources. Rather, funding for science has been decreasing every year and the country does not have the infrastructure and resources to mobilize strategies for vaccine development or new treatments.

How have your own individual research and your institution been affected?

I am an alumna of the Universidad Industrial de Santander in Bucaramanga, Colombia. The university was closed on March 16 and all laboratories were shut down. One of the researchers, however, opened her chemistry lab to make disinfectant to donate to hospitals. Other local universities in the city are collaborating with industry to manufacture low-cost ventilators.

Labs that are running long-term experiments with animals or plants are being affected. Some of these people can go to the universities but the data will be compromised. Some people are using this time to plan for the future and looking for international funds to start new projects.

How does your research relate to this pandemic?

At my company 10x Genomics we have technologies for high-throughput immune profiling at single cell resolution. These tools are speeding up the time to discover new targets for vaccines and treatments. They are also helping us to understand the immune response of the hosts (using human and animal models) to viral infections. A recent paper (Liao et al. preprint) using our technology revealed changes in specific cell types called macrophages and T cells in patients with severe symptoms of COVID-19. These results provided the groundwork for understanding the drivers of inflammatory responses after infection, which will help us to design therapeutics.

How can scientific research help to avoid or mitigate such crises?

We need research so we can be better prepared next time. We need a vaccine for coronaviruses so that in the next round of infection we can protect the most vulnerable population in developing countries. This is going to happen again with other viruses, so we need more broadly neutralizing antibodies to attack them. We also need new technologies to develop and test vaccines faster.

If we can protect and immunize people, we don't need to stop the economy. This epidemic is costing trillions of dollars. A small portion of that should be spent on research so we can prepare.

Have you or your research team been involved in a response to the pandemic in any way?

I have been helping researchers at the public health agencies in Canada to develop their experiments using single cell and spatial technologies. In Colombia, I have been assisting researchers looking for reagents for testing, and sharing information about local initiatives. I have also been educating my family and friends in terms of uncovering false information and providing more information on how vaccines and treatments are developed.

“ This epidemic is costing trillions of dollars. A small portion of that should be spent on research so we can prepare. ”

WINFRED MUENI MULWA

KENYA



Winfred Mueni Mulwa is the Head of Computational Physics at Egerton University, Njoro, Kenya. She is a 2019 OWSD Early Career Fellow.

How has your country been affected so far by the coronavirus pandemic?

As of March 31, Kenya has reported 122 cases of COVID-19; three have completely recovered. Learning institutions (including universities) are closed down to prevent any further spread. There is no movement of people from the capital city Nairobi to smaller towns or to the villages, as the majority of COVID-19 cases are in Nairobi. Everybody is encouraged to use face masks, which are being sold at subsidized prices. Fumigation has been done in all marketplaces where we buy groceries. Public transport vehicles are allowed to carry passengers at half capacity to maintain the one-meter distance. In Kenya there is closure of all international flights into and out of the country. All these measures have been taken to stop the spread of the virus. Because of all these precautions, I do not expect the spread of the virus to be very high.

The economy of the country has been deeply affected; many businesses are either closed or doing very poorly. The undergraduate students in all the universities may

not graduate within the expected time. However, research in universities and other research institutions has not yet been very much affected. So far, there is no total lockdown in the country.

How have your own individual research and your institution been affected?

My institution was closed down on March 20. All of the undergraduate students left the university. The international students are still there because they could not go back to their respective countries. The international students have been advised to observe all the precautionary measures to prevent any infection or spread of

COVID-19. My research has not been affected, but my students were arrested by the police on March 27 for being in the lab. We sorted it out with the head of the faculty of science, and my students have now been allowed to work from the lab, provided they take measures to prevent any infection or spread of the virus. They sit at a distance of one meter apart when in the lab and we use sanitizers in the lab. The students cannot effectively work from home because of the challenges of availability of computers and internet connection. Given that my research is purely computational and there are no experiments to be carried out, I do not expect my research group to be affected by COVID-19.



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The students cannot effectively work from home because of the challenges of availability of computers and internet connection.

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How does your research relate to this pandemic?

My research involves a lot of field work, outreach, communication and networking. Currently, I am developing a type of refrigerator that uses the magnetocaloric effect technology, which I will be introducing in the marginalized areas of the north-eastern part of Kenya. As I introduce my new product, I will allow the community to ask me questions. From my previous experience with this community, they love women who have gone to school, and I know they will ask me about COVID-19 and pandemics in general. Before I respond to their questions, I will make sure they are one meter apart so that they can understand the meaning of social distancing to prevent the spread of diseases. I will explain to them how this disease is transmitted from one person to the other, and will also explain the symptoms of COVID-19, as well as the preventive measures to be taken. By doing so, I will have achieved both my objective of training the community on magnetic refrigeration technology as well as creating awareness of COVID-19.

How can scientific research help to avoid or mitigate such crises?

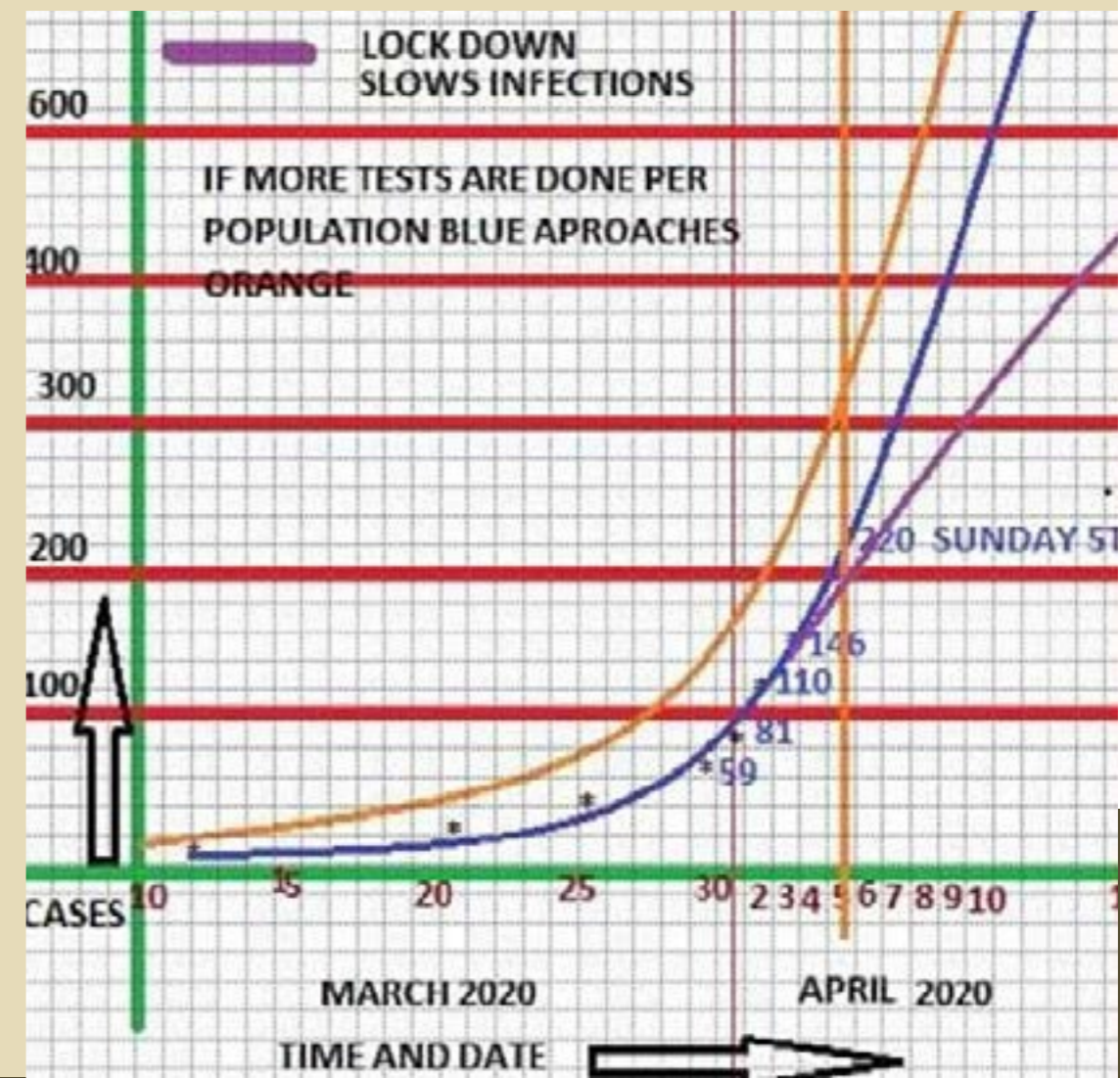
Scientific research is crucial when it comes to potential pandemics in general. Scientists should respond very quickly in the event of such pandemics. They should work on a mechanism to control the multiplication of viruses in the human body

whenever a person is infected. To achieve this, scientific research should characterize clearly the properties of viruses at different temperatures, in different humans of different age groups, and at different concentration levels of virus. Scientists should start developing vaccines immediately after the onset of a pandemic. In the developing countries, this may be challenging due to the shortage of facilities, but we are managing. Scientists should carry out intensive research to come up with relevant drugs once a pandemic arises.

“ I will have achieved both my objective of training the community on magnetic refrigeration technology as well as creating awareness of COVID-19. ”

Have you or your research team been involved in a response to the pandemic in any way?

My research group and I are very much involved in the response to the pandemic. We are developing an *ab initio* molecular dynamics input file for the coronavirus. This will help us to computationally investigate the properties of this virus. After we have identified the properties, we will provide this information to the drug manufacturing companies and/or to relevant research institutes. This will contribute to the development of vaccines and drugs against COVID-19. To facilitate this, the Centre for High Performance Computing (CHPC) in South Africa has promised to provide the required computing resources. As I am a principal investigator with CHPC, my students and research assistants can also access the CHPC facilities online. Using the computational data analysis software known as XMGRACE, my research group is constantly analysing the reported data on COVID-19. We create graphs using this software, print the graphs on paper and present this information on notice boards throughout the university to create awareness of the current situation regarding COVID-19.



FOR MORE INFORMATION ON OWSD AND OWSD PROGRAMMES:

[OWSD website](#)

Article, "[Women, science and development: The leading role of OWSD](#)", in *Economia Politica*

FOR CURRENT INFORMATION ON NUMBERS OF COVID-19 CASES WORLDWIDE, BY COUNTRY:

[Google world map and statistics of COVID-19 cases](#)

[Worldometer Confirmed Cases and Deaths by Country, Territory, or Conveyance](#)

[Global Cases by the Center for Systems Science and Engineering \(CSSE\) at Johns Hopkins University \(JHU\)](#)

FOR CURRENT INFORMATION ON LOCKDOWNS IMPLEMENTED, BY COUNTRY:

[Aura Vision Global COVID-19 Lockdown Tracker](#)

FOR RESOURCES MENTIONED IN THIS DOCUMENT:

Shreyashi Aryal: Video: [Corona Virus during Pregnancy || Stay Better in Quarantine || COVID-19](#)
Article: "[Pregnancy in the times of corona](#)" on *myRepública*

Therese Umuhoza: [ProMED-mail system](#) for global reporting of infectious diseases outbreaks

Fathiah Zakham: Article: "[Serological and molecular findings during SARS-CoV-2 infection: the first case study in Finland. January to February 2020](#)", in *Eurosurveillance*.

Jyoti Sharma: Article, "[The urgency for social distancing in India: Lessons to learn from Past and Present](#)", in *Research Matters*.

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OWSD
ICTP Campus, c/o TWAS
Strada Costiera II
34151 Trieste, Italy

 @OWSDSecretariat

owsd@owd.net
www.owd.net