WSD
South Africa National Chapter

Women's Day 2021

• ORGANISATION FOR WOMEN IN SCIENCE FOR THE DEVELOPING WORLD •
• SOUTH AFRICA NATIONAL CHAPTER •

Women scientists at the forefront of OWSD – SA Chapter

Women scientists across the globe have been at the forefront of the fight against COVID-19, playing pivotal roles, from advancing knowledge on the virus, to developing vaccines, treating patients, and assessing the pandemic's devastating economic and social impact. However, the health crisis has laid bare disparities in the scientific system. Girls are significantly underrepresented in Science Technology Engineering and Mathematics (STEM) subjects at school, and women occupy fewer senior positions than men at universities. The pandemic has widened the existing gender gaps, and increased care responsibilities for women. As we mark Women's Month in South Africa this August, Dr Stanley Maphosa, the National and International Liaison Manager at the Academy of Science of South Africa (ASSAf) and the Coordinator of The World Academy of Science Sub-Saharan Africa Regional Partner (TWAS SAREP) interviewed Miss Dorothy Ngila and Dr Caroline Pule, the Chair and Vice Chair, respectively, of the Organisation for Women in Science for the Developing World (OWSD) South Africa Chapter.

Dorothy Ngila advances her career at South Africa's National Research Foundation (NRF) as a project specialist in the Strategy, Planning and Partnerships business unit. Her core responsibility is to coordinate the NRF's contribution to the multi-stakeholder and multi-agency capacity strengthening programme, the Science Granting Councils Initiative (SGCI) in sub-Saharan Africa, which serves 15 public science granting councils in East, West and Southern Africa, and to support the NRF's strategic engagements in the rest of the continent. To advance conversations and actions promoting the equality and status of women in research, she is chair of the Organization for Women in Science for the Developing World (OWSD) South African National Chapter; serves on the Global Research Council (GRC) Gender Working Group representing the NRF and Sub-Saharan Africa region; serves on the Gendered Innovations Global Advisory Board to evaluate funding agencies for their policies on sex, gender, and intersectional/diversity analysis across 7 continents; and on the African Academy of Sciences (AAS) Gender and Science Steering Committee. Prior to joining the NRF, she served in various capacities within the international partnerships programme of the Academy of Science of South Africa (ASSAf). Ms Ngila possesses a Masters degree in Geography and Environmental Management from the University of KwaZulu-Natal (UKZN), South Africa and a Bachelor of Arts (Public Administration and Environmental Sciences) from the University of Botswana.

Dr Caroline Pule is a Biomedical Scientist who is passionate about global health, medical research, philanthropy and ensuring we have a disease-free nation. She is affiliated with the Division of Global Surgery, Department of Surgery at the University of Cape Town where she is an independent researcher, MSc Students Supervisor, acts as manager for Global Surgery Research Cluster and MSc/PhD Fellowship convener in collaboration with Harvard University Medical School. Dr Pule attained her PhD and MMedSc Degrees in Medical Sciences (Molecular Biology), Drug-resistant Tuberculosis (TB) research field from the Faculty of Medicine and Health Sciences, at the University of Stellenbosch. This is after attaining her BTech.Hons degree in Medical Biotechnology from the Faculty of Biomedical Sciences, at Cape Peninsula University of Technology. She is a UCT-Harvard PGSSC research fellow, UNICEF fellow and her primary research focuses on TB Surgery, drug-resistance, and drug-discovery. This includes maternal infections (TB, COVID-19 and HIV) and Stillirths data reporting strengthening. She helps as a volunteer scientist for the CrowdFight Covid-19 initiative and is a Goodwill Ambassador for the Tygerberg Hospital Children's Trust. Additionally, she is a Vice-Chair of the Organisation of Women in Science in the Developing World, SA National Chapter (OWSD SANC) and a founder/CEO of "Caroline Pule Science and Literacy Foundation" (CPSLF).

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Why did you want to become a scientist?

Dorothy: The natural sciences were not my first choice largely because of the way they were taught until high school level. I only passed biology and chemistry modestly (to allow university entry) and in fact failed mathematics at my O-levels. It was only at university and after deliberate interventions that I was able to understand statistics and then started to fall in love with geography, environmental sciences, and public administration.

Caroline: I knew from a young age that I wanted to live a purposeful life, give back to the community, and help others. My career in medical sciences was born from a desire to help people and a passion to save lives. Ever since High school (in grade 10), my dream was always to become a Medical Scientist, to find cures for diseases and help save lives. But I was not exactly sure what I wanted to do within that field – I was mostly interested in HIV and TB. When I was doing my undergraduate degree in Medical Biotechnology, I was saddened by how many lives were lost because of TB, something that used to be so easily treated. Seeing people dying really got to me and I wanted to do something about it. I wanted to make a difference in global health. I thought I could contribute to this by understanding what causes drug-resistant TB and figuring out how to cure it. This was and is still my biggest inspiration. Additionally, my love to travel the world sharing my TB research work and learning more about the ground-breaking research work being done by other scientists across the globe, motivated me to study towards my PhD degree. This has made the young independent medical scientist that I am now.

Why should more women and girls engage with science?

Dorothy: Because the scientific endeavour benefits from attracting all available talent.

Caroline: Because there is huge gap of independent women scientists globally, which can only be overcome by introducing more girls who are passionate about science to pursue careers in STEM. We need more scientists to conduct research, because of its importance to humanity in understanding the circle of life, the connection between human beings and the ecosystem as well as new technological inventions which have led to many important discoveries. For example, through science, the structure of the DNA, which makes part of our genetic material as humans was discovered by Watson and Crick in 1952. That discovery led to the understanding of human anatomy and physiology from genetic code, DNA replication- RNA translation-protein synthesis and to cell function. Moreover, through science, the Mycobacterium tuberculosis the causative agent of tuberculosis (TB) was discovered in 1882 by Robert Koch., Today, COVID-19 is being explored using current modern technology and which has allowed the faster development of vaccines and so on and so forth This does shows that science has and continues to play a huge role in humanity.

Did you encounter any obstacles in your studies and career compared to your male peers? If so, what were they?

Dorothy: I would say the main aspect was the way that physics, biology, mathematics, and chemistry were taught prejudiced against girls at school and the teachers seemed to only pick the boys or the A-grade girls as problem solvers. That disadvantaged those of us that needed specific attention and needed to learn by discovery and exploration as opposed to rote learning. At university, consistent mentoring supported my success, and this has continued to be a strong aspect for my career.

Caroline: Firstly, I had to prove that as a young black woman, I have what it takes to become a renowned independent scientist and a leader in my chosen career field. As it is, I must work twice as hard to be considered for many opportunities. However, I used these challenges as a motivation to press forward, work harder and excel. Secondly, besides conducting my own research, I also manage the Global Surgery Research cluster and so the challenge is to be the best young woman scientist and leader in a male-dominated work environment of doctors, registrars, surgeons, and professors. Thank God, I work with a great supportive team therefore, I am managing this challenge very well. Thirdly, in the laboratory, the challenge is that I am a perfectionist. It is therefore not surprising that my biggest challenge is patience and accepting that not all experiments are successful at the first try, or even the second or third attempt. Nevertheless, because I love my work as a medical scientist, I have learned to accept that this is the nature of science.

What remains to be done?

Dorothy: We have a long way to go. There are still girls and women that have been greatly disadvantaged by the pandemic, especially when coming to access to educational opportunities or lags in their career productivity. Policymakers do not always take into consideration the needs of women and girls in designing interventions. Also, more men need to play an activist and advocacy role in the various positions they hold so that change for women can be realised.

Caroline: It is worth mentioning that in the current era things are changing even though there is still more work to be done. As I grow and mature in my field of medical science research and global health, I recognise that there is a huge gap that exists in the recognition and representation of women in STEM. To be specific, representation of women scientists, engineers, technologists, and mathematicians in leadership positions, as grant recipients, in research publications, in postgraduate students' supervision, in politics, in research and innovation IPs ownerships, in science communication and many others is still lagging. However, there is hope now with organisations such as Inspiring Fifty, L'Oréal UNESCO, South African Women in Science Awards (SAWiSA), Department of Science and Innovation (DSI), the Organisation for Women in Science for the Development World (OWSD) and The South African Research Chairs Initiative (SARChI) and GenderINSITE. There seems to be more transformation and improvement. The hard work, passion, and dedication of women in STEM is being recognised and they are slowly being given leadership opportunities. Female role models are emerging for our girls and young women as well. There is light at the end of the proverbial tunnel after all. Change is happening, and I am happy to see it unfold in front of my eyes. Hence, I will continue to be an advocate for women in STEM for life!

Dorothy, can you describe your work and its impact on women in science

Dorothy: My work has largely focused on bringing to the attention of decision-makers the various ways changes can be made to promote the equality and status of women in research. In May 2021, a report that I led for the Global Research Council Gender Working Group was published with a focus on sharing the trends, practices, and experiences of funding agencies across the world in collecting and reporting gender disaggregated data. I believe that my work must include both strong elements of activism and providing evidence-backed solutions to decision-makers.

Caroline. What do your studies/current research focus on and what were/are your main findings?

Caroline: My current TB research focuses on TB Surgery, drug-resistance, and drug-discovery. Coming from a TB Biology background, I explore surgery as a treatment adjunct modality for drug-resistant TB, in settings with a very high TB prevalence. I also do clinical research that adds value towards TB drug-discovery. My research findings may lead to the improvement of TB treatment through surgery and development of new anti-TB drugs to combat the spread of drug-resistant TB. My PhD research project focused on deciphering the physiology of drug-resistant and tolerant Mycobacterium tuberculosis, and how these bacteria modulate the host response in the context of the macrophage infection model. I explored this research question using transcriptomic analysis, fluorescence dilution and macrophage-model experiments, integrating the resulting data using bioinformatics. My research findings led to the identification of novel biological pathways and the development of novel drug targets to combat the spread of drug-resistant TB.

What advice would you give to young women who aspire to having a career in science?

Dorothy: Find a good mentor and make sure that it is a two-way relationship.

Caroline: Firstly, and very importantly, self-esteem and believing you have got what it takes to reach your goals and that everything is possible through hard work, determination, and by the grace of God is critical. Without self-motivation, it is hard to start a career in any field, as it always come with its challenges. Secondly, when considering a career in STEM, it all starts in high school. You need to have science subjects as majors and volunteer in science and technology clubs for example. This will help you discover where your qualities, career goals and passion lie in STEM. Thirdly, you need to work hard, consistently, and smart and run-the-extra mile to get good marks, especially with your grade 12 results. This will help with acceptance at tertiary level and obtaining bursaries. Lastly, life is about choices. It does not matter what family you come from, whether rich or poor; that does not limit you as a young woman to pursue your career dream, to be that doctor, engineer, scientist, or mathematician you want to be. All you need to do is be focused, vigilant, willing to excel in all you do and use every opportunity that comes your way to succeed.

Building a better future for and with women in science.