NELSON MANDELA UNIVERSITY

Fourth Quarter

Faculty of Science

News

100 Years of physics in Africa

By Prof Azwinndini Muronga

Next year we will celebrate 100 years of the birth of the International Union of Pure and Applied Physics and Nelson Mandela University will host the joint African Conference on Physics and the South Africa Institute of Physics Conference (4 – 8 July 2022) and the African School of Physics (in the first two weeks of December 2022). The theme of these events will be 100 years of physics in Africa – looking at the past, the present and the future, with celebrations around the world.

Nelson Mandela University will join the South Africa Institute of Physics and other institutions in South Africa and the Southern Africa Development Community region in putting the spotlight on the link between the basic sciences and the sustainable development goals in meeting crucial challenges such as universal access to food, health coverage and communication technologies.

"Science is Hope"

To emphasize the indispensability of the basic sciences, Unesco has adopted a resolution to proclaim 2022 as the International Year of Basic Sciences for Sustainable Development. We have to start looking at the future and contributing positively to the protection of our complex physical systems for the benefit of all life, including humankind.

It gives us permission to hope for a better world, and what we can achieve. There are no laws of science that demand poverty, inequality, and destruction. These are human-made phenomena and humans can end them. Grand challenges of climate change and pandemics will require the sciences, humanities, governments and civil society to work together.

"There are no laws of science that demand poverty, inequality, and destruction. These are human-made phenomena and humans can end them. Grand challenges of climate change and pandemics will require the sciences, humanities, governments and civil society to work together." - Prof Azwinndini Muronga , Executive Dean of Science

The United Nations General Assembly proclaimed 2022 as the International Year of Basic Science s for Sustainable Development.

The United Nations General Assembly has proclaimed the year 2022 as the International Year of Basic Sciences for Sustainable Development (IYBSSD2022). The year 2022 will be a critical period of mobilization to persuade economic and political leaders, as well as the general people, of the seriousness of these goals and will highlight the linkages between basic sciences and sustainable development goals. Covid 19 remains one of the scourges that need to be eradicated. It has been going on for almost two years. The emergence of covid 19 has highlighted the important role of basic sciences in our lives and the pandemic serves as a harsh reminder of our reliance on basic science to maintain the planet's balanced, sustainable, and inclusive growth. Everything that helps in the battle against the pandemic and its repercussions – all have their roots in basic sciences. The United Nations General Assembly has conveyed a message to the world that to meet Agenda 2030's 17 Sustainable Development Goals, additional basic sciences are required. The United Nations General Assembly based its decision on the high significance of basic sciences for humanity, as well as the fact that improved global awareness, and expanded education in the basic sciences is critical to achieving sustainable development and improving the quality of life for people all over the globe. Therefore, Basic sciences and new technologies react to the demands of humanity by giving access to knowledge and improving the health and well-being of people, communities, and societies.

IYBSSD2022
International Year
of Basic Sciences
for Sustainable Development

Bolstering Learners through science communication program—Sparking a sense of curiosity

Dr. Pulleng Moleko-Boyce tells learners about the importance of explaining complex science in the simplest terms

The Science Communication Programme for learners which is spearheaded by Dr. Pulleng Moleko-Boyce was hosted by the Faculty of Science to introduce learners from grade 8 to grade 10 coming from the disadvantaged background into science. In this program science, communication was used as a tool to teach, also break down the complexity of science, and communicate science in simple terms. .The aim was to introduce learners to scientific concepts surrounding them in their daily lives, to help learners to understand the science relevant to them so they can be able to make informed decisions. By doing so, we were able to influence and enrich the learners by sparking a sense of curiosity, encouraging learners to ask a question and find answers, Inspiring a sense of wonder.

The above-mentioned tools were achieved successfully as the following fundamental concepts were exercised throughout the programme, such creating awareness, enjoyment, interest, opinions and understanding. Learners were tasked to conduct scientific experiments using home kitchen ingredients as these represented reagents in science

Siphumelele Majodina - A Ph.D. candidate giving a talk to learners about her humble beginnings and her journey in science

Siphumelele Majodina who is currently doing her Ph.D. in Chemistry took some time to speak to learners about her journey in science to inspire the youngsters to feel confident in pursuing science. Siphumelele was born and bred, in a small town called Sterkspruit in the Eastern Cape. She did her lower and higher grades in her hometown and She studied her undergrad at Stellenbosch University (BSc in Chemistry and Polymer Science) and finished in 2016. In 2018 she furthered her studies at Nelson Mandela University (Honours Chemistry). She recently completed a master's degree in Chemistry (MSc) with a Cum Laude at Nelson Mandela University. Her research interest is in inorganic chemistry, her master's work was based on engineering nanocatalysts using mixed metals for hydrodesulfurization (HDS) of fuel oil

Learners got to explore the following scientific concepts of Density, solubility, and extraction: using oil, water, and food colourant, Surface tension, Soap and Virus: using water, soap, and pepper, Colours formation in science through coordination chemistry.

Learners were able to learn science through exploring and having fun. The event was a success as learners were requested to present for 60 seconds what they have learned throughout the event in a form of a story, presenting in a language they were comfortable in. The program mainly tackled several critical issues, ranging societal challenges learners are the face, building self-confidence, identifying their interests, and being able to communicate the science that surrounds them in simple terms. Learners were able to communicate in different and unique ways, that are relevant to them, also being able to express their understanding of science in their language.

Learners were able to present and communicate what they have learned in front of adjudicators in three minutes. . The aim was to enhance the learner's presentation and communication skills. It was also to encourage learners to be confident when conveying their scientific findings.

Winners of the science communication for learners

Picture: Some of the learners who won in the science communication

Mandela Uni published author honoured among the national Top 10 Outstanding Young Persons of South Africa

Awonke Nqayiya, a second-year Mathematics Statistics Master's candidate in the Faculty of Science has been honoured among the 2021 Top 10 Outstanding Young Persons of South Africa by Junior Chamber International South Africa in the event that took place recently at Sandton in Johannesburg.

Awonke said statistics are found to be a helpful practical tool that often provides insights into different fields. He, therefore, seeks to develop and apply his level of information in education to students through statistics and to contribute to the academic experience. Earlier this year, Awonke won the Raising Legend Award in recognition of his noteworthy contribution to bringing change in the community while setting a good example for the boy child. He received a first-place award in the innovation category.

Awonke Nqayiya

Mandela Uni computer science student's app

Computing Sciences honours student, Marco Venter, has developed a smart phone security app that is already creating waves in Germany and the United States.

Uniface, as his app is called, uses face and voice "passive liveness recognition" technology. While reading up about trends in artificial intelligence, Marco got the idea for his app and explained that passive liveness detection for both face and voice was developed and used globally for the first time at the beginning of this year but has only been used in the e-commerce sector. It has never been used to open a locked door. And this is what his app does. After much research, he discovered that a company called IDR&D in New York are the only company in the world to properly implement passive liveness detection for both face and voice. As they were interested in what he was doing, they allowed him to use their technology.

So, he bought a model door with an electronic lock and used a selfie, his voice, and his cell phone to create a virtual key. Read the full story at: https://lnkd.in/d_yfrtqx

Mandela Uni Students scooped prizes at the Groundwater Conference

The students from the Department of Geosciences at the Faculty of Science have flown the flag of excellence high at the Groundwater Division of the Geological Society of South Africa Biennial Conference that was held in Johannesburg recently.

The students were invited at the conference to rub shoulders with experts from around the country who are in the groundwater field. The conference brought the groundwater community together to discuss monumental issues,
exchange knowledge, new research, and innovation.

"It has been the best 3 days ever, met with new people, made friends, and got encouraged by the professionals and groundwater experts. I'm grateful for such exposure and all thanks to my supervisor Dr. Gaathier Mahed and thanks to my team as well"

Sisipho Dlayiya, BSc Honours Candidate in Geology who attended the conference said she is very happy about the prizes that she has received and to see that her work has finally paid off. She won the second position prize for Best Poster presentation and Second Prize for Gamification. Other prize winners, includes Natasha Gariremo who won first prize for the poster presentation, and Aarifah Williams who received 3rd prize for gamification.

"First time attending a Groundwater Conference and I came back with 2 awards (2nd place in Gamification and for Best Poster presenter). It has been the best 3 days ever, met with new people, made friends, and got encouraged by the professionals and groundwater experts. I'm grateful for such exposure and all thanks to my supervisor Dr. Gaathier Mahed and thanks to my team as well" she said

Sisipho Dlakiya graduated with a BSc in Environmental Science in which she majored in Geography and Geology. She said from a young age, she has always been interested in Geography and fascinated to study places and the relationship between people and the environment. She aspires to be a groundwater expert and eventually focus her skills on the Oil and gas industry some day

Young physicist scooped the highest accolade for his outstanding master's degree

Ketshabile Nfanyana has raised the bars high in the field of physics for his ground-breaking research in developing novel optical fibre technologies for future 5G and SKA telescope networks.

Ketshabile won the prestigious Southern Africa Association for the Advancement of Science (S2A3) Medal for the most exceptional Master's degree student in a scientific discipline at Nelson Mandela University. The award is extremely competitive across many disciplines namely Natural Sciences, Chemical Sciences, Physical Sciences, Biological Sciences, Agricultural Sciences, Engineering Sciences, Earth Sciences, Environmental Sciences, Mathematical Sciences, and Informational Technology. The Southern Africa Association for the Advancement of Science (S2A3) Medal is awarded annually by each South African University and University of Technology to the most outstanding master's degree student in a scientific discipline. Only one award may be given each year and the medal may only be awarded once to any one person. The award is given in recognition of the perseverance and dedication of the successful master's student in the application of scientific principles in original research and the presentation of a written dissertation required at the master's level. Ketshabile graduated with a degree in master's in physics by research at the Centre for Broadband Communication (CBC) at Nelson Mandela University during the December 2020 graduations. His supervisors were Prof Tim Gibbon and Dr. Shukree Wassin.

Ketshaile Nfanyana

Ketshabile said it's an honor for him to obtain this highest accolade and he feels ecstatic about it.

"The award is not only a reflection of myself but a showcase of what we have achieved over the years at Centre for Broadband Communication"- He said

One of his supervisors Prof Tim Gibbon commended Ketshabile's wonderful achievement as a testimony to his hard work. One of his supervisors Prof Tim Gibbon commended Ketshabile's wonderful achievement as a testimony to his hard work.

“This is a fantastic achievement by Ketshabile. He did excellent research in developing novel optical fibre technologies for future 5G and SKA telescope networks. His work was internationally published, including an Optical Society of America (OSA) journal article. Our thanks go out to his co-Supervisor, Dr. Shukree Wassin, as well as all Ketshabile's colleagues and friends at the Centre for Broadband Communication who celebrate his success." Prof Gibbon said . HOD in the Department of Physics, Prof Andre’ Venter said this is a very pleasing achievement and commended the unwavering support and dedication of the supervisor’s

“Congratulations on providing a space where your students can express themselves and flourish. Well, done!" Prof Venter said. Ketshabile aspires to have a public-based corporation/company which creates ground-breaking technological products and solutions which are not only African-oriented but globally accessible at affordable prices.

When he was asked what advice, would he give to other students to be successful, he said

“Keep on striving to achieve your personal goals as well as your organizational teams i.e., departmental, research institution/lab, etc., goals regardless of circumstances you might face along the way. Never give in and never give up! Success requires sacrifice.”

WORLD SCIENCE DAY FOR PEACE AND DEVELOPMENT

The Faculty of Science celebrated World Science Day for Peace & Development - highlighting the significant role of science in society and the need to engage the wider public in debates on emerging scientific issues. It also underlines the importance and relevance of science in our daily lives. By linking science more closely with society, World Science Day for Peace and Development aims to ensure that citizens are kept informed of developments in science. It also underscores the role scientists play in broadening our understanding of the remarkable, fragile planet we call home and in making our societies more sustainable

A Look Back at Science Communication Competition

At the beginning of 2021, The Faculty of Science hosted a Science Communication competition spearheaded by Dr. Pulleng Moleko-Boyce. Irrespective of the challenges presented by the Covid 19, the science communication event was a success.

Dr. Pulleng Moleko-Boyce introduced the science communication (SciCom) programme intending to educate science students including learners to be able to communicate science in simple terms. SciCom is a way to introduce the public to a scientific evidence-based way of thinking to help society understand the science relevant to them so they can make their own decisions. SciCom act as a link between science and the public. The programme is designed to equip participants with tools on how to communicate the complexity of science to the public. Science communication programme, range from 60 seconds competition, introduction to science communication workshops, scientific experiments for learners, and motivation. The end goal is to stem down the stigma of seeing science as difficult but to appreciate science as art or entertainment. SciCom aims to build self-confidence in students and learners by tapping into societal challenges that hinder potential

Dr Pulleng Moleko-Boyce

Winners for Science Communication

1st Position

A 3rd-year electrical engineering student from Lusikisiki in Eastern Cape. Presented a scientific concept on "*security and alarm system research: Change in resistance alarm sensor*". He shared the competition gave him more confidence in his project which has encouraged him to do more research and possibly bring it to life

"*I am very happy, I won the competition, I have learned how to sell my product in a short space of time, the importance of capturing the audience's attention when presenting. It's exciting to see How to innovate the youth in South Africa as I watched my competitors present their products".*

A 4th-year Geoscience student from Lusikisiki in Eastern Cape. Presented a scientific concept on the **"**Environmental Management *Assessment and Impact: Land Use/Land Cover changes*". He shared science is a fascinating field with endless opportunities such as studying and solving existential and emerging issues in society, that requires scientific thinking. His research offers an opportunity to identify problems and addresses issues by offering solutions.
"The competition presented to be an eye-opening experience and that we can always go various ways, unconventional
exciting ways to communicate science to the public".

3rd Position

Sparking a sense of

A 3rd-year student from Kimberly Northern Cape in Galeshwe. Presented a scientific concept on the "*Create a new era of clothing that is produced to reduce the amount of carbon footprint.* He shared it was exhilarating winning the competition, it re-ignited my love for science and made me realize my never-fading love for study.

"I learned how to radiate my personality during a presentation and am now confident more than ever"

2nd Position

A 4th-year student from Samaria location AKA Nyokano located in a small town Qumbu. Presented a scientific concept on the *"Land Suitability Analysis (LSA) for the cultivation of Portulacaria afra (Igqwanitsha) in areas surrounding Nelson Mandela Bay Metropolitan Municipality"* She shared it was an exciting and a learning experience. It is not only winning that warms my heart but being able to communicate science while learning a few tricks along the way.

"Science is everywhere, and it should be as simple & interesting as the stories we were told by our grandparents before bedtime"

3rd Position

4t

By Lindelwe Myeza

The whole concept of renewable energy is structured around keeping global temperatures below 2°C. The driving factor in the research and development of renewable energy is to mitigate the effects of pumping unnatural levels of greenhouse gases into the atmosphere for 250+ years and prevent a runaway greenhouse effect which would see Earth's atmosphere become toxic to life as we know it. According to Data compiled by Our World in Data, the energy sector is responsible for about 73.2% of greenhouse gas emissions, so it makes sense that renewable energy be the main driver of change in the efforts to curb the effects of climate change. Current research in renewables prioritizes the efficiency and cost of energy generation technologies, particularly solar cell technology, as the most abundant source of energy currently at our disposal is the Sun. When scientists talk about efficiency in this case, they are referring to the ratio of total useful energy outputted by the system to the total energy that comes into the system, and the conventional silicon solar cells we use today are only about 26.7% efficient (compared to 33% for burning coal). The Photovoltaics Research group at Nelson Mandela University, led by Professor Ernest van Dyk and Dr Freddie Vorster, focuses particularly on problems pertaining to the efficiency of solar cells and overall photovoltaic power plants. Research of this nature is crucial in the efforts of greatly reducing the cost of solar panels, while also increasing the reliability of these systems as they become more commercialized. As dark as things might seem, the future of renewables is still bright. Efforts to accelerate innovation and discovery in the field of renewables are underway across the globe, from applying machine learning for faster material discovery and synthesis, to integrating artificial intelligence and robotics in various tasks .

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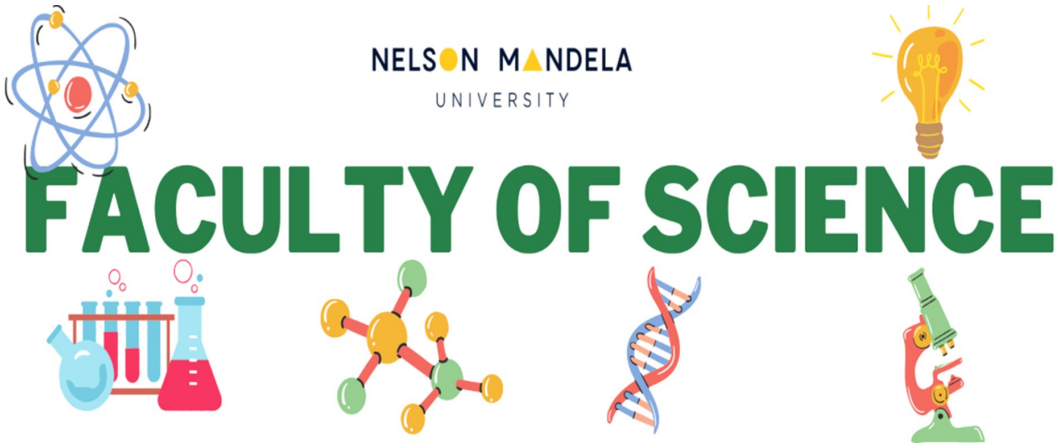

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Sanele.Thwala@mandela.ac.za
Azile.Tabalaza@mandela.ac.za

For General inquiries email : Science.marketing@mandela.ac.za