NELSON MANDELA UNIVERSITY

October 2023

Faculty of Science

News

Transforming Lives Through Evidence-Based Science

National Science Week 2023:

The Road to Mthatha 2023

This year's National Science Week 2023 promised to be an extraordinary celebration of science, set under the theme "Transforming lives through evidence-based science," with a sub-theme: "The role of scientific communication in a post-truth era."

Connecting Science and Society

National Science Week (NSW) is an annual event that aims to promote awareness and appreciation of science. This initiative, led by the Department of Science and Innovation (DSI), brings together various stakeholders and role players who engage in science-based activities during the week. It's a celebration of the vital role of science and technology in our daily lives.

Since its establishment in 2000, NSW has grown to encompass the entire nation. Coordinated by NRF/SAASTA, the week-long celebration takes place in all nine provinces, reaching communities far and wide.

NSW 2023 Theme

For NSW 2023, Nelson Mandela University's Faculty of Science has chosen a theme that resonates deeply with the world's challenges today: "Transforming lives through evidence-based science." This theme reflects our commitment to harnessing the power of science and technology to drive positive change and address critical global issues.

Ignite the passion for science and encourage future generations to pursue STEM-related careers.

The journey to NSW 2023 commenced on 18 July 2023, with a thought-provoking symposium titled "The role of scientific communication in a post-truth era." This symposium brought together a diverse panel of science lecturers, researchers, external guests, and students to explore the vital role of scientific communication in an age where facts and truth are often blurred.

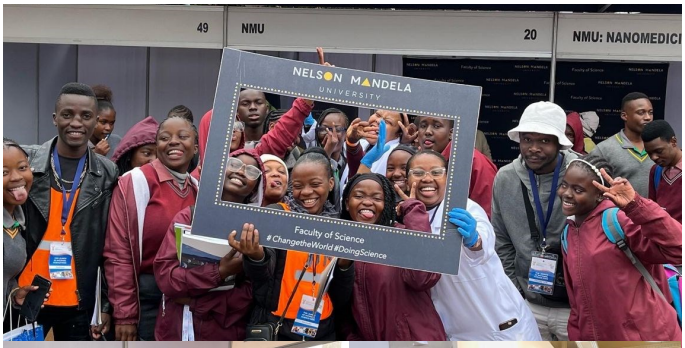
The symposium also served as a pre-launch of NSW 2023, which took place on 22 July 2023, in Thohoyandou, Limpopo at University of Venda, Department of Science and Innovation Minister Dr. Blade Nzimande officially inaugurated the week's activities virtually.

Engaging Learners of All Ages

NSW 2023 wasn't just about academics and experts. The program actively engaged learners of all ages, from primary to high school students from Gqeberha and surrounding areas. Activities ranged from tours of advanced scientific facilities to chemistry related workshops, maths presentations, human physiology demonstrations, zoology tours, computer coding workshops, and chemistry demonstrations.

These initiatives aimed to ignite the passion for science and encourage future generations to pursue STEM-related careers.

News Highlights



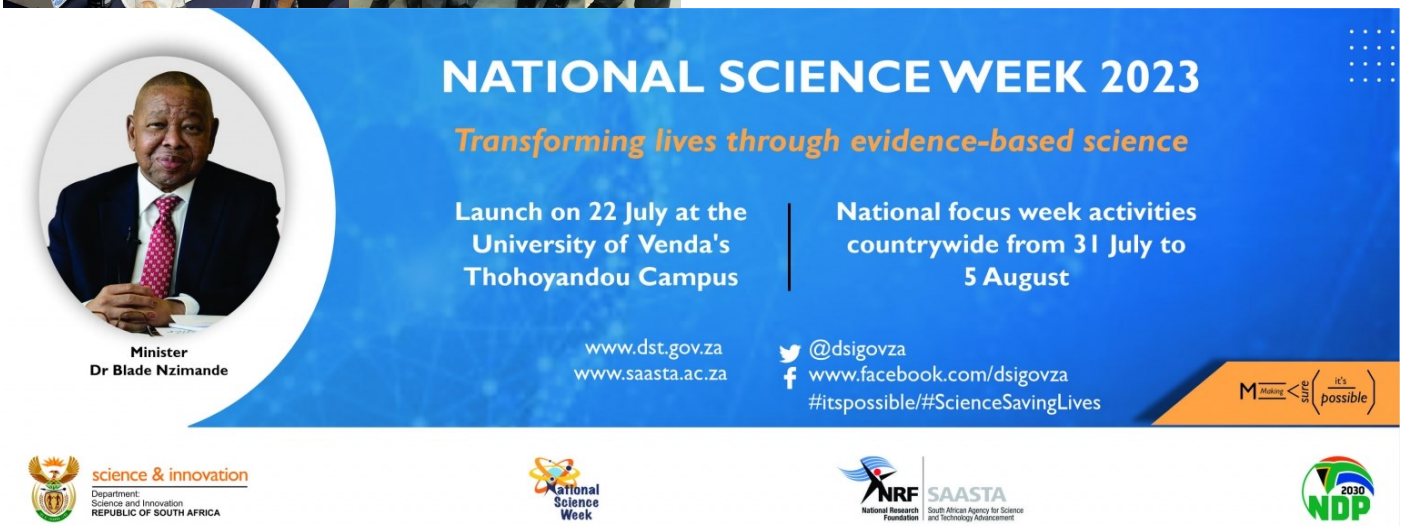
A Platform for Knowledge Sharing

Distinguished guests, including experts contributed their insights during public lectures. The Dean of Science, Prof Muronga, also hosted a public lecture titled "The Century of the Quantum: A Transformative Era in Science and Technology." aligning with the NSW 2023 theme. Nelson Mandela University staff, and students, together with members of the public participated in several workshops and symposiums, including: Theoretical and Computational Sciences Forum (symposium); Science Communication in Post-Truth Era (symposium), and Euclid and Diophantus and their role in algebra and geometry (Public Lecture).

A Resounding Success

The Faculty of Science's NSW 2023 program reached an impressive total of 1872 participants in Gqeberha and Mthatha, making it a resounding success. As we reflect on this year's achievements, we look forward to reaching even greater heights in 2024, continuing to inspire, educate, and transform lives through evidence-based science.

National Science Week 2023 has not only celebrated science but has also reinforced the critical importance of scientific communication in our ever-evolving world. It has highlighted the role of science in addressing societal challenges and fostering a society that is informed, critically engaged, and scientifically literate.



Igniting Young Minds at AIDC's Career Expo

We are thrilled to share with you the exciting experience our Faculty of Science had at the Careers Expo hosted jointly by the Automotive Industry Development Centre, Eastern Cape (AIDC-EC) and Nelson Mandela University in Gqeberha. The event took place on 15- 16 August 2023, at the Nelson Mandela Bay Stadium.

This two-day event brought together 1,000 eager learners from approximately 15 schools in and around the city. The expo aimed to guide these young individuals on how mathematics and science can open doors to exciting career opportunities in the future.

Whether students were searching for a passion to pursue, seeking industry qualifications for better job prospects, or exploring new career paths, they found a wealth of options and inspiration at the expo.

The atmosphere at our stall was electric, as we engaged with these bright young minds, igniting their passions, and discussing the diverse scientific domains and career avenues available to them. We firmly believe that by nurturing and guiding these talents, we are sculpting the next generation of scientists, innovators, and leaders.

Our Faculty of Science was delighted to participate in this event, alongside numerous other faculties from Nelson Mandela University. Together, we shared valuable insights into a wide range of possible study fields.

Empowerment and Inspiration: Women in Science

On Friday, 25 August 2023, the Faculty of Science, hosted an electrifying event that brought together brilliant minds and ignited meaningful connections. The Women in Science Event, an annual tradition, was a resounding success this year, leaving attendees inspired and motivated to push the boundaries of their scientific endeavours.

The highlight of the day was the distinguished guest speakers who graced the occasion. Dr NG. Hashe, a lecturer in Department of Physics and renowned figure in science education, shared her insights, showcasing the remarkable achievements that women can attain in the world of academia and sharing her life journey.

Joining her for the first time at the event was Ms. N. Sibambo, a trailblazer from the Engineering Faculty. Ms Sibambo's presence bridged the gap between science and engineering, offering a fresh perspective on how these two disciplines can intersect to create innovative solutions for our world's most pressing challenges. Their journeys and achievements left everyone in the audience inspired and motivated to pursue their own paths to success.

The event facilitator, Dr B. Hlangothi, played a pivotal role in setting the tone for the day. Her engaging and inclusive approach allowed everyone in attendance to feel comfortable asking questions, sharing comments, and connecting with their fellow attendees. Dr Hlangothi emphasized the importance of networking in the world of science and highlighted how these connections can lead to collaboration, innovation, and ultimately, progress.

As we look ahead to the future, we are excited to continue taking this annual event to greater heights, providing a platform for women in science to come together, share their experiences, and empower one another. A heartfelt thank you goes out to the engaging audience who attended the event, as their participation and enthusiasm played a significant role in making it a resounding success. Together, we are building a supportive and inspiring community of women in science, and we cannot wait to see what the future holds for our brilliant minds in the Faculty of Science.

Left-Right: Ms N. Sibambo from the Engineering Faculty, Dr NG. Hashe from the Department of Physics and Dr B. Hlangothi from the School of Biomolecular & Chemical Sciences.

11th Nanoscience Young Researchers Symposium at Nelson Mandela University: Shaping the Future of Nanotechnology

We are thrilled to share with you the highlights of the 11th Nanoscience Young Researchers' Symposium (NYRS-2023), held on September 7th at Nelson Mandela University. This event was a resounding success, bringing together brilliant minds from across South Africa to delve into the fascinating world of nanotechnology under the theme, "Nanotechnology for Sustainable Development."

Hosted by the Department of Chemistry at Nelson Mandela University, the symposium served as a vibrant platform for scientists, postgraduate students, academic researchers, and industry partners to exchange insights, discoveries, and ideas on nanoscience and nanotechnology. With the primary objective of expanding scientific networks, the symposium was an incubator for novel scientific ideas that could shape the future of this transformative field.

The symposium featured a diverse array of topics, highlighting the depth and breadth of nanoscience research. These encompassed nanomaterials synthesis and characterization, applications spanning energy, water, environment, agriculture, advanced materials, ocean sciences, green/bio nanotechnology, biomedicine, and even waste-to-products. Additionally, the crucial domain of intellectual property and nano-commercialization was explored, shedding light on the economic potential of nanotechnology.

Recognizing the importance of fostering young talent, the symposium celebrated the contributions of top masters and doctoral student presenters, who were awarded prizes for their outstanding research contributions. This support for emerging researchers ensures that the torch of innovation continues to burn brightly in the field of nanotechnology.

The symposium was truly a collaborative effort, with participants hailing from a variety of esteemed institutions, including Nelson Mandela University, Tshwane University of Technology, University of Limpopo, University of Johannesburg, CSIR, Rhodes University, University of Western Cape, Durban University of Technology, UNISA, and Mintek. Over 17 PhD oral presentations and more than 36 posters displayed the depth of research talent in the region.

The event attracted over 130 delegates, representing not only the aforementioned universities but also key organisations like SANi (South African Nanotechnology Initiative), SabiNano, and Pfeiffer vacuum. This diverse audience contributed to rich discussions and fostered collaborations that will undoubtedly yield significant advancements in the nanoscience field.

The South African Nanotechnology Initiative (SANi) played a pivotal role in making this event a reality. SANi has emerged as the indispensable network uniting academics, researchers, scientists, engineers, and industrialists. With a mandate to manage "nano" activities across South Africa, SANi continues to propel the nation into the forefront of emerging nanotechnology and nanoscience fields.

As the symposium demonstrated, SANi's focus has expanded to encompass a broad spectrum of exciting and emerging fields, including

advanced materials, nano commercialization, the fourth industrial revolution (4IR), and artificial intelligence (AI). The dynamic and ever-evolving nature of nanotechnology continues to open new doors of opportunity, and SANi is at the forefront of guiding South Africa toward these exciting horizons.

In closing, the 11th Nanoscience Young Researchers' Symposium (NYRS-2023) at Nelson Mandela University was a resounding success, highlighting the transformative potential of nanotechnology and emphasizing the importance of collaboration and innovation. We look forward to witnessing the continued growth and impact of this field in the years to come, and we extend our heartfelt gratitude to all who participated in making this event a reality.

For more details on the symposium and updates on future nanoscience endeavours, stay tuned to SANi's initiatives and the Department of Chemistry at Nelson Mandela University.

Prize winners

Nanoscience Young Researchers Symposium Attendees

Sparks of Knowledge Clash at the Science Debate Competition

Written by: Bayanda Maboza

On the 15 September 2023 I hosted an SRC driven Science Debate Competition in collaboration with the Faculty of Science, SCI-SA, and SPSF. This event aimed to showcase the exceptional debating skills and scientific knowledge of our students. The debate featured three thought-provoking topics that ignited stimulating discussions among participants and attendees alike.

The first topic examined the ethical concerns surrounding cloning technology. Students passionately explored the potential benefits and risks associated with this controversial field, delving into the ethical implications for both humans and animals. The arguments presented sparked a lively exchange of ideas, demonstrating the students' in-depth understanding of the subject matter.

The second topic explored the hotly debated issue of vaccine mandates and the potential risks they may pose. Students critically evaluated the necessity and effectiveness of vaccines while considering both individual and public health perspectives. This topic not only showcased their scientific acumen but

First prize winner: Ms. Dipuo Seripe

also highlighted their ability to navigate complex ethical and societal dilemmas.

Lastly, the impact of artificial intelligence on society provided a fascinating platform for the students to discuss how this rapidly advancing technology could either enhance or threaten humanity.

With insights from various scientific disciplines, the debate shed light on the potential implications of AI on employment, privacy, ethics, and overall societal well-being, where the first prize was won by Dipuo Grace Seripe, the second prize by Lukhanyo Phali, and the third prize by Zukhanye Nquma.

Overall, the science debate at Nelson Mandela University was a resounding success, capturing the intellect, passion, and critical thinking skills of our students. It served as a shining example of how academic discourse, backed by scientific knowledge, can lead to a better understanding of complex issues. I applaud the students' efforts in participating in this remarkable event, and I look forward to witnessing the continued growth and contributions of this competition from this year onwards in the field of science and beyond.

The prize winners and the programme director

Team HotBox Triumphs at Research Week Postgraduate Business Pitch Competition

A Bright Future for Climate Change Innovation

Written by: Esinam Tamakloe

Dr Gaathier Mahed and Team Hotbox

The annual Research Week at our university, held from September 11th to 15th, 2023, brought forth some remarkable talent and groundbreaking ideas. Among the highlights of this event was the Innovation Office's research commercialisation competition, where postgraduate students had a chance to showcase their innovative projects and compete for an impressive R100 000 seed fund grand prize.

This year, the coveted prize found its home with a group of four brilliant minds - MSc Geology students Esinam Tamakloe, Aarifah Williams, Francois Swanepoel, and BSc Hon Geology student Nathanael Davids, under the mentorship of senior lecturer Dr Gaathier Mahed. Their business idea, the HotBox, was more than just an innovation; but a game-changer in the fight against climate change. The HotBox is a remarkable self-growing box designed to combat and mitigate climate change, whilst understanding the needs of Africa. With their win of the R100 000 seed fund grand prize, Team HotBox is set to take their vision to the next level, turning their innovative idea into a reality.

Team HotBox

The judges recognised that the HotBox not only addresses climate change but also serves as a catalyst for job creation and entrepreneurship, while one judge mentioning that the HotBox aligned with multiple Sustainable Development Goals (SDGs). Looking ahead, Team HotBox is eager to build a minimal viable product, using their seed fund to conduct the necessary research and development. Their journey is not just about innovation; it's about making a real impact on our world and creating opportunities for the future.

Team HotBox's success at Research Week shines as a beacon of hope in the battle against climate change and a testament to the power of innovative thinking right here at our university.

Africa's vast underground water resources are under pressure from climate change - how to manage them

Written by: Dr Gaathier Mahed

All countries have a variety of water resources – some are on the surface, like rivers, and some are beneath the ground. This groundwater provides almost 50% of all global domestic use and 43% of all the water used for agriculture. Groundwater is stored in aquifers, which come in a variety of shapes and sizes. They can be accessed in several ways, but mostly by drilling wells. Not all groundwater is useful to us – it depends on whether it's fresh or mixed with salt and on how deep it is, as this will affect how easy it is to tap into.

In Africa, groundwater is very important. It supports almost 100% of household and agricultural activities in rural areas. And, because it's underground it's protected from evaporation, a crucial resource in a warming climate.

These facts and figures are in a recent World Bank report which unpacks issues facing groundwater in times of climate change. As a groundwater scientist focusing on its sustainable use, I've picked out some of the key issues when it comes to managing groundwater from the report. It's vital that African countries address these as pressure increases on the continent's water resources, through growing populations, development and changing weather patterns.

Key issues

Ownership of groundwater

Figuring out ownership of groundwater is important for the management of this finite resource. Without a clear understanding of ownership, conflict can happen.

In some countries groundwater is owned by the landowner, in others by the government. Generally, it's being poorly managed across the continent. In many cases, boreholes used to extract groundwater aren't even being registered.

" Monitoring aquifers is vital to know how much water is left in them. "

South Africa has used laws and policies to transfer the ownership of resources to the government. But this has led to issues around red tape and licensing permits, which determine how water is allocated.

The success of permit systems depends on a thorough understanding of the resources, property owners' compliance with granted user rights, and the enforcement of this regulation. This is particularly problematic in the developing world, according to the World Bank report.

A possible solution is decentralised management, as seen by the Qanat system in the Middle East. The system consists of a network of underground canals that transport water from aquifers in highlands to the surface at lower levels using gravity. It is normally managed by the community and financed collectively. These historical pieces of infrastructure have been abandoned in recent times, but could solve many of the water shortage issues in the semi-arid to arid areas of Africa.

Recharging aquifers

Groundwater in aquifers is finite, but it can be recharged with surface water or treated wastewater. The process also sometimes helps in the removal of harmful chemicals because the aquifer's material can act like a very large filter.

The World Bank report highlights managed aquifer recharge as a technique which can be used to recharge aquifers. Water is either injected through a well or seeps into the ground through infiltration ponds, man-made or natural depressions in the ground which allows water to soak into the earth. Countries in southern Africa have practised this for the past 40 years.

Aquifers can also be recharged naturally when rainwater infiltrates deep into the ground. This can be encouraged through afforestation, agricultural terraces and the prevention of land clearing. These practices allow permeable surfaces to dominate the landscape, stabilise the soil through plant growth, and slow the flow of water.

Monitoring aquifers

Monitoring aquifers is vital to know how much water is left in them. Unfortunately many African countries have poor monitoring networks and infrastructure in place. The number of monitoring points in certain countries is also dwindling, owing to financial constraints.

Satellite data can be used for monitoring. One example is the GRACE (Gravity, Recovery and Climate Experiment) twin satellites which have provided insights into subsurface water storage over the past 20 years. This means that the changes in aquifer volumes can be monitored, but only at a very large scale. It's necessary to know what's happening on the ground. Localised monitoring networks are needed, with data loggers at multiple wells.

Effective policies

Policies and incentives play a major role in the use of groundwater. They influence the cost of energy and abstraction and the overall accounting of groundwater resources and environmental impact.

In an African context, good policies are missing in places. There are, however, some community practices which help to protect the resource, like the Qanat system. These types of systems should be encouraged and replicated.

Groundwater dependent ecosystems

Groundwater dependent ecosystems, such as wetlands, play a critical role for many livelihoods in Africa and need to be more effectively managed. These ecosystems use groundwater to support plant and animal life and ecosystem services, such as fresh water and clean air, throughout the year.

But they're exposed to major risks because they're often close to semi-arid and arid areas. This is particularly true in the Sahel region. Groundwater dependent ecosystems are often close to border crossings and transport routes. Human activities, such as over-pumping, could adversely affect how they function and lead to a loss of biodiversity.

The conservation of these water bodies is of the utmost importance for the preservation of water resources and livelihoods. Policies which protect them – like the Ramsar convention – must be properly enforced. Governments could should also consider creating protected areas around some of these ecosystems.

Managing resources

It's imperative that governments better monitor our water resources. Coupled with good practical solutions, such as managing pump rates, this will sustain groundwater resources for many years to come.

The monitoring network on our continent is unfortunately limited or non-existent in certain countries. In some, like South Africa, the network is slowly diminishing. This is unfortunate as the ability to measure allows better management of groundwater resources.

Groundwater is vital to communities in northern Kenya during droughts. Tony Karumba/ AFP via Getty Images

#R2BP—Reasons To Be Proud

Winning team of master's students at Wildlife Management conference

Mandela University master's student in Zoology Ryan Forbes was awarded the prize for the Best MSc Student presentation at the recent Southern African Wildlife Management Association Conference.

Ryan, together with Kristen Davis and Nicky Dreyer, was also the best student team in the conference quiz, against 19 other teams of students and wildlife professionals.

The students, all from the University's Centre for African Conservation Ecology, and under the leadership of its Director Professor Graham Kerley, presented part of their MSc research findings at the annual Southern African Wildlife Management Association Conference, held in the Golden Gate National Park earlier this month.

Ryan's research focuses on the shift in carnivore diets in response to the depletion of wild prey and an abundance of livestock. Kristen explores the Camdeboo-Mountain Zebra Corridor as an opportunity to protect viable populations of medium- to large-sized mammals.

Nicky Dreyer works on the uncovering of seasonal patterns in the demographic-specific prey preferences of lions and cheetahs.

From left-right: Ryan Forbes, Kristen Davis, Nicky Dreyer and Prof Graham Kerley

Chemistry postdoc represents South Africa as young observer at IUPAC General Assembly

Originally published under: #R2BP

Nelson Mandela University postdoctoral fellow at the Department of Chemistry, Dr Mapokolo Phiri, has been selected to represent South Africa and participate at the 52nd IUPAC General Assembly, as an IUPAC Young Observer at The Hague, Netherlands.

The IUPAC General Assembly will take place from 18 to 25 August, in parallel to the IUPAC World Congress IUPAC|CHAINS2023.
Meetings of the statutory bodies of the Union, specifically of the Council, Bureau, Division and Standing Committees, will take place followed by the World Chemistry Leadership Meeting on "Catalyzing Innovation for Sustainable Development".

The Royal Chemistry Society called on African emerging researchers to apply for the opportunity to be young observers at the 52nd IUPAC General Assembly, to which Dr Phiri responded, and she was selected to represent South Africa.

"I am a polymer chemist, and my research interests are generally in the vaporisation of waste; my current project investigates the use of avocado seed extract as antimicrobial agent in sustainable polymer scaffolds for potential applications in wound and bone healing, says Dr Phiri.
She obtained her PhD from Stellenbosch University, and her research was on high solids coatings based on molecular brushes.

Department of Chemistry Fellow: Dr Mapokolo Phiri

First prize for poster presentation for Gqeberha groundwater challenges at international congress

Originally published under: #R2BP

Geoscience Masters Student: Bamanye Takashe

Mandela University master's student in Geosciences Bamanye Takashe won first prize for his poster at the Worldwide Congress of International Association of Hydrogeologists in Cape Town.

The title of Bamanye's poster presentation at the congress was "Hydrogeological Characterization of the Coastal Aquifer of Gqeberha, South Africa."

The poster is a significant component of his recently submitted thesis for his master's degree.

This project is particularly relevant due to the water challenges we have faced in the Nelson Mandela Bay in recent years. It focuses on the groundwater aspects of the coastal residential areas and the impact of increased borehole usage during droughts on aquifers. The research encompasses soil and wetland analysis, geology, hydrogeology, water chemistry, and geophysics, Bamanye said.

"Having completed both my undergraduate and honours degrees at Nelson Mandela University, it was an honour to represent our institution at this international conference, with 500 delegates from 52 countries attending.

"Winning this award underscores the exceptional work we are currently doing at the University's Department of Geosciences, recognised on an international stage," he said.

Statistics saves lives – helping hospitals make best decisions for vulnerable patients

Originally published under: #R2BP

A predictive scoring system aimed at improving care of intensive care unit (ICU) patients at Livingstone Hospital in Gqeberha may become a national gold standard, assisting medical professionals with making informed choices in critical situations – particularly in public health care settings.

Mandela University Statistics lecturer Dr Sisa Pazi's research culminated in a statistical model for assessing disease severity at ICU admission, which could also be used to predict in-hospital mortality.

The predictive scoring system uses patient information, such as age, and several other variables to obtain a numerical value, or score, for each individual at ICU admission.

The higher the score, the more ill the patient; and this score is then used to estimate the risk of in-hospital mortality.

Dr Pazi was the statistical consultant for the research project, which began in 2017, spearheaded by Livingstone Hospital's Adult Critical Care Unit head, Dr Elizabeth van der Merwe, and Mandela University Department of Statistics Professor Gary Sharp.

"This was part of a broader interdisciplinary research project which culminated in five research manuscripts, published in DHET-accredited journals, and six conference presentations."

Pioneering research

Several papers have been published, but the umbrella topic, 'Sustainable Critical Care: Biostatistics Empowers Life-Enhancing Decisions', encompasses all the work done, says Dr Pazi, who also serves as a South African Statistical Association member, involved in facilitating bursaries and scholarships for undergraduate statistics students in South Africa.

His research paper, titled 'Prediction of in-hospital mortality: an adaptive severity-of-illness score for a tertiary ICU in South Africa', encapsulated the research needed for his doctoral study.

"This is the first attempt to develop a predictive scoring system based on South African data. The purpose of the system is to identify high-risk patients who can then be treated with the urgency required. This aligns with a patient-first approach."

Livingstone ideal location

The choice of Livingstone for a research project of this nature was fortuitous, says Dr Pazi. "The timing aligned with Dr Van der Merwe's – and others' – need to broaden research, and the plan by our University to start a medical programme.

"Statistical skills in the health sciences are highly specialised, and this offered an opportunity to bridge that gap."

Studies quickly showed how beneficial a predictive scoring system is, positively impacting both medical professional and patient.

Department of Statistics Lecturer: Dr Sisa Pazi

"I wanted to use maths to solve real-world problems"

"Predictive scoring systems are useful for standardising research and comparing the quality of ICU patient care. In addition, for resource-constrained populations such as the South African public health care sector, predictive scoring systems are useful in facilitating triage guidelines."

The system was initially developed using patient information outside the African continent, and then tested at Livingstone Hospital.

"Although we found that it was adequate for use, it was clear that there was room for improvement. The current research paper then proposed a revised model based on data collected at Livingstone Hospital itself. This revised model can now predict in-hospital mortality with higher accuracy, allowing high-risk patients to be identified for urgent interventions."

"I wanted to use maths to solve real-world problems"

Born in East London to a domestic worker, Sisa Pazi was raised by his grandmother, Mavis Ndaro, whom he describes as a "superwoman".

Mathematics was Dr Pazi's favourite subject at school, and he always knew that he wanted a career in numbers.

"I enrolled for a BSc at Nelson Mandela University in 2011. After learning of career opportunities in the field of statistics, I knew that as a statistician, I could use mathematical tools to solve real-world problems."

Dr Pazi majored in statistics and applied mathematics, earning his BSc and MSc in 2015 and 2017 respectively, and graduating with his PhD in Mathematical Statistics in April this year.

Married to Sinoyolo and father to Zingce, 13, and one-year-old Lucwangco, he credits his mentors – grandmother Mavis Ndaro, sisters Noluthando Pazi and Unathi Faku, and Professor Gary Sharp – with putting him firmly on the path to finding solutions through statistics.

Two DSI SA Women in Science awards for Mandela University water researchers

Originally published under: #R2BP

Two DSI SA Women in Science awards for Mandela University water researchers at the recent South African Women in Science Awards ceremony.

Professor Adams (right) was the winner of the DSI Distinguished Woman Researcher in Natural Science and Engineering and Carla was awarded the DSI-Ndoni Mcunu Fellowship: Doctoral Award.

Prof Adams holds the DSI/NRF Research Chair for Shallow Water Ecosystems and is the deputy director for the Institute for Coastal and Marine Research. Her research focuses on the conservation and management of estuaries working across the science-policy-practice continuum.

She is an NRF B2-rated researcher, and her ongoing research investigates estuary restoration and the response of blue carbon ecosystems to climate change.

Carla, a doctoral student in Geosciences, focuses on groundwater chemistry and hydrology. Her current research investigates the groundwater cycle in the drought-stricken Nelson Mandela Bay and Kouga municipalities to inform the potential implications of catchment processes, such as ground water abstraction and pollution on coastal ecosystems. Her research addresses the crucial knowledge gap towards understanding the sustainability of these processes.

(Left) Prof Janine Adams and (Right) Carla Dodd

NMU Professor Embarked on Visiting Fellow Professorship in Finland

Written by: Prof Werner Olivier

During the period from August to October of 2023, Professor Werner Olivier visited and collaborated with the Innovative Learning Environments Research Group situated within the Finnish Institute for Educational Research (FIER) at Jyväskylä University (JYU). This was made possible through being awarded a JYU Visiting Fellow Programme Grant in 2023.

Professor Olivier is the founder and present director of the Govan Mbeki Mathematics Development Centre (GMMDC), an entity currently based in the Science Faculty at Nelson Mandela University (NMU). His scholarly endeavors at GMMDC focus on the research and development of bespoke techno-blended instructional models. These models have been meticulously designed to facilitate the effective teaching and learning of STEM (Science, Technology, Engineering, and Mathematics) subjects within the sphere of South African public education.

Notably, since the year 2017, Professor Olivier has cultivated a robust and fruitful research and development partnership with Dr. Fenyvesi and his research team at FIER. This collaboration has borne significant fruits and has resulted in numerous joint research initiatives, scholarly publications, and innovative STEAM development projects.

The collaboration has also seen the emergence of an innovative national MathArt project in schools, promoting trans-disciplinarity and real-life connections between mathematics and art. This initiative has attracted international attention and enjoys the support of provincial and national stakeholders in South Africa. It also forms part of a Finnish education research project.

Currently, selected MathArt works from the South African project with links to global sustainability themes are exhibited in a public Art Museum in Jyväskylä until April 2024. Thousands of year 6 level children with their teachers from Finnish schools around will visit this exhibit and be exposed to the South African Math Artworks as part of a joint STEAM research project to promote inclusive education and experiential learning outside formal classrooms.

Concurrently, two additional members of the Govan Mbeki Mathematics Development Centre (GMMDC), namely Dr. Carine Steyn and Flora Olivier, also visited Jyväskylä during this same timeframe. Their visit was driven by a commitment to also partake in various activities associated with STEAM (Science, Technology, Engineering, Arts, and Mathematics) education, which encompassed participation in teacher & learner workshops, attending educational conferences and immersive visits to Finnish schools.

Prof Olivier's visit as Guest Professor in Finland consolidated post-COVID STEAM (Science, Technology, Engineering, Arts, and Mathematics) research collaboration with JYU FIER and paved the way for further collaboration and to explore joint research funding opportunities in support of integrating Techno-Blended STEAM Education models in schools for sustainable development.

Photo above from left-right: *Carine Steyn & Werner Olivier (Nelson Mandela University), and Kristof Fenyvesi (FIER, University of Jyväskylä)*

Photo below from left-right: *Carine Steyn, Flora Olivier, & Werner Olivier (Nelson Mandela University), Leena Kuorikoski (Local School Teacher) and Kristof Fenyvesi (University of Jyväskylä)*

The University invited all the accepted/provisionally accepted students, parents and guardians to watch the Dean of Science as he welcomes the students to gain insight into our Faculty Science. The recorded message premiered on the Mandela University YouTube Channel on 21 September. The message has 1.5k views to date.

Nelson Mandela University Forestry Student Attends International Symposium in Germany

Written by: Avelile Cishe

Map indicating the areas travelled for the full duration of the event

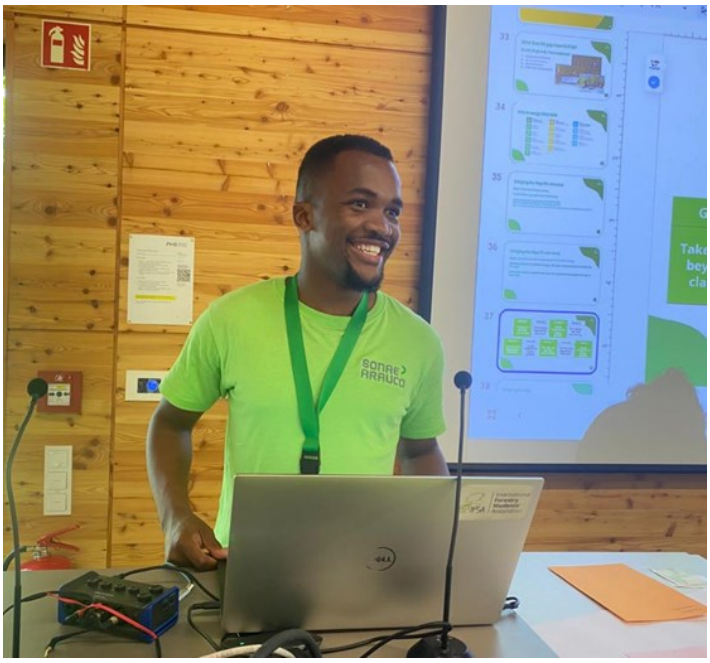
Avelile Cishe, a Bachelor of Science Honours in Natural Resource Management student at the George campus recently attended the 51st International Forestry Students' Symposium (IFSS) in Germany. The symposium was held from 16 August to 1 September. Avelile represented the Mandela Uni, as well as other forestry institutes in South Africa, including Stellenbosch University, University of Venda, University of Pretoria, and University of Mpumalanga.

The IFSS is the biggest annual meeting of the International Forestry Students' Association (IFSA). It is a platform for forestry students from all over the world to come together to learn about the latest trends in forestry, network with their peers, and share ideas.

The theme of this year's symposium was "Transforming forestry – getting ahead of current and future challenges." The students discussed a wide range of topics, including climate change, forest management, and sustainable forest products. They also had the opportunity to visit several forests and forestry research centres in Germany. This gave them a firsthand look at the different ways that forests are managed in Germany.

“The IFSS was a great opportunity and an amazing experience to network with other forestry students and learn about the latest trends in the field. We learned so much about forestry and we met some great people from all over the world.” - Avelile Cishe

The attendance of this symposium was made possible with funding support provided by the Nelson Mandela University, the Department of Forestry, Fisheries and Environment, and the Germany Federal Ministry of Food and Agriculture.



Avelile Cishe in Germany

Symposium attendees

Carla's Journey: From Passion to Prestige - A Next-Generation Researcher's Story

In the ever-evolving landscape of academic research, there are individuals who stand out not only for their dedication to their craft but also for their remarkable contributions to the field. Carla Dodd, a Geosciences PhD student at Nelson Mandela University, is undeniably one of these remarkable individuals. Recently, she received the esteemed NRF Next-Generation Researcher Award, recognizing her ground-breaking work in the realm of coastal groundwater resources.

Carla's research is nothing short of revolutionary, as she delves deep into the complexities of replenishment and pollution effects in coastal groundwater. Armed with cutting-edge methods and an international collaborative spirit, she meticulously maps hydrological flow paths and explores the intricate web of groundwater-dependent ecosystems. Her work holds profound significance in the context of drought mitigation and the pursuit of a sustainable future.

We asked Carla a couple of questions to gain insights into her research journey and her advice for aspiring researchers:

What's your go-to way to overcome research-related challenges?
Momentum... I try to just keep going when facing an obstacle, no matter how slowly. Often starting is the most difficult part, but once I get going it's not as bad as I thought.

Do you have any advice for aspiring researchers?
The two most important decisions you will make when doing postgraduate research are: 1) your topic and 2) your supervisory team. Choose a topic that excites you and a supervisor(s) that will support and encourage you and provide you with honest, constructive criticism when you need it. I have been very fortunate throughout my postgraduate journey to have had wonderful supervisors (and team members) and do research on something that I'm passionate about - it made the difficult days (and you'll have those no matter what) a lot easier to deal with!

Carla Dodd's journey is a shining example of dedication and innovation, making her a true role model in her field, and a source of immense pride for our faculty.

Department of Geosciences PhD student: Carla Dodd

Moments from National Science Week 2023

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