

◆ BOUNDLESS

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MUT

MANGOSUTHU
UNIVERSITY OF TECHNOLOGY

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◆ FROM THE DESK OF THE ◆ EDITOR-IN-CHIEF



Mbali Mkhize

MUT at the Nexus of Energy, Water, Food and Climate

Heartfelt congratulations to Professor Nokuthula Sibiya from across the world is still pouring in. Media coverage about her appointment has been 100% positive and this is a reassuring message that shows that the country is ready for positive news. Such a discourse is a healthy one for the MUT brand.

It is no coincidence that MUT's flagship project this year was put MUT at the nexus of energy, water, food and climate through the EnergyWaterFoodCimate Nexus Summit where Professor Sibiya was deeply involved in the conceptualisation of the summit. While the EnergyWaterFoodCimate Nexus Summit is the brainchild of Dr Victor Ibeanusi of Florida Agricultural &

Mechanical University (FAMU) in Tallahassee, Florida in the United States of America; it was indeed a strategic university decision to allow MUT to participate in this international summit as a partner.

MUT and FAMU have a 23-year-old partnership, and it was agreed that MUT would host the Summit at Coastlands Hotel in Durban, South Africa, from 1 to 4 July 2024. The local event was a collaboration between MUT and the South African Energy Development Institute (SANEDI). FAMU has been hosting the Summit for more than a decade in Florida, and this was the first time that it

was held in Africa. “This was an intentional move given that Africa faces challenges in energy, water, food and climate.

We also wanted to raise awareness that these challenges are being addressed in the Sustainable Development Goals; in Africa’s Agenda 2063; and the South African Department of Science and Innovation’s Decadal Plan addressing the Grand Societal Challenges,” said Summit founder Dr Victor Ibeanusi, who is Dean of the School of the Environment at FAMU.

It was also the first time MUT roped in a public entity as a partner. Professor Nkuto Sibiyi, then acting MUT VC and Summit Local Organising Committee (LOC) Chairperson said:

“We identified the South African National Energy Regulation Institute (SANEDI) right at the outset as a strategic partner based on the contributions which it has made in promoting energy research and technology innovation, and its programmes to promote energy efficiency throughout the country,”

said Professor Nokuthula Sibiyi, who was appointed by the then acting Vice-Chancellor, Professor Marcus Ramogale, as the Summit Local Organising Committee (LOC) Chairperson.

Noting that the discourse on the nexus of energy, water, food and climate continues to cut across the globe, and has become even more evident in Africa, the MUT LOC was intentional in positioning the Summit to ensure that the relevant delegates participated. The Summit was attended by more than 600 national and international delegates from government and academia as evidence-based research is required for policy development and country strategies.

The summit delegates also included young people from high schools and universities so that they can raise awareness about the need to undertake research on energy, water, food and climate, and to become activists. Women and vulnerable communities were represented to enable them to take home innovative strategies to influence behaviour change in the thematic areas of the Summit. There was a session specifically dedicated to vulnerable groups. Youth participation was taken to another level when young people were given roles to participate as note takers.

It is not common for a summit to have young people leading, but Dr Ibeanusi believes that “allocating pivotal roles to young people suddenly shifts the issues of power and allows young people to realise that they are being handed the baton to influence future generations on how they address the challenges of energy, water, food, and climate. It was for this reason that the summit theme was: ”



WHAT WE WANT IS
POSSIBLE

◆ PERSPECTIVES FROM OUR ◆ NEW VICE-CHANCELLOR



Professor Nokuthula Sibiyi

Fostering engagements with our people

At MUT, our Anchor Strategy means that we do not forget our people, we grow with them in harmony. I love the fact that every July, our university celebrates Nelson Mandela Month.

This gives us a special focus on our local Umlazi community, even as we constantly strive to revitalise it as an anchor institution. We have the honour of being the only university in South Africa to be intentionally established in a Township, not as a satellite campus or an afterthought. At 45, our institution was there during the difficult years before the dawn of democracy, and in the 30 years since then.

Today, MUT towers over Umlazi Township as a beacon of hope for the youth and for vulnerable communities. Our Mandela Month celebrations were inclusive, visiting some of these vulnerable communities and giving them hope and strength. In 2005, Nelson Mandela, South Africa's first democratically-elected President, said this at London's Trafalgar Square:

"Do not look the other way; do not hesitate. Recognise that the world is hungry for action, not words. Act with courage and vision."

“Sometimes it falls upon a generation to be great. You can be that great generation. Let your greatness blossom.”

Born on 18 July 1918, Mandela dedicated 67 years of his life to the struggle for political and social justice. That is why South Africans spend 67 minutes helping the needy. This is in line with Mandela’s philosophy of helping those in need, particularly the oldest and youngest.

The University had more than 25 events in honour of what Mandela stood for. Some of the events included the distribution of “pre-loved” clothing and blankets to a local non-profit organization (NPO), Ubhavu, on 9 July. This was followed by a sign language workshop for Umlazi Township’s Q Section citizens, particularly the deaf, and MUT staff. On 12 July, the Department of Nature Conservation provided a lecture on sanitation to the Naleni High School learners.

I was pleased that MUT’s Health Services unit was also part of the mix. Their mantra, “a healthy body begins with a healthy lifestyle”, which Health Services practice efficiently for the MUT student body, was repurposed for Umlazi’s youth during the Mandela month through their engaging presentations to young people on “Loving My Body, Loving Me”.

On Mandela’s birthday, the Faculty of Natural Sciences visited the local old age home, eKhanana, where staff and students cleaned the facility, donated clothing to the folks living there, baked cookies for the elderly and shared tea with them. As Professor Busisiwe Nkonki-Mandleni, Director of the Community Engagement Directorate said: “this might seem mundane for many people, but for the elderly who hardly get a visit even from family members, it is a benevolent gesture as it gives them a glimpse of the life outside, a reconnection and hope of a loving society”.

At MUT we strive to effectively engage and contribute to the advancement and development of communities, particularly our immediate communities. With our Anchor Strategy, which is derived from this goal, we endeavour to grow with our communities. Against this backdrop, MUT resolved to extend the commemoration of Mandela Day to the entire month of July with effect from 2023 due to the great enthusiasm that we, as the University community, in partnership with our external stakeholders, feel for this cause.

My wish is that we always remember some of the words Mandela penned from a prison cell: “Our cause is just. It is a fight for human dignity and an honourable life.”



◆ WELCOME TO OUR NEW ◆ VICE-CHANCELLOR



Professor Nokuthula Sibiyi

Announcing the appointment of Professor Nokuthula Sibiyi as MUT Vice-Chancellor

On 25 July MUT proudly shared the following announcement, which was echoed across several news publications: Mangosuthu University of Technology (MUT) is proud to announce the historic appointment of Professor Nokuthula Sibiyi as the new Vice-Chancellor, the first woman to hold this esteemed position in the institution's 45-year history. This groundbreaking appointment comes at a pivotal moment as MUT embarks on a new era of academic excellence, innovation, and community engagement. Since April 2020, MUT has been under the careful guidance of an Administrator, ensuring stability and continuity during a challenging period. The

Administrator's role has been vital in maintaining the university's governance and academic standards, setting the stage for a seamless transition to Professor Sibiyi's visionary leadership. She is a distinguished daughter of Umlazi Township, brings a wealth of experience and a profound commitment to academic excellence. As a rated researcher and seasoned executive, her extensive academic and leadership background positions her perfectly to steer MUT towards greater heights. Her academic journey, marked by numerous accolades and leadership roles, showcases her dedication to advancing higher education and fostering an environment of growth and innovation.

MUT's 45th anniversary is a testament to its legacy of shaping future leaders and contributing significantly to South Africa's socio-economic development. For nearly half a century, the university has been a beacon of hope, producing graduates equipped with the skills and knowledge to drive positive change in their communities and beyond.

Professor Sibiya's vision for MUT is centered around academic excellence, financial sustainability, and socio-economic development. She aims to enhance the university's research capabilities, promoting interdisciplinary collaborations and establishing cutting-edge research centres. Her strategic plan includes the introduction of globally competitive academic programmes that align with industry needs, ensuring that MUT graduates are well-prepared for the future.

Financial sustainability is a cornerstone of Professor Sibiya's administration. She plans to diversify funding sources, optimise resource management, and forge strategic partnerships with industry and government. Her innovative approach to financial planning will ensure that MUT remains resilient and capable of achieving its long-term goals.

Community engagement is another key focus for Professor Sibiya. She is committed to strengthening MUT's ties with the local community through various outreach programmes and initiatives. Her vision includes fostering a culture of innovation that encourages creativity and critical thinking among students and faculty alike. By enhancing MUT's global footprint through strategic partnerships and international collaborations, she

aims to position the university as a leader in higher education on a global scale.

Reflecting on her appointment, Professor Sibiya stated, "I am deeply honored to lead Mangosuthu University of Technology as its new Vice-Chancellor. This appointment is a collective victory for all women who aspire to break barriers and lead with purpose. I am committed to building on MUT's proud legacy and working collaboratively with our faculty, staff and students to drive excellence and innovation. Together, we will create a vibrant and inclusive university that empowers our students and contributes meaningfully to the development of our society."

Professor Sibiya's personal story is one of resilience, faith and dedication. Her strong relationship with God and her unwavering commitment to her family have been sources of strength throughout her journey. Despite numerous challenges, she has consistently demonstrated an indomitable spirit and a relentless pursuit of excellence. Her leadership style is characterised by empathy, inclusivity and a focus on empowering others. She believes in the transformative power of education and is dedicated to creating an environment where every student can thrive.

As MUT embraces this new chapter, the university community is filled with optimism and anticipation for the future. Professor Sibiya's leadership promises to bring transformative change, continuing MUT's tradition of excellence and its mission to Shape and Own the Future. Her strategic vision and personal dedication will undoubtedly leave a lasting impact on the university and the broader community it serves.



45 YEARS ♦ F
SHAPING ♦ UR
PEOPLE'S
FUTURE



shape and own the future



Professor Nokuthula Sibiya

MUT's first female Vice-Chancellor: a shining star of Umlazi Township

A few decades ago, Tholisu and Sawela Primary schools, as well as Velabahleke and Vukuzakhe High Schools in Umlazi Township, opened their doors to a young girl whom they would prepare for a trailblazing future. This young girl went on to attend the University of Zululand where she graduated with a degree in nursing, and never looked back. With a Doctor of Technology in Nursing from the Durban University of Technology (DUT), she is now a C2 National Research Foundation (NRF) rated researcher who has successfully supervised 60 Master's and 33 PhD students and published widely

in the primary health care field.

Assuming the Vice-Chancellor and Principal position on 1 August 2024, Professor Sibiya is no stranger to MUT. She first joined the University in October 2022 as the Deputy Vice-Chancellor: Research, Innovation and Engagements, and in May 2024 she was appointed as acting Vice-Chancellor and Principal. After a vigorous Vice-Chancellor recruitment process, MUT Administrator Professor Lourens Van Staden announced the long-awaited appointment on 25 July 2024.

A brief history of Professor Sibiya's journey in higher education

Professor Sibiya joined Durban University of Technology (DUT) in August 2003 as a lecturer in the Department of Nursing and graduated with her doctoral qualification in 2009. She then served as the Head of Department (HOD) of Nursing from 2011 to 2017. During her tenure as HOD, she received an Excellence Award for Leadership in Nursing Education in 2017 from the Nursing Education Association (NEA).

This was in recognition of the successful implementation of an undergraduate nursing programme at DUT with a strong Primary Health Care (PHC) philosophy, to address the shortage of nurses in the KwaZulu-Natal province.

DUT was the first university of technology to offer such a programme in South Africa. During her tenure at DUT, Professor Sibiya also served as the Executive Dean: Faculty of Health Sciences, and later appointed as Deputy Vice-Chancellor: Teaching and Learning at the same institution.

In recognition of her excellent contribution to primary health care, she was inaugurated as a Fellow of the Academy of Nursing of South Africa in 2015. She was also named by the Department of Science and Technology as the 2018 South African Distinguished Woman Scientist in Humanities and Social Sciences.

Professor Sibiya has also received several institutional research awards, which include Top Female Researcher of the Year, Top Researcher in the Faculty of Health Sciences and Senior Researcher of the Year. In 2019 the Forum of Professional Nurse Leadership recognised her as the 2019 Regional Nurse Leader. Her research area is primary health care with a specific focus on maternal and child health. She has published over 120 journal articles, conference proceedings, books and book chapters.

One of her most recent accolades was an award from Florida Agricultural and Mechanical University (FAMU) for the integrated approach of her research across Energy, Water, Food and Climate discussed in this publication.



Professor Nokuthula Sibiya



Professor Sibiya receiving the Nexus Leadership award from Dr Victor Ibeanusi

Two awards in less than six months

Professor Nokuthula Sibiya, MUT VC has scooped two awards, one national and another international, in less than six months. The first award came at the end of 2023 when Entrepreneurship Development in Higher Education (EDHE) awarded her the EDHE Rising Star DVC of the Year 2023 award on behalf of Universities South Africa (USAf) and the Department of Higher Education and Training (DHET).

The EDHE DVC Rising Star Award is presented to a Deputy Vice-Chancellor who has recently committed to advancing the entrepreneurship development mandate, and who demonstrates a firm commitment to making swift progress aimed at real impact.

This award recognised Professor Sibiya's role in developing student entrepreneurship; developing entrepreneurship through teaching, learning and/or

research; and advancing MUT's positioning as an entrepreneurial university. Professor Sibiya actively promotes student entrepreneurship and advocates for the advancement of entrepreneurship education and development initiatives at the University.

During the international Energy Water Food Climate Nexus Summit in July 2024, Professor Sibiya received the Nexus Thought Leadership Award, based on her activities in supporting the 'science enterprise' through advancing a trained workforce for sustainable outcomes in energy, water, food, and climate systems. Individuals receiving the Nexus International Thought Leaders Awards are recognised based on their contribution to the categories of Leadership, Science Enterprise, Accelerated Innovation and Workforce Development.

INTERNATIONAL ENGAGEMENTS IN THE SPOTLIGHT



Professor Sibiya, eight from left, with FAMU President, Dr Larry Robinson, ninth from left with MUT, FAMU and SANEDI executive and partners

Professor Sibiya reflects on SASUF and EnergyWaterFoodClimateNexus

This year kicked off with various international engagements and it has been one great success after the other. I had the opportunity to lead an MUT delegation to Sweden where nine established and new researchers participated in all four segments of the South African Swedish University Forum (SASUF) 2024 Research and Innovation Week, firmly putting MUT on the world map.

The MUT delegation participated in satellite workshops, poster presentations, sustainability workshops, and the SASUF Co-ordinators Forum. I also participated in a satellite workshop as I believe that when you lead research, you need to lead it from the front. It took my collaborators and I at least two full days to firm up our presentation and to captivate and retain an audience for a full day session that was presented in person and online. My MUT colleagues who participated in the SASUF

Research and Innovation week included Dr Awonke Mbangi, Senior Lecturer: Agriculture, who co-hosted a satellite workshop on remediation of contaminated soils with partners from University of Johannesburg, Central University of Technology, Lulea University, Swedish University of Agricultural Science, and Uppsala University. I commend Dr Mbangi's resilience as he had to travel from South Africa to Malmo to join his partners, and thereafter travel another nine hours to the Nordic Africa Institute in Uppsala where their workshop was held.

The MarComms team, Mbali Mkhize and Zama Sishi, made an invaluable contribution by presenting a workshop that focused on the sustainability of education and international student mobility. Together with partners from the Cape Peninsula University of Technology (CPUT) and Karlstad University, the workshop explored solutions that

would safeguard students and staff mobility against complexities brought about by pandemics and future crises.

Kavita Behara, Senior Lecturer: Electrical Engineering, together with Dr Thobeka Makhathini, Senior Lecturer: Chemical Engineering Department, and myself, collaborated with Durban University of Technology, Lund University, and Uppsala University on a workshop titled: “The impact of electronic waste on the environment and human health: emerging challenges and policy solutions”. All the colleagues also made poster presentations and the decision of the adjudicators to select them could not have been better. The SASUF Conference was described as an appetiser for MUT’s internationalisation engagements,

with the EnergyWaterFoodClimateNexus Summit taking place in mid-2024. This Summit has become a game-changer for our internationalisation agenda, as well as our stakeholder relations in general. It is our very own stakeholders who give credence to the Summit not only by attending but also by presenting the work they are doing concerning the themes of energy, water, food and climate, and being open to new collaborations. As acting Vice-Chancellor, I was given a mandate to ensure that the Summit was a success, and I am grateful to my Local Organising Committee for rising to the occasion.

Our post-summit programme will take us through a series of engagements on how we can put ideas into practice and produce a peer-reviewed publication.

EnergyWaterFoodClimate Nexus Summit: Two prominent speakers from outside South Africa

The profiles of two speakers from Hungary and Sierra Leone not only show how deep the discourse on energy, water, food, and climate goes, but they also give MUT the confidence that hosting the Summit, is connecting with countries across the globe on this vital topic.

Meet Professor Endre Dobos, Chair of the Commission 1.3 Soil Genesis of the International Union of Soil Sciences, and President of the Hungarian Soil Science Society. During his presentation he mentioned that one of the major problems in Africa was the continued desertification of the Southern African region because of overgrazing. Professor Dobos said that while Hungary struggles with problems like slopes and ice turning into water, in Africa there is huge soil erosion.

Professor Dobos said the possible solution could be the lessening of overgrazing. “In Southern Africa, to protect the land from erosion, you always must make sure it is covered with vegetation, throughout the year. You also must do tillage perpendicular to the slope. This is not only to stop the erosion but to lower the drought risk,” said Professor Dobos.

He also said that soils in many parts of Africa have a low content of organic matter, which is very important to create a soil structure which increases water filtration, has higher water retaining capacity, and allows for much safer agriculture. “It is very important to keep the crop residues and use cover crops to



Professor Endre Dobos

increase the biomass and support the biological activity of the soil,” he said.

Professor Dobos said another reason for attending the 2024 Nexus Summit was that the next summit would be held in Hungary’s Miskolc, almost 200km to the east of Budapest.

Now meet our speaker from Sierra Leone: the Honorable Minister Jiwoh E. Abdulai, from the Ministry of the Environment and Climate Change in Freetown. Sharing some of the challenges and practices in Sierra Leone, he said, “In Sierra Leone climate change and biodiversity loss are two sides of the same coin. Both crises continue to adversely impact the lives and livelihoods of majority of our citizens, even though our country has relatively low emissions. To reduce its vulnerability, Sierra Leone has mainstreamed inclusive green growth in its development process as evidenced by her Medium-Term National Development Plan (2024-2030)”.

Minister Abdulai added that “food and water are critical to our very existence, but we are facing an unprecedented biodiversity crisis that increases the risks of food and water insecurity across the planet even as the global population is set to increase from

8 billion to 9.7 billion by 2050 according to a recent UN Report”.

Some of the solutions Sierra Leone is working on entail leveraging its natural assets to respond to environmental crises by embarking on a national ecosystem restoration programme that will not only be inclusive and sustainable but will also transform the local economies of communities living in or close to the forests. “This restoration programme will address underlying factors that have driven deforestation and degradation of the ecosystems. Our government is leveraging bilateral and multilateral partnerships to design, implement and monitor the progress and success of this programme. The possibility of expanding such partnerships is one of the main reasons I am excited to be at the summit. We are hoping to establish a Nexus Center of Excellence to address our Nexus issues. Together, what we want is possible,” he said.

South Africa’s industry captains receive global recognition



SANEDI Board Chair, Sicelo Xulu, middle, receiving an award from the Summit founder, Dr Victor Ibeanusi, left. On the right is Mbali Mkhize, Senior Director: MUT’s Department of Marketing and Communications

Partnering with international organisations deepens an understanding of how individuals add value in solving global challenges. The work of the South African National Energy Development Institute (SANEDI) led by Chief Executive Officer, Dr Titus Mathe and his Board Chairperson, Sicelo Xulu, was not missed by the Global Advisory Board for the EnergyWaterFoodClimateNexus Summit. SANEDI’s work was singled out for recognition amongst submissions across the globe as it is in line with the Sustainable Development Goals, Africa’s Agenda 2063, and South Africa’s Grand

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Societal Challenges as outlined in the Department of Science and Technology's Decadal Plan. SANEDI's work dovetails with what the EnergyWaterFoodClimateNexus, a new science enterprise, aims to achieve. By partnering with Florida Agricultural & Mechanical University (FAMU), SANEDI leaders have already designed pathways to expand the research frontiers for discoveries that integrate systems-based research and education for solutions to the vexing challenges in our environment.

First Nexus Thought Leadership Award recipient gets appointed as a board member

During the glitz and glam of the Nexus Thought Leadership Awards in 2024, Mbali Mkhize, Senior Director: Marketing and Communications, was announced as a board member for the Nexus Global Team. One of the first recipients of a Nexus Thought Leadership award in 2022, Mkhize joins a board headquartered in Florida, USA, with offices in Hungary, Dubai, Nigeria and across various states in the USA, such as Texas and Oregon, to mention a few. Mkhize said, "This is an opportunity for the MUT brand to be presented for all its strengths and potential to a broader global community.

Apart from advocating for the MUT brand, I will also be looking for funding opportunities for our staff and students. One of those is to ensure that our Local Organising Committee (LOC) is funded for the next summit taking place in Hungary from 23 to 25 May 2025, and to find ways for our students to become a part of a new generation of leaders ready to solve the challenges of the environment and to promote cross-cutting discussion, scholarship, and collaboration among researchers, students, and entrepreneurs to advance science, policy and decision-making."

Explaining why this recognition is huge for MUT, Mkhize pointed out that these days it is not easy to get a seat at the table with an international stakeholder to discuss how one's organisation could play a role in solving vexing global challenges pertinent to the Sustainable Development Goals and Africa Agenda 2063, and for such a stakeholder to provide resources.



Mbali Mkhize



From right, Professor Nokuthula Sibiyi, MUT VC and Principal; Sicelo Xulu, SANEDI board chairperson; Bheki Nxumalo, Group Executive for Generating, Eskom; Eric Shunmagum, General Manager of the office of the Group Executive Generation, Eskom; Professor Prathan Moodley, General Manager of Applied Energy, Research, Development and Innovation, SANEDI

International summit gets a boost from SANEDI

MUT received a boost when it was able to partner with the South African National Energy Development Institute (SANEDI) to host the EnergyWaterFoodClimateNexus International Summit in Durban from 1 to 4 July 2024. Together, MUT, SANEDI and Florida Agricultural and Mechanical University (FAMU), founder of the summit, will also spearhead the establishment of a Specialisation Centre of Energy, Water, Food, and Climate which will see more research happen around the Centre and get papers published in accredited journals.

Before the summit, Professor Marcus Ramogale, then acting Vice-Chancellor and Principal, thanked Professor Nokuthula Sibiyi, Deputy Vice-Chancellor: Research, Innovation, and Engagements (RIE), and Mbali Mkhize, Senior Director: Marketing and Communications, for their engagements with SANEDI. “This partnership with SANEDI will not only support the planned summit but will also ensure that proceedings go beyond the scheduled summit. The partnership is a five-year arrangement with seed

funding of R2,6 million. We are truly grateful for the grant funding agreement with SANEDI. This shows that our stakeholder engagement programme is meaningful to our stakeholders,” he said. For SANEDI, this grant funding agreement with MUT shows how the unsolicited proposal submitted by MUT has objectives which are aligned with that of SANEDI.

“MUT showed a clear vision of how and what it wants to achieve, therefore, we believe this funding will leverage each institution’s expertise,”

said Moranakele Thipe, Manager in the office of SANEDI’s CEO, Dr Titus Mathe.

The other short-term objectives of the grant funding agreement will see the signing of an MoU and the establishment of a Steering Committee to provide oversight to the entire project.

'WhyHack' stimulates young minds to imagine EWFC solutions



Umlazi Township schools that took part in the competition, and some Summit partners

This year's EnergyWaterFoodClimateNexus Summit featured a new programme for youth interested in Science, Technology, Engineering and Mathematics (STEM), called the Nexus WhyHack. For two days, 200 secondary school learners from Durban participated in a design-thinking competition to create solutions to key environmental challenges. Using concepts from engineering, economics, health and politics, students worked in groups to ideate potential prototypes that could be answers to issues facing major cities within South Africa and the continent.

The concept of Nexus WhyHack stemmed from a key belief of the Nexus Foundation leaders. "One of Africa's greatest assets is the youth. To solve Africa's problems, we must involve them," said Dr Victor Ibeanusi, founder of Nexus Summit and Dean of the School of the Environment at FAMU. Doing this effectively demands that we reimagine the traditional ways of teaching and training young people within the STEM fields. "Solving complex problems requires new strategic ways of thinking. Rather than focusing on teaching siloed scientific concepts and methodologies, I wanted to give these learners a framework of how to think strategically and collaboratively," said Dr Leslie Nwoke, facilitator and host of the WhyHack competition. She, along with Joel Blount of FAMU, worked with teams to identify key problems they see every day and how they impact their lives. Students were able to relate to issues like poor

water quality, inability to water crops and livestock during water shortages, flooding, and increased GHG emissions from industry use. By simplifying the problem, they were able to create simple solutions that meet the needs of the community.

Encouraged to use lean startup principles, students used low-cost items like paper towel rolls, discarded cups and dishware, and everyday items from home. A team of students from the local Velabahleke and Umlazi ComTech high schools presented a simple way to test water in homes before ingestion, to stop diarrheal diseases. "Families are at risk if contaminated water is given to young children or newborns. Our design provides the solution to that," says a tenth grader from Velabahleke High School. Several learners from Ndukwenhle High School designed a system to catch rainwater for use during water shortages. They presented data on the benefits of this and how it saves cities money. Winners of the competition were from Umlazi ComTech High School, tagging themselves as the EcoWarriors. They designed a system that generates energy to power homes.

Presentations were judged by key industry leaders including partners from Dow (US and Africa) and Eskom. With their expertise and experience, judges listened and rated the top three projects.

MUT collaborates in workshops and satellite events with Swedish universities



The MUT delegation that went to Sweden

At the beginning of May 2024, Professor Nokuthula Sibiyi, MUT's then-acting Vice-Chancellor, led a delegation of eight researchers to share their research and conduct workshops on their research programmes in Sweden. The selection process by the South African Swedish University Forum (SASUF) was not an easy one. It required perseverance and adherence to a paper submission. In the end, Professor Sibiyi travelled with the following individuals: Dr Awonke Mbangi, Professor Xolile Mkhize, Dr Thobeka Makhathini, Dr Nkululeko Nkosi, Kevita Behara, Sibusiso Tshabalala, Mbali Mkhize and Zama Sishi. Here are perspectives on SASUF from some of the participants:



South Africa

Sweden

University Forum

SASUF NEWS ROUND-UP

Dr Awonke Mbangi

Participating in the SASUF research and innovation week marked a significant milestone in my career as a young researcher. I was part of a team that organised a satellite event in the form of a workshop with colleagues from the Central University of Technology (CUT), the University of Johannesburg (UJ), The Nordic Africa Institute and the Swedish University of Agricultural Sciences (SLU) in Uppsala, Sweden. The workshop focused on the remediation of soil and water resources, stemming from the urgent need to address the ongoing pollution of these critical yet often undervalued resources. The workshop was highly successful, generating considerable interest among students from the participating universities who are eager to pursue postgraduate studies. Two major outcomes emerged from the event: first, we agreed to collaborate on a joint funding proposal to be submitted as funding opportunities arise in both Sweden and South Africa; and second, we decided to co-author a review paper on recent advancements in techniques for remediating soils and water bodies.

As a South African, I learned a great deal from the culture and environment in Sweden. Most notably, I was impressed by their commitment to excellence and the efficiency of their systems, which provide a high level of convenience. Their transportation system, cashless payment options, and well-maintained infrastructure, including centuries-old buildings, were particularly remarkable. The Swedish emphasis on eco-friendliness and environmental consciousness was evident, as it was nearly impossible to find litter anywhere. They place a great deal of importance on sustainability, and they made significant investments in clean energy sources. Some of their universities are championing this cause by running their electricity on 80 percent renewable energy.

One of the more unusual experiences was the late sunset, with the sun setting after 10pm. Walking outside in daylight during what would be night time in South Africa was strange and took some time getting used to. Additionally, the weather was surprisingly pleasant, and the coats and jerseys I



Dr Awonke Mbangi

had packed did not make it out of the suitcase. I would like to express my sincere gratitude to Professor Sibiya and Mrs Mkhize who were very instrumental in this journey. Their support and encouragement has been invaluable.



Dr Thobeka Makhathini

Dr Thobeka Makhathini

We hosted a collaborative workshop on 16 May 2024 with three Universities – Uppsala and Lund Universities (both in Sweden) and DUT in South Africa. The collaborators in the workshop were Dr Carl Dalhammar (Lund), Dr Katja de Vries (Uppsala), Prof Mishra (DUT), Kavta Behara (MUT) and myself. The workshop title was “The Impact of Electronic Waste in the Environment and Human Health: An Emerging Challenge and Policy Solutions”. The workshop was attended by more than 20 delegates, and it was well received, with attendees participating in fruitful discussions which were enlightening. One of the suggestions from the attendees was for the

MUT staff to prepare and deliver a public lecture on e-waste management to inform and make the MUT community aware of the challenges and policies. We are hoping that we will accomplish this goal in the second semester of 2024.

I also presented a poster titled “Sustainable treatment strategies of solid waste for a circular economy: A case of e-waste”. My proposal in the poster was an extension of our workshop which focused on finding solutions for e-waste reuse, recycle and extraction of metals back to the value chain.

Swedish culture is completely different from our South African culture. In South Africa, we greet with a smile, and we even make small talk, but in Sweden you mind your own business and focus on yourself. However, one thing that I feel is brilliant is the tidiness and cleanliness. I did not see a single sheet of paper on the floor whether in the bus stop or train station or even on the street. Even in the breakfast or dining hall, or in fast food stalls, when you finish eating you must clean after yourself, take the dishes and cutlery in a tray and put it in the trolley. This is basic housekeeping that we seem to lack as South Africans because we are so used to ‘o-anti’ who clean after us.

As a spin-off from our collaborative workshop with our Swedish partners, we agreed to write an article for publication that will focus on policy solutions for both South Africa and Sweden.

I am grateful to Professor Sibiyi and Mrs Mkhize for providing such an academic and social experience for us. The Research Directorate assisted us financially, and we are forever indebted. I believe that the collaborative efforts and partnerships forged through this initiative will bear more fruits soon.



Professor Xolile Mkhize

The title of my poster presentation was “Building strategic partnerships to design a vulnerability and capacity matrix analysis in mitigating against the effects of climate change for food systems sustainability”. I had the opportunity to explain the assessment tools used to map out the case study and to invite Swedish partners to forge a partnership.

In my view, the Swedish education system is very functional, and resourced, and universities have a well-documented history which is the pride of each university community. There was a great appreciation of how the university takes care of its environment and resources. I also had the opportunity to visit one of the laboratories when I was looking for collaborators and met Professor Kutiate in the Department of Plant Breeding at the SLU University. I found that researchers were very engaged in their work and highly transdisciplinary. I observed that they are more interested in projects that have large funding grants when looking for collaborators.

I noted that the university environment demonstrates that it is a centre of knowledge even before you go into lecture halls this is communicated even through architecture. Professor Kutaite explained the various initiatives they are willing to do in Africa on proteins for food security. I thought this was excellent for laboratory research when providing sustainable solutions for crop diversity.

South Africa is a beautiful country and highly resourced we need to sell South Africa as a brand for research and innovation. Other possible collaborations have been formed from attending the SASUF RI Week.

Building strategic partnerships to design a vulnerability and capacity matrix analysis in mitigating against the effects of climate change for food systems sustainability

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19 TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACT

PROBLEM
 The impacts of climate change, looking at ecosystems, biodiversity, and human communities within global and regional levels is escalating. There is an urgent need to assess vulnerabilities and the capacities and limits of the natural world and human societies to adapt to climate change.

STUDY OBJECTIVE
 The project will undertake a vulnerability and capacity matrix and adaptive capacity analysis and for South Africa and Sweden case studies for using these tools tailored for identifying hazards for regional hotspots to determine the extent to which natural resources and other key resources are susceptible to climate impact risk.

CLIMATIC DRIVERS (natural and human induced) **NON-CLIMATIC DRIVERS (socio-economic, land use, governance, geological)**

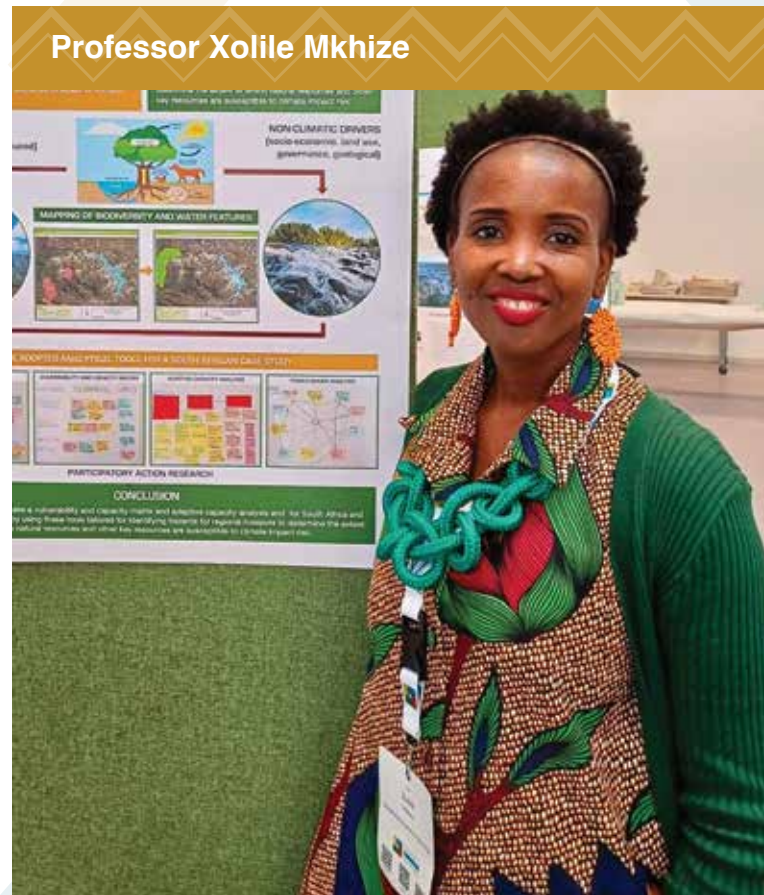
MAPPING OF BIODIVERSITY AND WATER FEATURES

THE ADOPTED ANALYTICAL TOOLS FOR A SOUTH AFRICAN CASE STUDY

IMPACT CHAIN ANALYSIS **VULNERABILITY AND CAPACITY MATRIX** **ADAPTIVE CAPACITY ANALYSIS** **RIVER STRESS ANALYSIS**

PARTICIPATORY ACTION RESEARCH

CONCLUSION
 The project will undertake a vulnerability and capacity matrix and adaptive capacity analysis and for South Africa and Sweden case studies by using these tools tailored for identifying hazards for regional hotspots to determine the extent to which natural resources and other key resources are susceptible to climate impact risk.





Sibusiso Trevor Tshabalala in conversation with the MUT VC and Principal

Sibusiso Trevor Tshabalala

I presented a poster titled “A snapshot of a failed counterbalance land reform strategy in AmaJuba and Zululand District, KwaZulu Natal, South Africa” at the Swedish Agricultural University in Sweden.

The radical system the Swedish have implemented, which is foreign in a developing country, is to decentralise services and abide by the reduction to zero carbon dioxide emissions. Sweden is transforming to live without fossil fuel burning, and I enjoyed the

atmosphere, the cleanliness, safety, warmth and the fact that no one was elevated from the others when dining – whether a Vice-Chancellor, Dean, student or researcher. Most importantly, what I took home was the recycling of everything. Recycling is fundamentally important and generating income from waste is something worth focusing on. The Swedish angle is to live life as it was meant to be, and that is something worthwhile to emulate even at our university, MUT.



Kavita Behara, middle, with her colleague, Dr Thobeka Makhathini, second from right, with her collaborators from DUT, Lund University and Uppsala University in Sweden

Kavita Behara

As a participant in the South Africa-Sweden University Forum (SASUF), I had the privilege of presenting a poster titled "Skin Cancer Classification Using Explainable AI-Powered Deep Neural Networks". The poster detailed my research on optimising deep learning algorithms for improved skin cancer detection and classification. I focused on integrating explainable AI techniques to enhance the interpretability of the neural networks used, making it easier for medical professionals to understand and trust the model's predictions. In addition, I conducted a workshop along with Prof Sibiba and Dr Makhathini from MUT, titled "The Impact of Electronic Waste in the Environment and Human Health: Emerging Challenges and Policy Solutions," in collaboration with two Swedish partners, Dr Carl from Lund University and Professor Katja from Uppsala University as well as a South African partner, Prof Ajay Mishra from Durban University of Technology. The workshop explored the environmental and health implications of e-waste and discussed strategies for sustainable electronic waste management. Participants

engaged in discussions on how to mitigate the adverse effects of e-waste through policy changes, technological innovations and public awareness campaigns.

Immersing myself in Swedish culture was an enlightening experience. As a South African academic, the opportunity to interact with Swedish colleagues and students provided a unique perspective on their educational and societal norms. I learned that Swedish culture places a high value on sustainability, inclusivity and innovation. The Swedish educational system's emphasis on collaborative learning and equal opportunities for all students was particularly inspiring. The concept of "fika," a daily break involving coffee and socialising, emphasised the importance of work-life balance and the value of informal interactions in fostering community and creativity.

Dr Nkululeko Nkosi

The SASUF Sustainability Forum in Sweden was a great experience for me. My poster presentation attracted the attention of highly esteemed researchers who later expressed interest in my research. The poster was titled “Gas hydrate-based technology for fruit juice concentration: Lessons learnt thus far”. Fortunately, I have managed to find a Swedish partner with extensive thermodynamic modelling experience at Uppsala University.

One lesson I have learned from Sweden is that the UN’s goal of net-zero emissions by 2050 is achievable through renewables. I was amazed at their 100% electric public transportation system. This shows the importance of realising the positive impact of research and innovation on the country’s development. As part of its commitment to improving the educational attainment of its citizens, deepening their engagement in governance processes, and providing economic development opportunities through increased access to public Wi-Fi, Sweden has chosen to connect its citizens to reliable free Wi-Fi in public transportation, malls, and other public areas. It was a unique experience to see how clean, safe, and well used bicycles and public transportation were – including by high-profile individuals like Vice-Chancellors, professors, and mayors, which is uncommon in South Africa.

Sweden has done an excellent job of maintaining its environment by recycling everything, including citizens’ attitudes toward this act. This is by far the most interesting sustainability project I have witnessed as part of the lessons learned in Sweden. Sweden’s commitment to sustainability through recycling and the use of electric vehicles offers many lessons for the world at large.

GAS HYDRATE-BASED TECHNOLOGY IN FRUIT JUICE CONCENTRATION: A lesson learnt thus far

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INTRODUCTION

HYDRATE-BASED TECHNOLOGY

TECHNO-ECONOMIC ANALYSIS

Case	Energy consumption (kWh)	Number of stages	Time per stage (min)
Reference	1000	5	10.0
Case 1	800	5	8.0
Case 2	600	5	6.0

CONCLUSION

- Observed inhibition effects may not be ignored when the predictive thermodynamic model is developed to calculate the dissociation points for investigated systems.
- We suggest that further studies on how molecular properties of hydrate, CO₂, and water are changed must be carried out to understand better the increase in the dissociation enthalpies.
- Based on a study of hydrate technology it was discovered that hydrate based technology could replace three evaporators in fruit juice production.

OUTLOOK

Priority should be given to hydrate dissociation data as well as kinetic data of commercially relevant water-jacket systems which, once measured, will constitute a database that can be instrumental in developing modelling approaches.

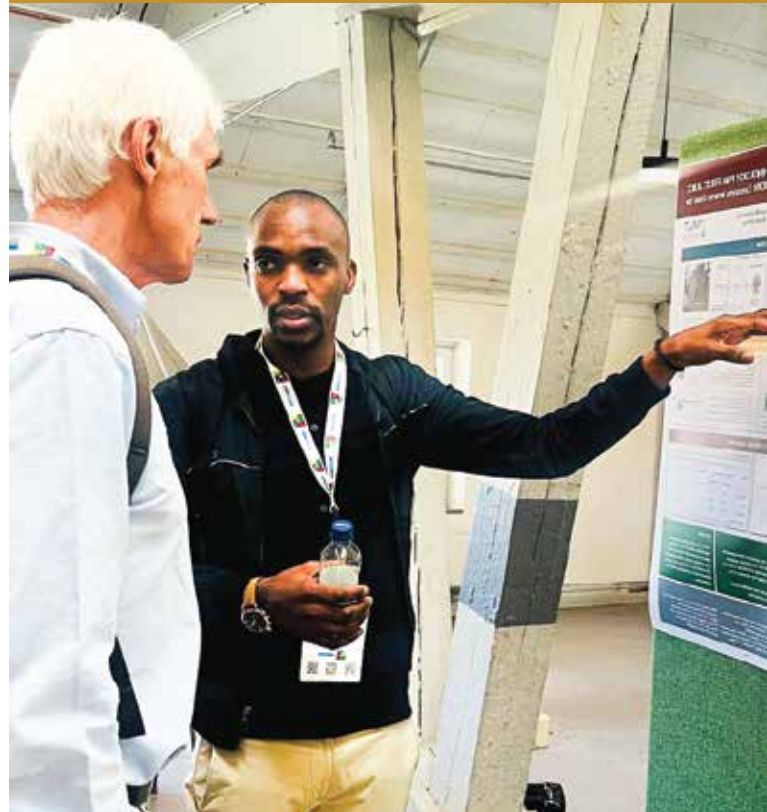
REFERENCES

Mut, N. Nkosi, A. T. Kaniki, K. 2023. A review of thermodynamic and kinetic models for gas hydrate-based fruit juice concentration. J. Food Eng. Technol. 10(1): 1-10.

Mut, N. Nkosi, A. T. Kaniki, K. 2023. Experimental study of gas hydrate-based fruit juice concentration. J. Food Eng. Technol. 10(1): 1-10.

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Dr Nkululeko Nkosi, right, making a point to a delegate in Sweden



Mbali Mkhize

Concerned by the dwindling international student numbers at MUT, from 2021 Mbali Mkhize began a study aimed at determining if this was a national or global phenomenon. Bolstered by a DAAD fellowship that brought her together with at least 30 international administrators from Africa, Latin America and Asia, she realised that this phenomenon required a detailed study. In Sweden she presented a workshop on “Future proofing international student mobility post Covid-19” with colleagues from Mangosuthu University of Technology, Cape Peninsula University of Technology and Karlstad University as a part of her study, which will contribute to the Department of Higher Education and Training’s internationalisation agenda for all universities.

“The input from delegates during this workshop was quite invaluable and added to the global voice I need to strengthen my current study,” said Mkhize. She also presented a poster on a similar project because “A poster provides you with more exposure. Even if people were not able to attend your workshop, they would still obtain more information about your study. This is what exactly happened as the Vice-Chancellor from the University of the Free State where I am undertaking my studies just happened to visit my poster.”

“From an intercultural communication perspective, I was impressed at how the Swedes speak English. It was easy to get around and we later learned that English is part of the medium of instruction. For me, this is important as it is easier when we have collaborations with countries who understand our official language of communication. I loved the lifestyle, everyone either walks or cycles thus saving the environment against greenhouse gas emissions and adding more years into one’s lifespan,” Mkhize said.

FUTURE-PROOFING INTERNATIONAL STUDENT MOBILITY POST COVID-19

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THEME 2:
Education for a sustainable society

THEME 3:
Social transformation through change:
Knowledge and social development strategies

INTRODUCTION

International Student Mobility (ISM) is a gateway for universities across the globe to increase their third stream income, as well as to:

- Diversify the student body
- Enhance multiculturalism and intercultural communication

International studentmobilitet stärker mångkulturalitet och interkulturell kommunikation

国際生徒交流促進多元文化文化交流

Internationale Studierendemobilität fördert Multikulturalität und interkulturelle Kommunikation

留学生の流動性は、多文化主義と異文化間コミュニケーションを強化します

Ukuzumba kwabalandi bamazwe ngamazwe kuthuthukisa amawiko amaningi nokuzhumana phakathi kwamawiko

PROBLEM

- Covid-19 resulted in global lockdowns.
 - Students returning to home countries
 - Online education

EXPECTED SOLUTIONS WILL BE ON:

Risk management

- Building a digital strategy
- Migration issues
- Unemployment
- Racism and xenophobia
- Working in silos vs co-creating knowledge
- Transitioning from being an International Student abroad to being an international student at home faced with:
 - Poor access to digital resources
 - Different time zones
 - SA time-UK time
 - SA time-New York time
 - SA time-Beijing

Mbali Mkhize, left, in discussion with a delegate in Sweden





Zama Sishi, left and a delegate in Sweden

Zama Sishi

“Strategic communication messaging for stakeholder resilience” was the title of Zama Sishi’s poster presented under Sustainable Development Goal 5 during the SASUF Research and Innovation Week. The poster was focused on positioning universities as active contributors to community resilience in times of disasters and pandemics.

Aligned with her work as director of stakeholder engagements at MUT’s Marketing and Communication department, Zama Sishi’s research is grounded on university communication departments designing two-way stakeholder-focused communication that incorporates the views and feedback of stakeholders. She proposes that crafting proactive communication messaging is set to create reputational ambassadors and climate change advocates.

The research takes into consideration the fact that university communication has evolved from merely being a tool for brand positioning to becoming an intangible asset that universities employ to reduce inequalities among communities. “The pressure is mounting for university communication

professionals to tailor communication activities in a way that not only enhances business strategies but yields a value that could be translated into economic terms.

Resilient institutions and communities are achieved with a shift of communication towards a people-focused approach which takes into cognisance the fact that organisations rely on communication as a driver of culture,” Sishi said. The poster presented dovetails from Sishi’s Master’s research findings. The research further feeds into her current study which investigates the future legitimacy of South African higher education institutions using effective and purposeful communication practices and strategies to retain stakeholder support.



South Africa
Sweden
University Forum



Dr Jean Gad Mukuna

Refuelling in Morocco

Globally, researchers and academics are known to use their long breaks, be it summer or winter, at other institutions where they get opportunities to reconnect with their peers and sharpen their skills and competencies. During the South African winter break, Dr Jean-Gad Mukuna, the acting head of department for Mechanical Engineering, collaborated with peers at Mohammed VI Polytechnic University (UM6P) in Morocco. UM6P is a non-profit private research university which is oriented towards applied research and innovation and is engaged in regional economic and human development.

The visit was facilitated by Professor Tumba Kaniki, Research Leader in MUT's Faculty of Engineering, who has connections with Professor Mouad Dahbi (whose special interests are in electrochemical energy storage, supercapacitors, Lithium-ion and Sodium-ion batteries) and Professor Mohamed Makha (whose special interests are in thin film solar cell technologies, organic photovoltaics, perovskite solar cells, organic electronics, and surface technology). Both are researchers at the

Materials Science, Energy, and Nano-engineering (MSN) department at UM6P.

Professor Kaniki and the Moroccan colleagues became acquainted during meetings on lithium-ion battery studies and Professor Kaniki had the foresight to deepen the relations further with MUT through Dr Mukuna

Dr Mukuna said: "In June and July 2024, I visited Mohammed VI Polytechnic University, focusing primarily on the Materials Science, Energy, and Nano-engineering departments based in the green city of Benguerir. The tour began with a comprehensive overview of the cutting-edge facilities, including advanced laboratories dedicated to solar energy research and nano-materials development. The collaboration with The Green Energy Park was highlighted, showcasing joint projects aimed at optimising renewable energy technologies and developing innovative materials for energy applications. I observed demonstrations of photovoltaic module

testing, thermal energy storage solutions, and state-of-the-art nano-engineering techniques. Discussions with leading researchers provided insights into ongoing projects and potential future collaborations. The visit concluded with a tour of the outdoor testing facilities, where pilot-scale solar technologies are rigorously evaluated”.

Some of the visits included time spent at the MSN department, which aims to make use of innovative research and education to promote solution development and entrepreneurship in the context of Moroccan and African challenges, while training the next generation of top scientists, innovators and entrepreneurs.

“I was particularly attracted and interested in the development of phosphate-based materials for storing thermal energy primarily from solar energy. I also visited the Green Energy Park which is a platform for experimentation, research, and training in renewable energy. It was established through a collaboration between the Institute for Research in Solar Energy and New Energies (IRESEN) and the Mohammed VI Polytechnic University (UM6P),” said Dr Mukuna.

The Green Energy Park platform, the first of its kind in Africa, facilitates the creation of synergies

and coalitions among several Moroccan research institutions to achieve excellence. It also allows for the acquisition of knowledge and expertise through partnerships with other universities and Moroccan industries.

Takeaways from the visit

“My visit deepened my understanding of the latest developments in materials science, energy technologies, and nano-engineering, particularly concerning their applications in renewable energy. I also gained insight into the latest technological innovations in solar energy storage and photovoltaic module testing, which could inform future research or projects. It also fostered a better understanding of the academic and research culture in Morocco, enriching the overall experience and broadening perspectives on global research trends.

I am grateful to our Research Directorate for this opportunity as it gave me a chance to benchmark the practical applications of research, such as the development of phosphate-based materials for thermal energy storage and advanced photovoltaic systems, and demonstrate how academic research translates into real-world solutions,” said Dr Mukuna.



MUT Chemical Engineering researcher forges ties with like-minded international institutions

“The outcome of these engagements can only benefit MUT” – Professor Tumba

The tail end of 2023 and the opening months of 2024 were a very busy time for one of MUT’s leading researchers. The Chemical Engineering Department’s Professor Kaniki Tumba, a Research Leader for Energy and the Environment at MUT, spent time in Europe and Central Africa, as well as online with colleagues in Asia, creating ties with like-minded individuals in these regions. Below we profile two key collaborations with potential for further future spinoffs.



Professor Kaniki Tumba

Pioneering life cycle analysis training for Chinese PhD students

Professor Tumba was invited by the research-intensive Jilin University in the People's Republic of China to deliver a series of life cycle analysis lectures to 20 PhD students in the Department of Biological and Mechanical Engineering. The training, conducted in English, began in January 2024, and is scheduled to continue online until December 2024. Professor Tumba said the focus of the training is to equip postgraduate students with the skills necessary to quantitatively assess environmental impacts, such as the global warming potential of various processes, particularly with agricultural mechanisation research.

Upon completion of the training, the students should be able to apply eco-design principles in

their research associated with the development and use of agricultural machinery. This includes the design and innovation of tractors, harvesters, ploughs, harrows, cultivators, seeders, planters, tillers and spreaders. “The aim is to foster a new generation of engineers capable of creating more sustainable and environmentally friendly agricultural tools,” said Professor Tumba.

Professor Guo Li and Professor Jiangtao Qi are Professor Tumba’s main collaborators at Jilin University, ensuring the successful integration and application of these advanced environmental assessment techniques in applied research undertaken by their graduate students. Professor Tumba said the collaboration highlights the global reach and impact of MUT's research initiatives, underscoring the University's commitment to fostering international academic partnerships and addressing critical global challenges.

Collaboration with the University of Zambia (UNZA) School of Mines

In a significant step toward fostering international academic collaboration and capacity building, the School of Mines at the University of Zambia (UNZA) hosted Professor Tumba from 15 October to 15 November, 2023. This programme, sponsored by the MUT Research Directorate, was marked by a diverse range of activities. It took place across various Zambian cities, including Lusaka, Ndola, Kitwe and Kariba.

The initiative was spearheaded at UNZA by Dr Jewette Masinja, a prominent School of Mines researcher in the Engineering faculty. The primary aim of this visit was to facilitate experience sharing and engage in preliminary discussions for a formal collaboration between the UNZA Faculty of Engineering, and the MUT Faculty of Engineering.

Professor Tumba and Dr Masinja engaged in numerous hands-on consultancy tasks that yielded practical and invaluable insights. One notable activity was the preparation of the Environmental, Social and Governance (ESG) report for Kariba Minerals, which operates the world's largest emerald mine. "This crucial document underscores the company's commitment to sustainable practices and ethical standards," said Professor Tumba. Additionally, the participants worked on two other consultancy reports, further enhancing their expertise in real-world applications of environmental impact assessment tools. Professor Tumba said the collaboration involved detailed discussions and activities focused on the development of skills in writing ESG policies, ESG reports, and Environmental Impact Assessment (EIA) reports. "These tasks are vital for engineers to effectively address environmental and social challenges in the mining sector," said Professor Tumba.

This scholarly visit has set the stage for a formal Memorandum of Understanding (MOU) between UNZA and MUT. This MOU would not only formalise the collaborative efforts, but also pave the way for ongoing exchanges and joint projects. "Such an agreement is expected to enhance the skill sets of Engineering staff members from both



Professor Kaniki Tumba, right, Dr Jewette Masinja, at Konkola Copper Mines Offices in Zambia

institutions, particularly in areas related to ESG and EIA, which are becoming increasingly important in the global mining industry. "This initiative is closely aligned with the Energy and the Environment Focus Area mandate, which emphasises capacity building and collaboration. By equipping Engineering professionals with the necessary skills to produce comprehensive ESG and EIA reports, the programme contributes to the broader goal of sustainable development in the mining sector," said Professor Tumba.

MUT RESEARCHERS MAKE HISTORY IN MAJOR INTERNATIONAL CONFERENCE ON ENVIRONMENT AND HEALTH



MUT staff at the University of Galway, Ireland

Professor Theo Davies, MUT Research Professor led a team of eight MUT researchers who presented to a global audience of over 500 leading scientists, consultants and public servants engaged in the multi-disciplinary areas of “Environment and Health”. The Joint Conference of ISEH (International Symposium on Environment and Health), ICEPH (International Conference on Environmental Pollution and Health) and ISEG (Environmental Symposium on Environmental Geochemistry) was held at the University of Galway, Ireland from 11 to 18 August 2024.

Professor Davies said, “With the fast economic development, the importance of environment and health is being increasingly recognised in the world, echoing the need for the creation of a suitable platform where diverse cadres of environmental scientists and international experts can interact.”

The MUT team returned home with two meritorious awards for their presentations under the sub-theme: “Recent Advances on Medical Geology Research in Africa: A Decadal View”.

These are the MUT researchers who got awards: Nadasan, D.S. and Davies, T.C.: “A Code for Medical Geology Fieldwork in Africa: Guidelines on Health and Safety Issues in Mapping Disease Distribution and Their Geoenvironmental Correlates” – Dr. D.S. Nadasan scooped “Best Oral Presentation Award”.

Mkhize, X.M. and Davies, T.C.: “The Geochemical Circulation of Nutritional and Potentially Harmful Elements in the Human Body: Climate Change Impacts on Bioavailability and Bioaccessibility” – Prof. Xolile Mkhize scooped “Most Insightful Paper Award”.

All MUT presentations have been accepted for publication in a Special Issue of the Springer Book Series known as: “Springer Briefs”. Some of the conference spinoffs include the proposed joint research plan of Prof Alfred Msomi, acting dean in the Faculty of Natural Sciences and Professor Theo Davies, and delegate Dr. Wilfried Duthe of Dawei Export- und Import marketing of Germany on: “Mercury Exposure and Health in Alluvial and Small Scale Mining” and “The absorption of mercury by zeolite. The research collaborative initiative put forth by Professor Davies and Dr. Jing Zhou of Springer Nature Editorial Office on: “Carbon Sequestration Research”; (iii) “Medical Geology Short Courses Offering” to African Medical Geology researchers proposed by Medical Geology pioneers – Professor Robert Finkelman (Dallas, Texas), Professor Jose Centeno (US Military Academy), Dr. Emmanuel Arhin (University of Energy and Natural Resources, Ghana) and Professor Davies. In addition, several potential visiting scholars are expected to visit MUT, and some future supervisors were identified by MUT participants.



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