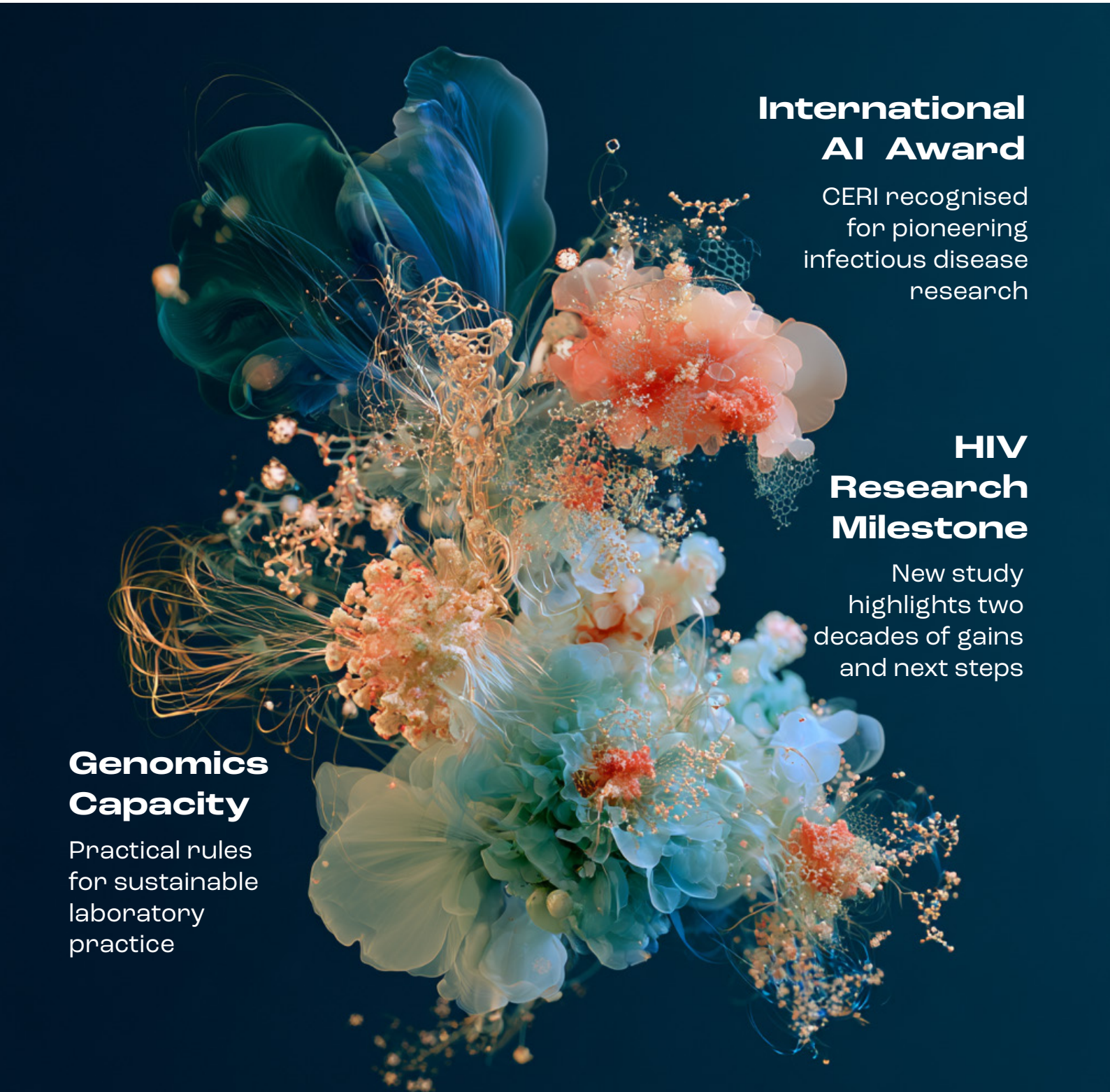
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genomics, epidemics
& microbes

the gem



International AI Award

CERI recognised for pioneering infectious disease research

HIV Research Milestone

New study highlights two decades of gains and next steps

Genomics Capacity

Practical rules for sustainable laboratory practice

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New Lancet HIV Study

One of the world's largest ongoing population-based HIV studies shows major declines in new infections over two decades. But from 2019, progress has stalled – and in some cases begun to reverse. A new study identifies where renewed action could help South Africa regain momentum towards epidemic control.

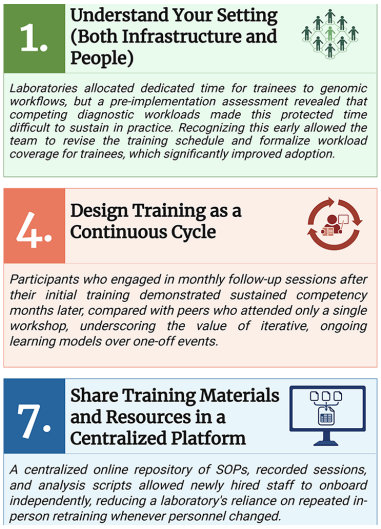
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SPARK in South Africa

SPARK, an international network pioneered at Stanford University, is strengthening its presence in Africa, helping researchers translate scientific discoveries into practical health solutions. New partnerships and mentorship opportunities, including SPARK Neglected Tropical Diseases (SPARK NTD), support plans to expand the network in South Africa.

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Building Genomics Capacity

Drawing on experiences in Brazil and Africa, a new publication offers ten practical rules for making genomics part of routine laboratory practice. At its heart is a message about the importance of people, collaboration, and continuous learning in building sustainable scientific capacity. The rules also address practical challenges involving infrastructure, training, and institutional support.

the gem: Centre for Epidemic Response and Innovation (CERI) & South African Centre for Epidemiology and Modelling Analysis (SACEMA), Stellenbosch University, and KwaZulu-Natal Research, Innovation and Sequencing Platform (KRISP), UKZN, Durban
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Harnessing Seaweed

African STARS fellow Grace Bosco is exploring how biotechnology can transform Tanzania's underutilised seaweed into valuable products while creating new opportunities for women in coastal communities. Her work focuses on developing agricultural and livestock products while helping women gain the skills to participate in the emerging seaweed industry.

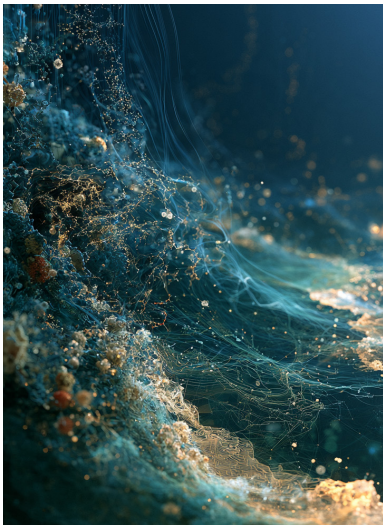
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African Science: Global Health

At a global health discussion during the 2026 United Nations General Assembly in New York, Dr Monika Moir shared how African scientific expertise, genomic surveillance, and predictive modelling can help countries anticipate outbreaks and build more resilient healthcare systems. She also highlighted the importance of strengthening African leadership in global health research and decision-making.

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Nature Awards AI for Discovery

A multidisciplinary research team at CERI, Stellenbosch University, led by Prof Houriiyah Tegally, has won the Health and Life Sciences category of the Nature Awards AI for Discovery. The award recognises the team's innovative use of artificial intelligence (AI) and machine learning to analyse pathogen genomes, investigate how infectious diseases evolve and spread, and identify environmental conditions that may increase the risk of outbreaks.


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editorial

Scientific progress takes many forms, and this issue of **the gem** reflects that diversity through new discoveries, international recognition, innovation, and the people behind the work.

A highlight is the Nature Awards AI for Discovery, recognising CERI's multidisciplinary team led by Prof Houriiyah Tegally. Their work demonstrates how artificial intelligence is opening up new possibilities for understanding and anticipating infectious disease threats.

We also examine what long-term studies can reveal. More than two decades of HIV surveillance in KwaZulu-Natal show remarkable progress, but also worrying signs of stalled gains. Meanwhile, new findings on Rift Valley fever provide insights into how viruses evolve and spread between outbreaks.

These studies highlight an important challenge: generating evidence is only part of the process. Ensuring that it informs public health decisions requires continued surveillance, reliable data, and the ability to respond as circumstances change.

Putting scientific advances into practice is another focus. We explore approaches to integrating genomics into routine laboratory work, alongside initiatives such as SPARK and SWEAT Africa that connect science with innovation and entrepreneurship.

Beyond the findings, we meet African STARS fellows, students, scientists, and laboratory professionals, sharing their experiences, ambitions, and contributions. Their stories offer insight into different career paths, the challenges they encounter, and the opportunities available to researchers across Africa.

Together, these stories reflect the breadth of work taking place across CERI and its networks, the challenges being addressed, and the ideas and collaborations opening up new possibilities.

text: **Katrine Anker-Nilssen**

After Two Decades of Gains, HIV Progress in KwaZulu-Natal Has Stalled Since 2019, Lancet HIV Study Finds

One of the world's largest ongoing population-based HIV studies shows major declines in new infections over two decades. But from 2019, progress has stalled – and in some cases begun to reverse. A new study identifies where renewed action could help South Africa regain momentum towards epidemic control.

text: CERI Media photos: Supplied

South Africa's HIV response has transformed the course of the epidemic over the past two decades, with expanded treatment and prevention contributing to substantial declines in new infections and improvements in survival.

Now, this long-running population-based HIV cohort is providing a detailed picture of that progress – and showing where the next phase of the response needs to focus.

An international study published in *The Lancet HIV* found that overall HIV incidence in a rural KwaZulu-Natal population fell by 55% between 2010 and 2024–25, with particularly steep declines between 2013 and 2018. However, progress has largely stalled since 2019, with some key epidemic-control measures beginning to reverse, highlighting the need to adapt prevention and treatment strategies to sustain the gains already achieved.



The findings come from more than two decades of population-based HIV surveillance by the Africa Health Research Institute (AHRI), analysed by researchers from AHRI, Stellenbosch University's South African Centre for Epidemiological Modelling and Analysis (SACEMA) and Centre for Epidemic Response and Innovation (CERI), and international partners. Professor Frank Tanser (pictured on page 8), based at both AHRI and SACEMA/CERI, is the study's senior author.

"South Africa has made extraordinary progress against HIV over the past two decades," says Prof Tanser. "These data show what sustained investment in treatment and prevention can achieve. They also give us a clear picture of where we now need to focus to protect those gains and accelerate progress towards epidemic control."

Two Decades of Progress

Between 2013 and 2018, annual HIV incidence fell by 52.2% among males and 36.9% among females. Across the longer period, overall incidence declined from 3.32 new infections per 100 person-years in 2010 to 1.49 in 2024–25 – an overall reduction of 55%.

Population-level viral control also improved dramatically during much of the study period. Between 2011 and 2018, detectable viraemia among people living with HIV fell by 44.5% in males and 50.5% in females, reflecting the impact of expanded antiretroviral treatment.

Another key measure of epidemic control – the incidence-to-prevalence ratio – fell by 74.2% between 2006 and 2022, moving close to the benchmark associated with epidemic control.



Where Progress Is Slowing

The most recent data, however, show a clear loss of momentum. The researchers found no evidence of a continued decline in HIV incidence between 2019 and 2025 among either females or males.

After years of improvement, detectable viraemia increased by 9.6 percentage points between 2019 and 2025, while the incidence-to-prevalence ratio stalled above the epidemic-control benchmark after reaching its lowest recorded level in 2022.

“These results provide a timely insight into the changing dynamics of the HIV epidemic,” says lead author Elphas Okango. “This should be a call to action. We need to build on the successes of the past but use the tools we have at our disposal more effectively to drive the epidemic towards elimination.”

The substantial gains of the past two decades remain clear, but the findings show that further progress cannot be taken for granted – and that the next phase of South Africa’s HIV response will need to evolve with the epidemic.

Expanding Who We Need to Reach

The study highlights important differences by age and sex that can help guide more targeted prevention and treatment strategies.

HIV incidence has continued to decline among younger adults aged 15–34, but these gains are being offset by stalled or increasing incidence among adults aged 35–54. The researchers say this points to the need for prevention programmes that reach people across a broader range of ages.

The lifetime risk of acquiring HIV has also fallen substantially over the course of the study, but remains high – particularly for women. Based on the age-specific incidence rates observed between 2019 and 2025, the estimated cumulative risk of acquiring HIV between ages 15 and 54 was 53% for females and 32% for males, assuming those incidence patterns persisted and excluding the competing risk of death.

These patterns provide an opportunity to focus interventions more precisely on the groups and stages of life where additional gains can now be made.

Data That Can Guide the Next Phase

The study draws on AHRI’s health and demographic surveillance system in rural KwaZulu-Natal, one of the world’s largest population-based cohorts with over two decades of ongoing longitudinal HIV data collection.

Among 42,662 participants who initially tested HIV negative and were subsequently recontacted, 29,702 underwent repeat HIV testing. Across more than 182,000 person-years of observation, researchers recorded 4,852 new HIV infections.

The longitudinal data allowed researchers to examine HIV incidence, viral suppression, lifetime acquisition risk, and other epidemic-control measures in exceptional detail.

“The power of this data from AHRI’s health and demographic surveillance system lies in its depth and continuity. By following the same population over more than two decades, we can see changes in the epidemic that would be difficult to capture through

periodic surveys alone. This gives us a much clearer picture of where we are making progress, where we are losing momentum, and where targeted action could make the greatest difference," said AHRI Director of Science and study co-author Dr Kobus Herbst.

While the cohort is based in rural KwaZulu-Natal and is not nationally representative, its long-term, high-resolution data provide an important window into epidemic dynamics in one of South Africa's highest HIV-burden settings.

The Tools to Change Course Are Already Here

Importantly, the researchers emphasise that the recent slowdown is not irreversible. The tools needed to accelerate progress already exist.

They point to tailored prevention options for different risk groups, stronger initiation of and adherence to antiretroviral therapy, more flexible and patient-centred services, and long-acting agents for HIV prevention and treatment as important opportunities for the next phase of the response.

Taken together, these findings challenge the assumption that progress towards HIV epidemic control will continue without renewed action. While South Africa has made substantial gains, the recent slowdown highlights the need to reassess strategies, strengthen the response, and plan beyond the UNAIDS 2030 targets.

The findings come at a time of growing uncertainty in global HIV financing, reinforcing the importance of sustaining the programmes that have driven progress while adapting them to the changing epidemic. The authors call for coordinated action across research, policy, government, civil society, and international funding partners to ensure that proven tools are implemented effectively and sustained.

**The study was funded by the National Institute of Mental Health.*

Read more here: https://www.thelancet.com/journals/lanhiv/article/PIIS2352-3018(26)00180-3/fulltext



Expanding AI Skills

An African initiative aims to equip university lecturers to train the next generation of AI researchers.

The South African launch of AI Research Foundations (AIRF) took place on 9 November 2026 at Stellenbosch University's Biomedical Research Institute (BMRI), Tygerberg campus, hosted by the Centre for Epidemic Response and Innovation (CERI) in collaboration with the African Institute for Mathematical Sciences (AIMS) South Africa.

The pan-African initiative aims to reach 30 universities across Ghana, Kenya, Nigeria, and South Africa, with the ambition of training 30,000 students in advanced artificial intelligence (AI).

Supported by Google.org, with a curriculum developed by Google DeepMind, AIRF focuses on deep learning, neural networks, generative language models, and responsible AI development.

The launch marked the beginning of a five-day Train the Trainer workshop, equipping university lecturers and researchers to introduce advanced AI courses at their institutions.

Representatives from CERI, AIMS, FATE Foundation, Google South Africa, and the National Institute for Theoretical and Computational Sciences (NITheCS) highlighted the importance of collaboration, scientific excellence, and developing African AI expertise.

CERI researchers are participating in the workshop and will help deliver the curriculum across Stellenbosch University in 2027, expanding opportunities for students and researchers to develop advanced AI skills.



Scaling Biotechnology

At an African STARS seminar, biotechnology entrepreneur Dominic Nicholas shared Immobazyme's journey towards commercial production and the lessons learned along the way.

Africa imports most of the enzymes and recombinant proteins used by its industries. Developing local manufacturing capacity presents an opportunity for African biotechnology companies to reduce this dependence.

At an African STARS seminar hosted by the Centre for Epidemic Response and Innovation (CERI) at Stellenbosch University on 29 October 2026, Dominic Nicholas, co-founder and CEO of Immobazyme, shared the South African company's journey of finding the right market fit, from sugar processing to nutraceuticals.

Founded in 2019 by Nicholas, Nick Enslin, and Ethan Hunter, Immobazyme develops recombinant proteins for industrial, cosmetic, food, and pharmaceutical applications.

Its progress includes achieving ISO 22000 certification, supplying its Solulase™ product across four continents, conducting a customer-funded field trial, and designing a production cleanroom.

Nicholas also reflected on lessons learned in establishing the business. Initially, the founders tried to conserve limited funding by doing much of the work themselves, but discovered the value of investing in experienced professionals and giving them the resources and freedom to succeed.

Another important lesson was understanding customers' regulatory requirements early. A technically successful product was not enough. Food safety certification, halal or kosher compliance, and laboratory testing documentation were also essential to accessing markets.

A Stellenbosch University MSc Microbiology graduate, Nicholas is overseeing the development of a 1,800m² manufacturing facility to support Immobazyme's expansion.

Hosted by Dr Richard Gordon, the seminar formed part of the African STARS Seminar Series, which connects fellows with leaders working across Africa's science, health, and biotechnology sectors.

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Building Momentum for SPARK in Africa

SPARK is strengthening its presence in Africa, helping researchers advance promising scientific discoveries towards practical health solutions. New international partnerships and mentorship opportunities are supporting plans to expand the network in South Africa.

text: **CERI Media** photos: **Jasmin Frei**

A recent visit to Switzerland by Dr Juandré Klopper *(pictured below)*, an African STARS MBA fellow with CERI at Stellenbosch University, provided an opportunity to participate in the launch of SPARK Neglected Tropical Diseases (SPARK NTD) in Basel, engage with leading global health organisations, and learn from established SPARK programmes as preparations continue to expand the network in South Africa.

SPARK is an international network dedicated to helping researchers translate scientific discoveries into practical solutions. Its approach centres on mentorship, connecting research teams with experienced clinicians, industry specialists, and other experts who understand what it takes to move promising findings towards implementation and commercialisation.



SPARK NTD is a collaboration between Stellenbosch University and the University of Basel, focused on advancing research into neglected tropical diseases. Working alongside Douglas Häggström, Dr Klopper participated in preparations for the launch at the SPARK Showcase and discussions about the programme's future development.

During the visit, Dr Klopper engaged with organisations in Geneva, including the World Health Organization, Medicines for Malaria Venture, and FIND. He also visited the Novartis headquarters in Basel.

"The meetings in Geneva were also particularly meaningful. Being there to represent Stellenbosch University helped demonstrate that SPARK NTD is a shared initiative between the Global North and Global South. It was encouraging to see the interest in what we are building together," says Dr Klopper.

"One message stood out: academia, industry and health officials can and must communicate effectively if we want research to improve people's lives."

– Dr Juandré Klopper

The visit reinforced the importance of collaboration between researchers, industry, and health organisations in ensuring that scientific discoveries benefit patients and communities.

“One message stood out: academia, industry and health officials can and must communicate effectively if we want research to improve people’s lives,” says Dr Klopper.

Dr Klopper also connected with colleagues from Stanford SPARK and programmes in Bordeaux, the Midlands, Zurich, Finland, Denmark, and Western Switzerland, gaining insights into their experiences of establishing and running SPARK initiatives.

“What stood out most was how warmly we were received and how generously people shared their experience,” Dr Klopper reflects. “In my conversations with colleagues from established SPARK programmes, I could ask practical questions about getting started, what had worked for them and what they would do differently.”

These exchanges provided valuable insights for establishing SPARK in South Africa, along with relationships with experienced colleagues who can offer ongoing guidance.

With support from Prof Collen Masimirembwa, Director of SPARK Africa, preparations are underway to establish SPARK in South Africa as part of the continental network. SPARK Africa serves as the umbrella organisation coordinating SPARK programmes across the continent.

The initiative aims to complement existing support through universities and innovation organisations, helping research teams identify the questions they need to answer, the evidence they need to generate, and the next steps towards implementation and commercialisation.

“I see the biggest opportunity in connecting researchers with people who have experience taking discoveries through the next stages of development,” Dr Klopper explains. “A promising finding is an important starting point, but moving it towards a practical solution requires additional expertise: understanding clinical needs, product development, regulation, intellectual property and commercial viability.”

SPARK NTD is already active, supporting its first research project towards translation. Researchers working on neglected tropical diseases with potentially commercially viable findings, as well as industry partners and experts interested in becoming mentors, are encouraged to connect through sparkntd.org, where they can also join the programme’s mailing list.

Reflecting on the visit, Dr Klopper echoed a message shared by his colleague Douglas Häggström: good research deserves more than publication and should have the opportunity to be translated into action.

“As a medical doctor, I am most excited by the possibility of helping research reach the people who could benefit from it,” he says. “There is something very motivating about bringing researchers, clinicians and industry experts into the same room and working through what it would take to turn a promising idea into a useful solution.” Beyond the practical knowledge gained in Switzerland, Dr Klopper hopes to bring the same spirit of openness and collaboration to researchers in South Africa.

“I am also excited to be a part of a community in which researchers feel supported as they explore unfamiliar territory. I experienced that generosity within the international SPARK network, and I would love for our teams to experience it here.”

The next priority is to build on these international relationships, expand support through SPARK NTD, and develop the mentorship network and structures needed to establish SPARK in South Africa.



Creating a Home for African Health Innovation

For African scientists developing new health technologies, the journey towards commercialisation can be challenging. Scientific expertise and promising research do not automatically translate into the business skills, investment, and partnerships needed to bring an innovation to market.

Creating those connections was at the heart of a discussion on ecosystem development at the sixth African Health Research and Innovation Funders Forum (AHRIFF), held in Cape Town, South Africa, from 19 to 21 October 2026.

Professor Houda Ghozzi *(pictured below)*, founder of OpenStartUp, described three essential ingredients for sustainable innovation: the brain, representing scientific knowledge and expertise; the heart, including accelerators and financial support; and the home, where the different players can meet and work together.

"SWEAT is a home," she said, highlighting the importance of bringing scientists, investors, funders and start-ups together around a shared vision.

Her message was reinforced by Dr Ross Vermeulen, Chief Scientific Officer of South African biotechnology company Fluorobiotech, who shared how entrepreneurship support helped him navigate the transition between academic research and commercialisation.

After developing technology with potential applications in local vaccine manufacturing, Dr Vermeulen and his co-founder received an initial translational grant of approximately R800 000. But when they sought further investment, a prospective investor instead encouraged them to participate in OpenStartUp's accelerator programme.

The experience fundamentally changed his understanding of how to take an innovation to market.



"Sell it before you build it," was one of the most important lessons, he said, alongside learning to communicate the benefits of a technology rather than its technical features.

"It took me three years to say raw materials for vaccines and not IVT enzymes," he recalled.

Today, Fluorobiotech supplies raw materials for vaccine manufacturing, employs nine people and is pursuing opportunities to support local vaccine producers. Dr Vermeulen, who is also part of the SWEAT Africa team, highlighted SWEAT Africa's role in encouraging young scientists to consider entrepreneurship as a viable career path and recognise the potential of technologies developed within African universities.

Developing this talent pipeline was another focus of the session. Dr Bethlehem Tefera presented the African STARS Fellowship Programme, which is developing African expertise in science, entrepreneurship, and healthcare leadership. The programme has trained 105 fellows representing 27 African countries, with early outcomes including the advancement of four start-up companies.

Her message was that Africa needs stronger connections between existing programmes, so that researchers and innovators can progress towards commercialisation without having to start again each time one funding opportunity ends.

The discussion also emphasised the need for better coordination among funders, particularly around shared priorities and closer collaboration with African governments. Effective collaboration does not necessarily require funders to pool their resources, but rather to align their investments and work towards complementary objectives.

SWEAT Africa's role in connecting researchers with potential investors offered a practical example of how these connections can be strengthened. Yolisa Nalule, Ecosystems Lead, Africa, at Wellcome, described how promising scientific ideas can reach the end of a research grant without a clear pathway towards further development. Bringing researchers to SWEAT Africa to meet venture capitalists and angel investors offers one way to help bridge that gap.

For Prof Ghozzi, the ambition extends beyond individual innovations. It is about changing the opportunities available to African scientists and building businesses that respond to local needs.

SWEAT Africa's contribution lies in helping create the connections, visibility, and shared ambition needed to make that possible.

Coastal Connections

Engagements in Mombasa brought Kenyan and South African innovation communities together ahead of SWEAT Africa 2027.

SWEAT Africa strengthened its continental network of entrepreneurs, investors, and innovation partners at the seventh edition of Pwani Innovation Week in Mombasa, Kenya. The six-day event, from 26 October to 31 October, provided a platform for building connections across East Africa ahead of SWEAT Africa 2027.

Hosted by Swahilipot Hub Foundation, the annual gathering brings together young innovators, entrepreneurs, investors, policymakers, and ecosystem builders to explore opportunities for collaboration and investment across East Africa. This year's event marked Swahilipot's tenth anniversary under the theme *A Decade and Beyond: Youth, Innovation & Coastal Futures*.

Representing SWEAT Africa as a partner, Bushra Razack saw Mombasa as an important starting point for building stronger connections with East Africa's innovation communities.

"East Africa is one of the most dynamic innovation regions on the continent, and SWEAT Africa can't truly be African without it," she said. "Spending a week at Pwani Innovation Week has shown me that the energy isn't only in the capital cities."

The Kenyan coast is home to entrepreneurs and innovators working across the blue economy, tourism, agritech, and community enterprise. For SWEAT Africa, engaging with these emerging businesses was an opportunity to broaden its network and support connections beyond established innovation centres.

"Making Mombasa SWEAT Africa's first stop in Kenya was a deliberate choice: we want the next great African companies to come from everywhere," Razack explained.

The Pwani Innovation Week programme included the Deals Den investment pitch competition, three innovation hackathons focusing on the circular economy, artificial intelligence, and creative industries, and the launch of the Pwani Innovation Agenda 2026–2036, a

ten-year roadmap for coastal innovation and economic development.

For Razack, collaboration between Kenya and South Africa offers opportunities to combine complementary strengths.

“Kenya has shown the world how to build at speed and at scale, and South Africa brings deep research, strong universities and growing investor networks,” she said.

She points to Swahilipot Hub, where technology, arts, and heritage come together beside Mombasa’s historic Fort Jesus, as an example of the community-driven innovation ecosystems SWEAT Africa hopes to learn from and partner with.

“Imagine a Mombasa founder pitching to investors in the Cape Winelands, or a South African startup finding its first East African market through a connection made here this week. That’s the collaboration we’re building.”

A central part of SWEAT Africa’s participation was The Ecosystem Table, a networking dinner on Thursday, 29 October, hosted in partnership with Close The Gap. The gathering brought together founders, funders, creatives, and ecosystem builders from Kenya and South Africa to explore shared opportunities and establish relationships that can lead to future collaborations.

“No institution, however well resourced, builds an ecosystem alone,” said Razack. “The Ecosystem Table was about sitting together around one table, founders, funders, creatives and partners, and asking one question: what could we build together that none of us could build alone?”

Razack expressed particular appreciation to Close The Gap for its generosity in hosting the gathering, describing the partnership as an example of the collaborative spirit SWEAT Africa hopes to strengthen across the continent.

“My hope is that the relationships started over dinner that Thursday don’t end there, but carry through to SWEAT Africa 2027 in March and well beyond. We also look forward to welcoming Close The Gap to our SWEAT Africa event next year.”

The Mombasa engagement coincided with another African science initiative taking place further south along the continent’s eastern coast, where CERI and its partners participated in WEMA, a Wellcome-supported programme focused on climate change and mental health, in Ponta do Ouro, Mozambique.

Together, these activities reflect the growing connections between African scientific, entrepreneurial, and innovation communities.

With SWEAT Africa 2027 taking place on 16 and 17 March, the relationships established during Pwani Innovation Week offer a foundation for further engagement between East and Southern Africa.

“Pwani Innovation Week has shown that the Kenyan coast is serious about innovation. SWEAT Africa is proud to be part of it, and we hope to see many Kenyan founders with us in March,” concluded Razack.



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Prof. Zaza Ndhlovu

About this talk This seminar explores how advanced spatial multi-omics technologies are helping scientists uncover the cellular interactions, tissue barriers, and immune-regulatory mechanisms that influence the persistence of pathogens and the body's ability to clear them.

Drawing on recent discoveries from the Ndhlovu Lab, the presentation will highlight how lymphoid and gastrointestinal tissues create protected environments where natural killer (NK) cells and cytotoxic CD8+ T cells have limited ability to detect and eliminate HIV-infected cells. It will also showcase lymphoid tissue models that help researchers investigate these barriers and explore innovative strategies to enhance HIV clearance.

About the speaker Professor Zaza Ndhlovu is an immunologist who earned his PhD in Molecular Microbiology and Immunology from Johns Hopkins University, followed by postdoctoral training at Harvard University. His research focuses on two interconnected areas of HIV science: advancing T-cell immunology for vaccine development and applying spatial biology to define HIV reservoirs and tissue-resident immune responses. Professor Ndhlovu is also deeply committed to scientific mentorship and research-capacity development. Through advanced training programmes, qualified laboratory platforms, and spatial multi-omics infrastructure, he is helping to build sustainable African leadership in immunology, vaccine development, and HIV cure research.

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Tracing Rift Valley Fever's Journey Across Africa

New research reveals how a widespread lineage of Rift Valley fever virus emerged in southern Africa, travelled thousands of kilometres, and continued evolving during the years between major outbreaks.

The most widespread lineage of Rift Valley fever virus (RVFV) may have originated in Zimbabwe in the mid-1970s before making its way across Africa and eventually reaching the Arabian Peninsula. Its journey, reconstructed through a new genomic study, reveals a history of long-distance movement, unexpected speed, and continued viral activity even during years without recognised outbreaks.

Published in *The Lancet Microbe*, the study was led by Dr John Juma of the International Livestock Research Institute (ILRI), with collaborators including researchers from the Centre for Epidemic Response and Innovation (CERI) at Stellenbosch University. It examined the geographical spread and evolutionary history of RVFV, with particular attention to lineage C.

"Across the longer history, the picture is of a virus with a home base and long-distance reach," says Dr Juma. "East Africa – Kenya in particular – sits at the center of onward spread in the region."

Yet lineage C appears to have emerged further south. The researchers traced its probable origins to Zimbabwe in the mid-1970s, followed by its arrival in Kenya in the early 1980s, Madagascar in the 1990s, South Africa around 1999, and the Arabian Peninsula in the early 2000s. More recently, the lineage has reached Uganda, Rwanda, and Burundi.

Its movement was not continuous. Instead, the analysis identified periods of increased geographical spread, with major outbreaks and expansions occurring at intervals of approximately 10–15 years.

"So the virus appears to sit in a region, then make a long jump," Juma explains.

The speed of its geographical spread was among the study's most surprising findings. Estimated diffusion rates exceeded 50,000 km² per year, far greater than the researchers had anticipated for a virus transmitted by mosquitoes and associated with animal movements.

An even more significant finding challenged their understanding of what happens between outbreaks.

"We went in assuming the virus more or less pauses between outbreaks. It doesn't," says Juma. "Lineage C kept accumulating changes and splitting into new sublineages right through the quiet interepidemic periods. We had thought of those years as a gap in virus's story. They are part of it."

This suggests that the absence of reported outbreaks does not necessarily mean the virus has disappeared. Instead, it may continue circulating and diversifying without being detected.

"It suggests that the virus is still there and still changing when no outbreak is being reported – and we are almost blind to it, because active surveillance is lacking," Juma explains.

For countries where lineage C is endemic, these findings have practical implications. Regular sampling between outbreaks could provide an earlier indication of viral activity and help inform decisions about livestock vaccination before seasonal outbreaks cause significant losses.

"The practical implication is that surveillance triggered by outbreaks is always too late by design," Juma says.

The study offers a different

perspective on Rift Valley fever's history, demonstrating that the years between outbreaks are an important part of understanding how the virus persists, evolves, and spreads.

Abstract

This retrospective genomic epidemiology study investigated the evolutionary history, geographical spread, and environmental drivers of Rift Valley fever virus across Africa. Researchers combined newly generated viral genomic sequences with publicly available data and applied phylogenetic and spatial modelling techniques.

The findings identified lineage C as the most widely distributed lineage, with a probable origin in Zimbabwe in the mid-1970s. The analysis revealed rapid geographical expansion, ongoing genetic diversification, and evidence of viral evolution during periods between recognised outbreaks.

The study highlights the potential for lineage C to establish endemic transmission in new regions and emphasises the importance of continuous genomic surveillance, particularly during periods of undetected circulation.

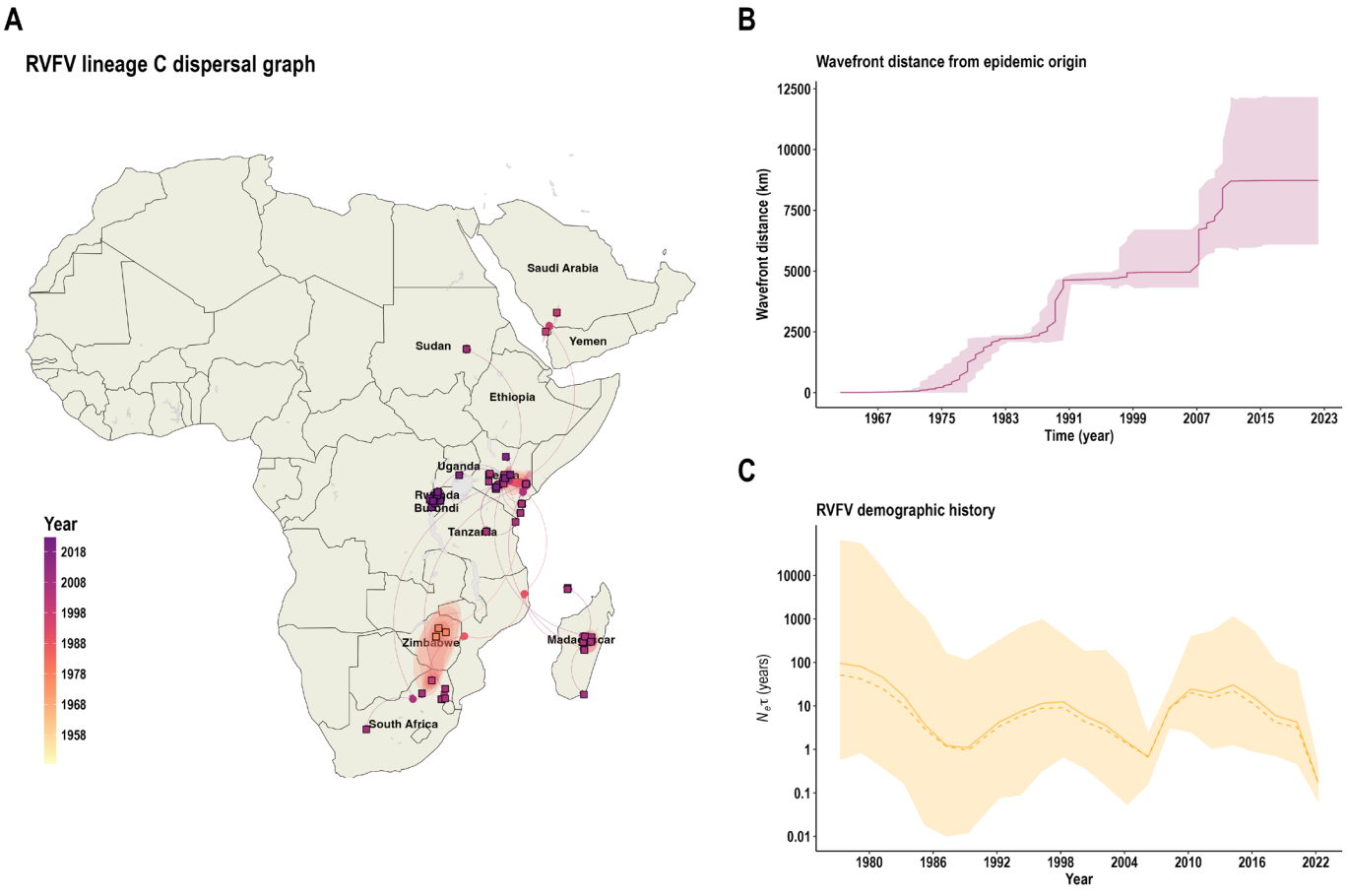
Read full publication here: https://doi.org/10.1016/j.lanmic.2025.101251

BELOW:

Figure 3: (A) Reconstructed geographical dispersal of lineage C across Africa and the Arabian Peninsula, with colours indicating the estimated timing of viral movement. (B) Estimated expansion of the geographical wavefront from its epidemic origin over time. (C) Changes in the estimated effective viral population size over the past five decades. Shaded areas represent uncertainty intervals.

"The practical implication is that surveillance triggered by outbreaks is always too late by design."

– John Juma



Building Genomics Capacity That Lasts

Drawing on experiences in Brazil and Africa, a new publication offers ten practical rules for making genomics part of routine laboratory practice. At its heart is a message about the importance of people, collaboration, and continuous learning in building sustainable scientific capacity.

Behind every successful genomics laboratory are people learning new skills, sharing knowledge, overcoming challenges, and finding ways to make sophisticated technologies work in their own settings.

These experiences are at the heart of a new publication co-authored by Dr Emilyn Costa Conceição, a researcher at the Centre for Epidemic Response and Innovation (CERI) at Stellenbosch University.

Published in *PLOS Computational, Biology, Ten simple rules to build genomics capacity for routine laboratory practice in the Global South* brings together lessons learned through genomics capacity-building initiatives in Brazil and Africa, including the REVIGET, REVIGEN, and GenPath Africa consortia.

"I hope these 10 rules will be useful to others building and sustaining genomics in their own settings. There is still so much for us to learn together!"

— **Dr Emilyn Costa Conceição**

The paper, jointly first-authored by Dr Costa Conceição, Abhinav Sharma, and Davi Josué Marcon, explores how laboratories can move beyond individual training programmes and research projects to make genomics a sustainable part of everyday clinical and public health practice.

Genomic technologies are increasingly important for identifying pathogens, monitoring infectious diseases, and supporting public health responses. Yet laboratories in low- and middle-income countries often face challenges involving infrastructure, equipment, procurement, specialist expertise, and institutional support.

The authors emphasise that sustainable capacity building requires more than providing sequencing equipment or organising occasional training workshops. It means understanding the needs of individual laboratories, working with existing expertise, and developing systems that can be maintained locally.

"Behind these ten rules are people learning together, sharing challenges, finding solutions and supporting each other as genomics becomes part of everyday laboratory work," Dr Costa Conceição reflects.

The ten rules address practical considerations, including infrastructure and procurement planning, continuous training, collaborative development of protocols and educational materials, accessible resources, professional roles, and communities of practice. They also emphasise the importance of connecting genomic data with clinical and public health needs.

For Dr Costa Conceição, one of the most meaningful

Short Case Vignettes: Putting the Ten Simple Rules into Practice

Real-world examples from genomics capacity building in the Global South

1. Understand Your Setting (Both Infrastructure and People)

Laboratories allocated dedicated time for trainees to genomic workflows, but a pre-implementation assessment revealed that competing diagnostic workloads made this protected time difficult to sustain in practice. Recognizing this early allowed the team to revise the training schedule and formalize workload coverage for trainees, which significantly improved adoption.

2. Anticipate and Overcome Infrastructure Challenges

During training in a low-connectivity setting, intermittent internet access repeatedly disrupted cloud-based analyses. Trainers adapted by pre-loading datasets and preparing offline pipelines in advance, while all sessions were recorded and uploaded to the virtual learning environment, ensuring training could continue uninterrupted and equitably for all participants, including those who needed to catch up asynchronously.

3. Plan and Procure Well in Advance

A sequencing rollout was delayed by over two months due to customs clearance of imported reagents. A shared procurement calendar and pre-approved local suppliers reduced future delays, while a standing resource-sharing arrangement among partner institutions, allowing reagents to be borrowed and later replenished, provided a valuable safeguard against unforeseen shortages.

4. Design Training as a Continuous Cycle

Participants who engaged in monthly follow-up sessions after their initial training demonstrated sustained competency months later, compared with peers who attended only a single workshop, underscoring the value of iterative, ongoing learning models over one-off events.

5. Co-Create Laboratory-Specific Protocols and Checklists

A laboratory adapted both the proposed DNA-extraction method and an existing generic protocol to fit locally available reagents and workflows. Co-developing this standard operating procedure (SOP) with laboratory staff improved reproducibility and ensured long-term adherence to the resulting practice.

6. Encourage Ownership and Co-Create Educational Materials for Sustainability

Trainees who helped develop and refine training materials and SOPs during their own training later went on to become local trainers themselves, accelerating capacity expansion and strengthening institutional ownership beyond the original project team.

7. Share Training Materials and Resources in a Centralized Platform

A centralized online repository of SOPs, recorded sessions, and analysis scripts allowed newly hired staff to onboard independently, reducing a laboratory's reliance on repeated in-person retraining whenever personnel changed.

8. Expand Expertise Without Redefining Roles

Laboratory scientists trained in basic bioinformatics interpretation were able to communicate more effectively with dedicated data analysts, shortening reporting turnaround time without requiring a full transition into a new professional role.

9. Foster Communities and Subcommunities of Practice

An instant-messaging group connecting laboratories across different regions enabled rapid peer troubleshooting of sequencing issues, often resolving problems within hours rather than the days it previously took through formal support channels.

10. Synchronize Databases and Promote Cross-Environment Networking with Public Health Authorities

Linking genomic sequencing data with clinical metadata through a shared, secure database enabled real-time interpretation of drug-resistance profiles, directly informing patient management decisions rather than being reported back only after significant delay.

These vignettes are drawn from experiences within the REVIGET, REVIGEN and GENPATH AFRICA Consortia and partner laboratories across Latin America and Africa.

aspects of capacity building is what happens after formal training has ended.

"For me, a particularly meaningful part is the learning that continues after a workshop ends."

She highlights the everyday achievements that demonstrate how knowledge and confidence develop within laboratory teams.

"The colleague who feels comfortable asking for help, the trainee who becomes a trainer, and the team that adapts a protocol and makes it their own. These are achievements worth celebrating too."

This emphasis on continuous learning and local ownership runs throughout the paper, which encourages laboratories to develop the expertise and institutional support needed to sustain genomics independently. Reflecting on the collaboration between colleagues in Brazil and Africa, Dr Costa Conceição hopes the publication will provide practical guidance for other institutions seeking to establish and sustain their own genomics programmes.

"It makes me happy to see a little of our shared journey between Brazil and Africa reflected in these pages. I hope these 10 rules will be useful to others building and sustaining genomics in their own settings. There is still so much for us to learn together!"

Read full publication here: https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1014863

ABOVE:

Figure 1: Putting the ten simple rules into practice. Practical examples from the REVIGET, REVIGEN, and GenPath Africa consortia illustrate how laboratories in Latin America and Africa have addressed challenges in infrastructure, procurement, training, knowledge sharing, and the integration of genomic data into public health practice.

Beyond The Lab Coat

Xolani Zulu's journey of purpose, patience and people.

text & photo: **Paul Harris**

Growing up in Umlazi, Xolani Zulu had a clear picture of his future. Inspired by a childhood doctor's kit bought for him by his mother, he was convinced he would one day become a doctor. Although his career eventually took a different path, his desire to make a difference in people's lives has remained at the heart of everything he does.

As a skilled laboratory technician at the KwaZulu-Natal Research Innovation and Sequencing Platform (KRISP) at the University of KwaZulu-Natal (UKZN), Xolani plays an important role in ensuring the accuracy and reliability of HIV drug resistance testing. His work requires technical expertise, meticulous attention to detail, and a steady hand under pressure. Yet his greatest reward is knowing that his efforts can help someone receive the care they need.

Raised in Umlazi by his mother, grandmother, and aunt, Xolani remembers his childhood fondly. Surrounded by family and friends, he enjoyed exploring different parts of the township, sometimes disappearing for most of the day until the neighbourhood joined the search for him. His grandmother kept him in line, occasionally with a stern reminder of who was in charge, but those early years helped shape the person he is today.

His childhood ambitions were firmly rooted in medicine. However, his university admission points did not allow him to pursue a medical degree. Instead, he enrolled in Biomedical Science at the Mangosuthu University of Technology (MUT), a second choice that would ultimately open the door to a rewarding career in laboratory science.

His interest in science had already developed at high school, where he particularly enjoyed Physical Science, Mathematics, and Biology. He also admired his Physics teacher, whose knowledge of the subject inspired him and strengthened his appreciation for science.

What began as an alternative route became a fulfilling professional journey, demonstrating that an unexpected change in direction can lead to a meaningful career. Xolani began his professional career in 2005 in the Virology Department at Inkosi Albert Luthuli Central Hospital (IALCH). There, he gained experience in serology, molecular testing, and cell culture, building the technical foundation that would serve him throughout his career.

He later joined Addington Hospital, where he helped establish a new laboratory for viral load testing and worked towards accreditation through the South African National Accreditation System (SANAS).

In 2023, he joined KRISP, where he contributes to HIV drug resistance testing and helps maintain compliance with the ISO 15189:2022 medical laboratory quality standard.

His responsibilities extend well beyond performing tests. Receiving samples, conducting laboratory procedures, maintaining equipment, managing documentation, and supporting colleagues all contribute to the delivery of reliable results.

For Xolani, the purpose behind these responsibilities is clear.

"I get satisfied and proud when I send the results report to the client, knowing that someone will get help in their sickness all because of the effort I have put," he explains.

It is this connection between laboratory work and its potential impact on people's lives that gives his role meaning. Although the scientific processes take place out of public view, their importance extends far beyond the laboratory.

Working in a laboratory demands precision, consistency, and the ability to remain calm when things do not go according to plan. Xolani has learnt that managing these moments is just as important as mastering the technical aspects of his work.



One of his biggest challenges has been overcoming the fear and panic that can arise when something goes wrong. His approach is to remain calm, keep moving forward, and remind himself that difficult moments will pass.

"I have taught myself to be patient and to be calm no matter the circumstance," he says, adding that prayer before beginning his working day has played an important role throughout his journey.

This perspective has shaped not only his approach to work but also his relationships with those around him. At KRISP, he values working alongside talented scientists who are approachable, supportive, and willing to help. He also appreciates the opportunity to learn from colleagues with different backgrounds, cultures, and perspectives, recognising that working towards a common goal requires understanding and respect for others.

His contribution extends beyond the tests he performs. Throughout his career, he has helped train numerous staff members, many of whom have developed into capable professionals. It is an achievement he takes pride in, knowing that even a small contribution to another person's journey can make a lasting difference.

Away from the laboratory, Xolani enjoys spending time in his garage, working on tools and small engines he has collected over the years. It offers a different kind of problem-solving, allowing him to put his practical skills to use in his own time.

His greatest joy, however, comes from spending time with his youngest daughter, Lisakhanya, aged six. As a father of three daughters, Olusha, 19, Ndalo, nine, and Lisakhanya, six, family remains central to his life and his hopes for the future.

When asked what he hopes to achieve over the next five to ten years, his answer reflects the values that have guided him throughout his journey. Above all, he wants to be a good role model and father to his daughters, helping them grow into independent young women who can stand on their own feet.

Professionally and personally, he hopes to continue growing, learning from others, and offering a helping hand wherever he can.

The young boy who once imagined himself treating patients as a doctor has found another way to contribute to people's well-being, through the precision of laboratory science, the knowledge he shares with colleagues, and the care he brings to his responsibilities.

For Xolani Zulu, making a difference is not about being in the spotlight. It is about doing his work carefully, helping others along the way, and recognising that even the smallest contribution can have a meaningful impact.

And that is a lesson that extends well beyond the lab coat.

Harnessing Seaweed: Creating Opportunities for Coastal Communities

African STARS fellow Grace Bosco is exploring how biotechnology can transform Tanzania's underutilised seaweed into valuable products while creating new opportunities for women in coastal communities.

text: **Katrine Anker-Nilssen** photo: **Supplied**

For Grace Bosco, science is about more than developing new technologies. It is about finding practical solutions to challenges facing local communities and ensuring that women have opportunities to benefit from them.

A chemical and process engineer from Tanzania and founder of SAB BIOMANUFACTURES, Grace is exploring the potential of Sargassum, a type of brown seaweed that remains largely underutilised in Tanzania, unlike red seaweed, which is widely cultivated and processed.

"I am interested in using science to solve community problems," she explains. "I see an opportunity to use science to turn this resource into useful products for agriculture and livestock while creating jobs for coastal communities."



Through SAB BIOMANUFACTURES, Grace is investigating how biotechnology, particularly enzyme-based extraction, could recover valuable bioactive compounds from Sargassum for use in agricultural and livestock products, including crop biostimulants and livestock supplements. She is also engaging with the University of Dar es Salaam to support scientific learning and explore the potential of seaweed.

But Grace's ambitions extend beyond developing new products. She has already met with 10 women in the coastal communities of Kigamboni and Bagamoyo, where people have experience in seaweed farming and other coastal activities.

"I want women to understand that seaweed offers opportunities beyond traditional farming and selling," she says.

Grace is now working towards establishing a formal initiative focused on women in the bioeconomy, beginning with these 10 women and eventually reaching more coastal communities.

"Through an initiative focused on women in the bioeconomy, I hope to share knowledge about seaweed processing, biotechnology, and entrepreneurship, helping women participate in emerging industries and find new sources of income."

The possibilities extend across the seaweed value chain, including collection, sorting, drying, transportation, processing and supplying raw materials to biotechnology companies. Further opportunities could emerge in product development, packaging and marketing.

"My goal is to help women participate in higher value activities, earn additional income, and contribute to a

growing bioeconomy," Grace explains.
Her participation in the African STARS Fellowship has helped shape her approach, particularly through exposure to new biotechnology applications and mentorship.

"As an African STARS fellow, I have gained more knowledge about using biotechnology to solve community problems, particularly in agriculture. I have learned about the potential of scientific tools such as enzymes and how they can be used to develop valuable products."

The programme has also connected her with mentors, including Professor Brian Fox, who have offered advice and guidance, strengthening her confidence in pursuing her ambitions.

"Through my training and mentorship, I have learned how biotechnology can address community challenges. I want to share this knowledge with women in coastal communities and help them participate in science, innovation, and entrepreneurship."

However, turning this vision into a viable industry will require further research, laboratory equipment, funding and partnerships. Limited awareness of Sargassum's potential remains a challenge, while extraction methods and potential products still need further development and testing. Women will also need training and access to markets to participate meaningfully in the emerging value chain.

Grace hopes to collaborate with research institutions, biotechnology experts, investors, and development partners to advance the science and establish the women's initiative.

Looking ahead, she wants SAB BIOMANUFACTURES to contribute to a sustainable seaweed industry that creates jobs, supports livelihoods, and promotes the responsible use of Tanzania's marine resources.

"Meeting women in Kigamboni and Bagamoyo made me think more deeply about how scientific innovation can benefit coastal communities," she reflects.

"For me, being a woman in science means using the knowledge and opportunities I receive to create opportunities for others. I believe women should not only benefit from new technologies but also participate in developing businesses and creating solutions. By connecting science with local resources, we can create opportunities for women to earn income and contribute to sustainable development."

Finding My Place in Science

text: Dr Natasha Onalenna Moraka-Mankge
photo: Supplied

As a child, I dreamed of becoming an engineer. I loved taking apart electronic devices to understand how they worked. I never imagined that curiosity would lead me to virology, but my desire to ask questions and find answers has remained central to my journey.

My interest in viruses began during my undergraduate studies at the University of Botswana. I later pursued a Master's degree in Medical Virology at Stellenbosch University, investigating HIV drug resistance in children. I also contributed to Botswana's initial COVID-19 response, learning to adapt when laboratory closures and limited samples disrupted my research.

In 2022, I began my PhD in Medical Sciences at the University of Botswana, supported by the Sub-Saharan African Network for TB/HIV Research Excellence (SANTHE). I also received a university scholarship and worked as a teaching assistant, helping train future medical laboratory scientists.



My research explored HIV-1 subtype C in Botswana, focusing on viral diversity, drug resistance, and transmission. Together with my supervisors, I established Tekodiso, a cohort study investigating HIV among newly diagnosed individuals. The name loosely translates to “to consult”, reflecting my desire to consult the virus itself to better understand the epidemic. Tekodiso was among the first studies funded by Botswana’s Ministry of Communication and Innovation.

My PhD taught me to find opportunities in setbacks. When laboratory reagents were delayed, I explored machine learning to predict HIV resistance to broadly neutralising antibodies. This work earned the Best Abstract Award at the 2022 Botswana HIV/AIDS Conference, a CROI New Investigator Scholarship in 2023, recognition at international Collaboration for AIDS Vaccine Discovery meetings, and a publication in Scientific Reports.

One of my proudest moments came in 2024, when I received the L’Oréal–UNESCO For Women in Science Sub-Saharan Africa Young Talent Award. I was pregnant when I received the news, and I wept. It was deeply affirming during a period of significant personal change.

Balancing my PhD with marriage and motherhood taught me patience, resilience, and the importance of giving myself grace.

In November 2025, I defended my PhD thesis with no corrections, becoming the first in my family to achieve this milestone. It represented years of persistence and the support of those who believed in me.

My latest chapter is the African STARS Fellowship at CERI. Despite my achievements, imposter syndrome sometimes made me question whether I was good enough. Being selected was both surprising and validating, helping me recognise my growth and reflect on the leader I want to become.

I hope to strengthen genomics capacity in Botswana and inspire more young Africans, particularly women, to pursue science.

My advice is simple: remain curious, seek opportunities, and keep going when things do not work out as planned. You do not need every step figured out to begin.

I am still that curious child who wanted to understand how things work. Today, I am asking those questions one genome at a time, hoping our discoveries will help shape the future of HIV research in Africa.

Creating Opportunities in African Science

With a new Wellcome-funded project and a commitment to mentoring younger scientists, Dr Doreen Lugano is taking on greater leadership in African research. As she completes her African STARS Fellowship, she reflects on the opportunities, relationships, and family support that have shaped her career.

text: Katrine Anker-Nilssen
photo: Supplied

The design of buildings, shared spaces, and everyday human interactions may all influence how people are exposed to infectious diseases. Understanding these connections is at the heart of a new Wellcome-funded research project in which Dr Doreen Lugano will lead the genomics component.

The project, *Pathogen Urbanism: Genomics, Social Interactions, and High-Rise Urban Forms in Global South Cities*, brings together genomics, anthropology, urban research, and design to investigate how densely populated urban environments may influence exposure to and circulation of pathogens.

“What excites me about this project is the opportunity to work across disciplines,” says Dr Lugano, an African STARS fellow at the Centre for Epidemic Response and Innovation (CERI). “We will be bringing genomics into conversation with anthropology, urban research, and design to investigate questions that are difficult to answer from any one discipline alone.”

Securing the Wellcome Genomics in Context Award marks an important milestone in her development as an independent researcher, opening opportunities to lead scientific work, establish collaborations, and contribute to

research that could inform healthier urban environments.

Dr Lugano's interest in becoming a scientist began at 22, when she visited the laboratory of Professor Bulimo during her undergraduate studies. Impressed by how he combined teaching with running a research laboratory, she completed a three-month internship that inspired her to pursue postgraduate studies.

During her PhD at the University of South Florida, she was encouraged to develop independent research questions and explore unfamiliar experimental approaches. Later, at the University of Texas Medical Branch, she strengthened her grant-writing skills, submitting five applications and proposals within 18 months, including one to the US National Institutes of Health. A successful Rockefeller Foundation fellowship enabled her to return to Kenya for a second postdoctoral fellowship at the KEMRI–Wellcome Trust Research Programme.

Her ambitions have since expanded beyond her own research. In 2023, she established The RNA Salon Kenya, connecting scientists working on RNA research, helping younger researchers find mentors, and strengthening scientific networks.

"Over time, my understanding of success has expanded. I still want to do excellent research, but I also think about the opportunities I can create for other scientists and the questions we can pursue together."

African STARS has reinforced this commitment to leadership and mentorship. Its training encouraged Dr Lugano to reflect on how she makes decisions, responds to challenges, and works with others, including in her personal life. One lesson particularly resonated with her: "You cannot lead others if you cannot lead yourself".

She also valued the programme's practical grant-writing training, particularly an exercise with Professor Cheryl Baxter and her team that demonstrated how easily researchers can overlook critical funding requirements. Managing these professional commitments alongside family life requires considerable planning, flexibility, and support.

During her African STARS Fellowship, Dr Lugano travelled with her then 10-month-old twins. With her husband also travelling, her mother and mother-in-law alternated caring for her older children in Kenya, managing school runs, homework, and daily video calls.

"My reality involves several calendars, reminders, and being overstimulated much of the time – especially at home!" she says.

She credits her spouse, family, and friends for helping her manage these responsibilities, and acknowledges African STARS for enabling her to travel with her infants.

"Over time, I have also become comfortable with the idea that balance is not something I will achieve every day. There are periods when work demands more of my time and others when my family needs more of me."

Asked what matters most beyond the qualifications, publications, and grants on her CV, Dr Lugano's answer is simple: "Mentorship and relationships."

She credits mentors who trusted her abilities and colleagues who encouraged her to pursue opportunities, alongside the friendships and professional connections developed through African STARS.

As she completes the fellowship, Dr Lugano hopes to help more African scientists develop their own research questions and establish collaborations across institutions and disciplines. Her advice to younger African women entering science reflects the approach she has taken throughout her own career: "Bet on yourself. Apply for opportunities even when you are unsure of the outcome. Look for mentors and allies, ask questions, and be willing to take on unfamiliar challenges and spaces."

Ultimately, her ambitions extend beyond her own research achievements.

"I want to become a scientist who listens, mentors, and contributes to building a strong scientific community that lives beyond me."



CERI's Genomic Expertise Advances Malaria Research

Dr Emilyn Costa Conceição shares how CERI is contributing to the search for new malaria treatments through genomic surveillance, international collaboration, and research capacity development in Africa.

text: **Dr Emilyn Costa Conceição** photos: **Supplied**

How do we look for resistance to a new malaria treatment when we do not yet know what that resistance will look like? This was one of the questions we discussed during the CUREMAL (Innovative transformative **CURE** for **MAL**aria: rapid-action combinations to replace artemisinins) General Assembly, held at GSK's Global Health research centre in Tres Cantos, Madrid, on 7–8 October 2026.

Representing the Centre for Epidemic Response and Innovation (CERI) at Stellenbosch University, I joined colleagues working towards a shared goal: advancing a new treatment for malaria while building the expertise needed to monitor its effectiveness.

CUREMAL, a Global Health EDCTP3-funded consortium (European & Developing Countries Clinical Trials Partnership), brings together clinical researchers, laboratory scientists and partners involved in developing the investigational antimalarial GSK3772701. The annual meeting provided an opportunity to review progress, connect the different parts of the project and plan the work ahead. For me, it was also a chance to show how CERI's experience in genomic surveillance can contribute to this effort, and to strengthen our collaboration with the Centro de Investigação em Saúde de Manhiça (CISM) in Mozambique.



Searching for clues across the parasite's genome

At CERI, I lead the Antimicrobial Resistance programme, which includes our contribution to CUREMAL. Together with CISM, we co-lead the project's work package 4 (WP4) on parasite genomic surveillance and antimalarial resistance, as well as capacity development. Our role centres on understanding the genetic makeup of Plasmodium falciparum, the parasite responsible for the deadliest form of malaria, and investigating changes that could influence its response to treatment.

During the meeting, I presented this work alongside CISM's Simone Boene. Our joint presentation reflected how closely our contributions fit together. CISM will use targeted sequencing to examine selected regions of the parasite's DNA, while CERI will use whole genome sequencing to explore genetic variation more broadly.

That broader view matters when studying a new drug. Tests designed around known resistance markers are useful for tracking familiar threats, but they may miss changes associated with a treatment that works differently. By examining the parasite's genome and comparing those findings with clinical outcomes, we aim to identify possible clues to reduced drug susceptibility. These would provide starting points for further investigation, helping the consortium understand how resistance might develop.

Bringing CERI's experience into malaria research

In a second presentation, "Integrated Genomic Surveillance of Infectious Diseases in Africa and Beyond", I shared the wider experience behind CERI's contribution. Our work across influenza, tuberculosis, cholera, arboviruses and other infectious diseases has helped establish the sequencing platforms, analytical expertise and quality systems that we will draw on for CUREMAL.

Although each pathogen presents different challenges, many of the foundations are shared: reliable laboratory methods, careful interpretation of genetic data and close collaboration between the people generating results and

those who need to use them. This is an exciting aspect of the project for me. We are applying expertise developed across several areas of infectious disease research to questions about malaria treatment, while learning from partners with extensive experience in malaria research and clinical trials.

Connecting the laboratory with the clinical study

Some of the most useful conversations in Madrid focused on what happens between collecting a sample and understanding its results. With our CISM colleagues and the wider consortium, we discussed how samples will reach the laboratories, how our sequencing approaches will complement each other and how genetic findings will be linked with information about treatment response.

These practical arrangements are essential. A genome can tell us a great deal about a parasite, but its meaning becomes clearer when we understand the clinical context: what treatment a participant received and how the infection responded. The meeting gave us time to work through these connections together and identify the decisions needed before study samples arrive. It also reinforced the value of bringing laboratory, clinical and data teams into the same conversation early.

Building expertise through participation

Alongside the research, CERI and CISM have committed to training eight researchers in whole genome sequencing and targeted sequencing methods, respectively. Our aim is for participants to work with study samples and gain experience across the process, from preparing material in the laboratory to analysing and interpreting the data. Learning through this kind of participation gives researchers opportunities to troubleshoot, ask questions and understand why each step matters.

I left Madrid encouraged by the opportunity to connect drug development, genomic research and training within one collaborative effort, within the consortium and beyond. As CUREMAL moves towards its next phase, our contribution will be to help turn parasite DNA into evidence that supports the evaluation of a new treatment, and to promote capacity development so that more researchers have the skills to carry this work forward.

**The project is supported by Global Health EDCTP3 and its members.*

Why Better Prostate Cancer Diagnosis Must Include Africa

New genetic research could help identify aggressive prostate cancers more accurately while reducing unnecessary investigations and treatment. Following a seminar hosted by CERI and SACEMA at Stellenbosch University on 8 October 2026, Professor Jyotsna Batra of Bond University, Australia, explains how advances in prostate-specific antigen (PSA) research could improve diagnosis and why African populations must be included in developing better diagnostic tools.

How do we find prostate cancers that threaten lives without putting other men through unnecessary tests and treatment?

That question shaped my recent seminar at Stellenbosch University's Centre for Epidemic Response and Innovation (CERI), kindly arranged by my friend Dr Margot Otto. It also connects to a broader challenge: ensuring advances in cancer diagnosis benefit the populations who need them.

As I explained recently in The Conversation, PSA is a prostate test, not a cancer test. Prostate-specific antigen is produced by both healthy and cancerous prostate cells. Levels can rise because of benign enlargement or inflammation, while some dangerous cancers produce relatively little PSA. Testing can therefore miss important disease or uncover cancers that would never have caused harm.

Our research explores how inherited DNA differences might help us read that signal more accurately. In a study published in Nature Communications in 2024, our international team investigated rs17632542, a

variation in KLK3, the gene that encodes PSA. It was associated with lower PSA levels, yet among men with prostate cancer, it was also associated with more aggressive disease and a higher risk of prostate cancer death.

Experiments also showed that the altered PSA protein could promote cancer invasion and spread in laboratory and animal models. This suggests PSA is not simply a passive marker: its biological activity may help shape disease behaviour.

The aim is not to abandon PSA, but to interpret it more intelligently. Combining genetic information with PSA, family history, and clinical assessment could help guide who needs further investigation. For our approach, the next step is prospective clinical validation: establishing whether it improves decisions and outcomes in routine care.

For African populations, this raises an essential question: whose genetic information informs the test? Men of African ancestry face a disproportionate burden of aggressive prostate cancer, but Africa's diverse populations remain underrepresented in genomic research. Findings from predominantly European-ancestry studies – including much of our own clinical evidence – cannot simply be assumed to apply across the continent.

Local validation must therefore be central, not an afterthought. We need African-led partnerships with researchers, clinicians, and communities to understand which biomarkers are useful, how they perform in different populations, and whether they can be delivered affordably alongside accessible diagnosis and treatment. Success should mean fewer avoidable investigations without overlooking cancers that need attention.

I hope this visit helps build those connections between Bond University and colleagues at Stellenbosch. For me, precision medicine is not just about a more sophisticated test. It is about giving more men a better chance of receiving the right care, at the right time, wherever they live.

Dr Margot Otto, Research Fellow at the Africa Health Research Institute (AHRI), who arranged Professor Batra's seminar at CERI, reflects on its personal and professional significance:

"Cancer research, particularly personalised medicine, is an area I am and always have been very passionate about, both professionally and personally. My family has been directly affected by prostate cancer, as my father was diagnosed with the disease a few years ago. It was interesting to learn about the promising advances in prostate cancer screening and to see how our understanding of the genetic factors influencing disease progression is progressing. I believe this research could improve early detection and reduce unnecessary interventions and the associated costs."

BELOW, from left: *Prof Jyotsna Batra and Dr Margot Otto.*





Beyond Lab Equipment and Consumables Supply

How Lasec supports sustainable healthcare programmes across Africa.

text: **Naledi Plaatjies** photos: **Supplied**

We recently welcomed African STARS Fellows from the Centre for Epidemic Response and Innovation (CERI) to our head office in Cape Town for a visit focused on how industry can support sustainable healthcare programmes across Africa.

The visit included a tour of our warehouse, dedicated service centre and sample collection kit packing facilities. This gave the fellows an opportunity to see the infrastructure, technical capabilities, and processes that underpin our work in delivering laboratory and healthcare solutions across the continent.

The session continued with a presentation on how we support healthcare programmes, covering everything from sales and logistics to regulatory compliance, installation, training, and after-sales technical support.

Our experience across diverse African markets has shown us that supporting healthcare programmes requires far more than delivering equipment. It means understanding local needs, navigating complex regulatory and logistical environments, providing appropriate technical support, and building long-term partnerships that help ensure solutions remain effective and fit for purpose.

A key focus was the sustainability of donor-funded laboratory equipment, particularly the challenges associated with servicing and maintenance after installation. While funding often covers the initial purchase, installation and training, provision for preventative maintenance, spare parts, repairs, and ongoing technical support may be overlooked. Without adequate provision for these needs, equipment can become less reliable over time, potentially compromising the impact of investments in healthcare infrastructure.

We drew on our experience supporting projects across Africa, including the installation of 201 autoclaves in Mozambique and the delivery of 350 vaccine refrigerators and freezers across South Africa. These projects highlighted the importance of proactive planning, local adaptation, and continued technical support in helping healthcare programmes achieve sustainable outcomes.

The engagement reinforced our commitment to going beyond supply by supporting the full equipment lifecycle. It also created an opportunity to discuss how governments, funders, implementing partners, researchers, and industry can work together to incorporate maintenance planning and technical capacity into healthcare programmes from the outset.

As Africa continues to strengthen its research and laboratory capacity, ensuring that investments remain functional and fit for purpose long after project funding ends will be essential to building resilient healthcare systems.

The visit reflected CERI's commitment to creating opportunities for industry, emerging African public health leaders and scientific innovators to connect, exchange insights, and explore collaborative approaches to strengthening healthcare systems and advancing development across the continent.

"Science that impacts society is what drives me, and that kind of science needs partners who stay. Lasec is one of them. What stood out most for me during the visit was how Lasec puts the customer first, not only before the purchase but after it, through continuous support and servicing. Kylie Davies, Head of Marketing at Lasec, gave advice I will not forget. As early career scientists writing grants, never see equipment acquisition as just the equipment. Plan and factor in maintenance and servicing across the whole life of the project. An instrument that sits idle is a delay in the science."

— Elvis Poku-Adusei, African STARS fellow



Taking African Science to the Global Health Conversation

At a global health discussion during the 2026 United Nations General Assembly in New York, Dr Monika Moir shared how African scientific expertise, genomic surveillance, and predictive modelling can help countries anticipate outbreaks and build more resilient healthcare systems.

text: Dr Monika Moir **photo:** Supplied

Coming from the quiet town of Stellenbosch, it was inspiring to experience the energy of New York City during the 2026 United Nations General Assembly (UNGA) and Climate Week. Roads were closed off, and police escorts echoed through the city as politicians and policymakers were rushed from one important meeting to the next. Amid all this activity, I had the opportunity to participate in a panel hosted by The Rockefeller Foundation, discussing how we can build resilient healthcare systems in an increasingly uncertain world.

On 21 September 2026, The Rockefeller Foundation, in partnership with the WHO Special Envoy for Health Resilience, hosted a panel discussion titled 'Health Resilience in the 21st Century: Delivering Outcomes Amid Shocks and Stressors'. The event brought together senior policymakers, global health leaders, and scientists to discuss how countries can strengthen their health systems in the face of climate change, conflict, and shrinking external health assistance.

BELOW: *Dr Moika Moir with Manisha Bhinge, Vice President for Health at the Rockefeller Foundation.*



Anticipating outbreaks through science

One of the most significant shifts in global health in recent years has been the move from reacting to outbreaks towards anticipating them. Diseases such as dengue, cholera, chikungunya, and Rift Valley fever are influenced by climate and environmental change, population mobility, and pathogen evolution. At CERI, we develop computational approaches that combine satellite imagery, climate data, pathogen genomes, and epidemiological surveillance to better understand why pathogens emerge, where they are likely to spread, and which populations are most at risk.

During the panel, I shared several examples of how these approaches can contribute to public health preparedness. One was Carlin Foka's work on dengue, using deep learning to estimate disease suitability by incorporating a wider range of socioeconomic and environmental factors than traditional approaches. When we accounted for human population density, our model identified more than 100 million additional people living in areas at risk of dengue infection compared with baseline estimates. In West and East Africa, poverty emerged as an important driver of disease suitability, highlighting the challenge of protecting communities that may have the fewest resources to respond.

Another example came from the 2025 chikungunya outbreak in Réunion, through work led by collaborators from the Mauritian Ministry of Health and Wellness. The outbreak reached approximately 23,000 cases per week at its peak. We analysed genomic data from cases detected in Mauritius to establish the outbreak lineage and confirm its introduction from Réunion Island. Mauritius had already begun mosquito control and public health communication in response to the outbreak on Réunion. The subsequent outbreak in Mauritius remained small and contained. This illustrates the potential value of early warning, rapid genomic analysis, and timely public health action working together.

Five years ago, we might have been able to tell a health ministry that an outbreak was happening. Today, advances in genomics, artificial intelligence, and computational modelling are creating opportunities to identify emerging risks earlier, forecast epidemic trajectories, and help officials decide where to strengthen surveillance or direct resources. The challenge is ensuring that these insights are acted upon before an outbreak becomes a crisis.

Investing in African science and data

An important message I conveyed was that Africa has developed considerable expertise in outbreak detection and response, and that this capacity needs to be recognised and strengthened. However, sophisticated computational models and AI tools are only as useful as the data on which they depend. Across much of Africa, epidemiological and genomic surveillance remains limited and uneven. Without sustained investment in surveillance infrastructure, local expertise, and the institutions responsible for generating and interpreting data, even the most advanced analytical methods have limited practical value.

My message to governments and global health partners was simple: invest in data, and in the people who generate it. This means moving beyond short-term project funding towards sustained support for African researchers, laboratories, and public health institutions. It also means embedding genomic insights and predictive models into national health policies and emergency response frameworks, so that the pathway from scientific evidence to public health action is already established when the next threat emerges.

My reflections

Participating in this panel was an opportunity to share the work being done at CERI with an international audience and to reflect on how scientific research can contribute to stronger health systems. New York was an exciting experience, from the energy of the city to the opportunity to meet people working at the highest levels of global health and policy. I returned to Stellenbosch feeling inspired by the possibilities for African science and the importance of continuing to build connections beyond our immediate research environments.

South African AMR Research Goes Global

International collaboration is helping researchers better understand how antibiotic-resistant bacteria spread. At a recent conference in Chicago, South African researchers highlighted their contribution to GENOSAR and the importance of African genomic data in tackling this global health challenge.

text: **Dr Emilyn Costa Conceição**
photo: **Rouxjeane Venter**

Antimicrobial resistance connects hospitals and communities across borders, and understanding its spread requires collaboration on the same scale. This was the focus of our contribution to the Stellenbosch University–Northwestern University (SU–NU) Hub conference in Chicago, where I had the pleasure of representing CERI alongside Dr Marije Hofstra, medical microbiologist and postdoctoral fellow.

Hosted by Northwestern University's Robert J. Havey MD Institute for Global Health from 28–30 September 2026, the conference brought Stellenbosch and Northwestern colleagues together on the Chicago and Evanston campuses to share research and explore what we can achieve through our partnership. It was also an opportunity to connect with the people behind projects linking our institutions and discuss future collaboration.

During the Infectious Diseases and Genomics session, I presented alongside Prof Egon Ozer, sharing the South African component of GENOSAR, the Global Genomic Surveillance of Antimicrobial Resistance project. Presenting together allowed us to highlight how our teams are contributing to this international collaboration.

Led by Prof Ozer, Director of Northwestern's Center for Pathogen Genomics and Microbial Evolution, GENOSAR brings together partners in the United States, Peru, Nigeria, Pakistan, and South Africa. The project is funded by the Lenny Family Global Health Fund, in honour of Robert J. Havey, MD, and in memory of Andrew J. McKenna.

Our research focuses on two bacteria, *Escherichia coli* and *Klebsiella pneumoniae*, which can cause infections ranging from urinary tract infections to severe bloodstream infections. When these bacteria become resistant to commonly used antibiotics,

treatment becomes more difficult. GENOSAR investigates the genetic changes that contribute to resistance and how resistant bacteria spread.

For us, South Africa's participation is particularly meaningful. African settings remain under-represented in global genomic datasets, limiting our understanding of the bacteria circulating in our own communities. Contributing local data will help ensure that the international picture better reflects the patients and health systems we serve.

Over five years, GENOSAR plans to generate 6 000 bacterial genomes across four participating collection sites. By combining sequencing results with laboratory and clinical information, the project aims to improve resistance prediction and track the movement of bacterial strains and the genetic material carrying resistance genes. A shared online dashboard will allow researchers to explore these patterns, while training will strengthen surveillance capacity at partner institutions.

In South Africa, this work connects CERI with Prof Andrew Whitelaw and colleagues in Medical Microbiology at Stellenbosch University and the National Health Laboratory Service (NHLS), alongside Dr Ruan Marais and the Division of Medical Microbiology at the University of Cape Town. Isolates from Tygerberg and Groote Schuur hospitals will contribute to the project, linking genomic research with the realities of hospital microbiology.

There was also much to celebrate among the Stellenbosch students. Rouxjeane Venter, from the CLIME Research Group, received the best poster prize, while Caitlin October was part of the winning oral presentation team. Seeing emerging researchers recognised for their work was a highlight of the meeting.

Alongside the scientific programme, conversations with colleagues created opportunities for new ideas, joint planning, and some time to enjoy Chicago. I returned grateful for the Havey Institute's warm hospitality and excited about the work ahead. We look forward to sharing our progress and welcoming our Northwestern partners to South Africa.



From Pipettes to Python

For African STARS fellow Nicholas Nyabera, a passion for science has led him across borders and into the world of bioinformatics. He reflects on his journey from Kenya to CERI, the power of mentorship and collaboration, and his ambition to strengthen African leadership in pathogen genomics.

text: **Nicholas Nyabera**
photo: **Supplied**

For me, home is Kenya. It is where my scientific journey began, and where I hope much of its impact will be felt. Since childhood, I have been curious and in love with hands-on science. Encouraged by my parents, I developed a fascination with the natural sciences. Little did I imagine that this curiosity would take me from the microbiology laboratories of western Kenya to the rather different world of Python scripts and pathogen genomics at Stellenbosch University.

This safari began at a propitious moment while studying at Masinde Muliro University of Science and Technology (MMUST). I became involved in a research collaboration with mentors at Cambridge, UK, and Pretoria, South Africa. This opened doors to technologies and opportunities that were otherwise beyond my reach. My first MSc investigated multidrug-resistant *Staphylococcus aureus* associated with infections after surgery in western Kenya. Through whole-genome sequencing, which reads an organism's complete genetic code, I began to appreciate the extraordinary complexity of pathogens and how readily they evolve and become resistant to antimicrobials. But the deeper I looked, the more questions emerged.

Africa is generating vast amounts of genomic information,

yet much of it has undergone only surface-level analysis. Sequencing a pathogen is one thing. Understanding what its genome tells us about disease, antimicrobial resistance (AMR), and evolution is quite another.

My father once advised me to keep a pen and paper beside my bed. “Most of the greatest ideas strike at 3am,” he would say. One thought stayed in my mind: what if some of the answers we seek are already hidden in the genomic information we have generated? I wanted to be the person behind the screen, exploring that data and uncovering its hidden nuggets. This was the gap that drew me towards bioinformatics.

Put simply, bioinformatics brings biology and computing together to make sense of complex biological information. Not only does it allow us to investigate how pathogens evolve, but also to identify genetic changes linked to drug resistance. For Africa, where infectious diseases remain a major public health challenge, the ability to ask questions that conventional laboratory methods alone cannot easily answer, using the resources we already have, is crucial.

So I started a second MSc in Bioinformatics of Infectious Diseases and Pathogen Genomics at CERI. Being selected as one of seven African STARS Fellows from over 1 000 applicants to pursue the inaugural structured MSc was a pivotal moment for a budding researcher buoyed by the beauty of his dreams.

Eight months into the programme, I have moved rather quickly from pipettes to Python. Hosted at the medical campus, I now spend time writing and fixing code, analysing genomic datasets, and automating computational workflows. It is fascinating work, indeed, although a misplaced character can bring hours of computation to an abrupt halt. The computer, I have discovered, is remarkably indifferent to one’s good intentions.

Beyond the screen, South Africa has much to offer. Stellenbosch’s magnificent mountains and vineyards provide a rather agreeable backdrop to research life. More importantly, I have found myself among people whose curiosity and generosity make the experience worthwhile. Seminars, conversations with mentors, and working within multicultural and multidisciplinary teams have broadened my scientific outlook considerably.

My current research examines nontuberculous mycobacteria, relatives of the bacterium that causes tuberculosis. These organisms are widespread in the environment, yet some cause serious human infections. Much remains unknown about their genomic diversity and resistance to treatment. I hope to help close this knowledge gap by comparing their genomes using computational tools.

Yet perhaps the greatest lesson has come from the people around me. I am fortunate to learn from generous mentors and researchers who put research excellence above self. Under Prof Tulio de Oliveira’s leadership, CERI has created an environment in which collaboration and discovery thrive.

My own path here has made me a link between collaborators at MMUST, Cambridge, and Dr Emilyn Costa Conceição’s group at CERI within the Genomics of AMR programme. Prof Martin Welch (Cambridge) and Dr Anthony Sifuna (MMUST) have encouraged me to look beyond the genes to the proteins they make. These interactions continually remind me that good science begins with asking the right questions, and that new discoveries rarely happen in isolation.

As an African STAR, I am convinced that the future of Africa’s research will depend as much on the people and collaborations we nurture as on the technologies we acquire. My ambition is to contribute to that future as a next-generation researcher, strengthening pathogen genomics and bioinformatics capacity in Kenya and beyond.

My dream is to see Africa not merely supplying data to global research but increasingly leading the questions and discoveries that shape our response to infectious diseases. This conviction aligns with CERI’s vision and Sustainable Development Goal 3 (good health and well-being).

After all, the safari is not only about becoming a better researcher, but also about helping to create opportunities for others to ask better questions and pursue their own contributions to science. I remain grateful to the African STARS Fellowship and the Mastercard Foundation for helping me contribute to that future.

Kenya is home. CERI has become another. And the safari continues.



From A/B Tests to Better Health Decisions

Thenuja Pillay, a data scientist and MSc candidate at the South African Centre for Epidemiological Modelling and Analysis (SACEMA), explores how data science and digital experimentation could help healthcare systems make better decisions and improve health outcomes.



I recently presented at Katalitix on how A/B testing and experimentation, commonly used in digital industries, could be applied to healthcare to improve patient engagement, healthcare delivery, and potentially health outcomes.

The presentation drew on my previous experience as a data scientist in an experimentation team, where we used A/B testing to understand how changes to online games influenced user behaviour. Following a discussion with Prof Wim Delva about the potential to apply these methods in healthcare, I explored how the same experimental principles could help answer practical questions about patient behaviour and digital health interventions.

The central idea is that healthcare often involves decisions about how best to encourage people to take action. For example, could a different medication reminder improve adherence? Could the way a screening or vaccination campaign is communicated influence whether people attend? Could a digital health application help patients remain engaged with treatment over time? Rather than relying solely on assumptions about what might work, experimentation provides a structured way to test alternatives and learn from the results.

Randomised controlled trials (RCTs) have long helped researchers establish whether healthcare interventions are effective. As more healthcare interactions move online, the principles behind these trials can also inform digital experimentation.

The science behind the test

A/B testing compares two or more versions of an intervention. People are randomly assigned to different versions, and outcomes are measured to assess which approach performs better. The methodology involves more than comparing results. It requires appropriate randomisation, adequate sample sizes, data quality checks, and statistical methods to quantify uncertainty and improve the reliability of conclusions.

The presentation covered the experimentation lifecycle, including developing a hypothesis, designing an experiment, monitoring results, analysing outcomes, and using findings to inform decisions. It introduced statistical and technical approaches, including sample ratio checks, power analysis, methods to improve precision, sequential testing, and Bayesian methods to balance exploring different interventions with directing more exposure towards those performing better.

These methods are well established in digital industries such as technology, e-commerce, social media, streaming, travel, and gaming. The opportunity is to explore where they could also support healthcare, particularly as patients increasingly interact with services through websites, mobile applications, digital campaigns, and connected devices.

Connecting behavioural science and data science

A key theme of the presentation was the role of behaviour in determining whether healthcare interventions achieve their intended purpose. Making health information available or prescribing an effective treatment does not automatically mean that people will act on the information or consistently follow the treatment.

Gaming offers examples of how goals, reminders, feedback, progress tracking, and rewards can encourage participation and sustained engagement. These principles may offer useful ideas for healthcare, provided they are adapted appropriately to patients' needs and clinical objectives.

One example discussed was research by Taj and colleagues, who adapted the game 2048 to simulate medication-taking behaviour. The study found that a reminder intervention significantly improved adherence, illustrating how controlled experiments can help investigate the behavioural factors influencing health.

Taking experimentation into digital healthcare

The potential applications extend across several stages of the patient journey:

- Medication adherence and patient support: Testing reminder wording, timing, and progress feedback to understand which approaches help patients follow treatment plans.
- Digital health campaigns: Comparing messages and formats used to communicate screening, vaccination, and health education initiatives.
- Patient communications: Exploring how information is presented to support understanding, engagement, and appropriate action.
- Healthcare websites and applications: Testing content, navigation, and digital experiences to identify ways of making health services easier to access and use.
- Rehabilitation and chronic disease management: Exploring how goals, feedback, and progress tracking support continued participation in rehabilitation or self-management activities.

The presentation also considered the wider use of gamification in health technology, including fitness trackers, rehabilitation platforms, and medication adherence applications. Repeated interactions with these tools can generate longitudinal data on behaviours and treatment responses. For example, information on medication-taking, rehabilitation activity, or regular blood glucose measurements may help researchers and healthcare teams understand patterns over time.

A further industry example discussed was a digital companion application introduced alongside a rheumatoid arthritis therapy. The application provided patient education and treatment support and was associated with an 8% increase in revenue through better use of the therapy. This illustrates the potential commercial value of patient support tools, although revenue is not itself evidence of improved clinical outcomes.

Innovation with responsibility

Although the underlying experimental principles are transferable, healthcare differs from commercial digital environments in important ways. An intervention that increases clicks, app usage, or engagement does not necessarily improve a patient's health. Experiments must therefore be designed around meaningful outcomes and conducted with appropriate attention to medical accuracy, patient safety, privacy, equity, and ethical oversight.

The aim is not simply to optimise engagement, but to understand which interventions genuinely help patients and healthcare systems. A/B testing should complement, rather than replace, clinical research and the evaluation required to establish safety and effectiveness.

The broader opportunity

The presentation concluded by considering how behavioural science, data science, and experimental methods could work together to support more responsive healthcare services. The opportunity is to move beyond collecting data towards using it systematically to evaluate interventions, improve decisions, and refine how care is delivered.

The methodology remains the same: define, test, measure, and learn. However, the responsibility behind what we test is greater.

The discussion and Q&A at Katalitix explored how these ideas might be relevant to the company's clients, including opportunities to investigate healthcare system efficiencies and improve digital patient experiences.

Ultimately, the question is how experimentation can be applied responsibly to help healthcare learn what works, for whom, and in what context, with patients and their health outcomes at the centre.

With better data, we can make better decisions and drive innovation towards better health.

From Heartbreak to the HERD

Building a scientific benchmark for equine health.

text & photo: **Prof Jo-Ann Passmore**

My love affair with horses began decades ago in Noordhoek. In the 1990s, before children and the demands of my academic career, my soul was literally tethered to a spirited horse named Underwood. When Underwood retired, Missy, a gentle thoroughbred mare, stepped into my life.

But heartbreak followed. During an exceptionally hot January heatwave in Cape Town in the early 2000s, we lost Missy to severe colic. As a scientist, I knew colic was fundamentally a catastrophic breakdown of the hindgut. I was simply devastated.

Soon after, life intervened. Raising young children and paying school fees meant horses became an unaffordable "luxury". I put my passion in a closet (so to speak), loving horses from afar for nearly thirty years, convinced that chapter had closed.

Then came my fifties. With my children grown and my career in mucosal immunology established, the quiet pull of nature returned. At 54, after three decades out of the saddle, I met Adwina. Being with Adwina and her herd at the lovely Mountainview Stables in Tokai brought immense peace and reignited my scientific curiosity. As I stood in her paddock on a hot day, hearing warnings of the extreme El Niño summer predicted for South Africa in 2026/2027, the memory of losing Missy resurfaced with sharp urgency.

Unlike humans, horses are obligate hindgut fermenters. Their massive caecum and colon host a delicate, highly specialised microbial bioreactor responsible for extracting energy from fibrous forage and maintaining systemic immunity. In horses, the microbiome is not just a passenger; it is their engine.

Yet extreme heat places an enormous toll on these magnificent creatures. When temperatures soar, blood flow is redirected away from the gut towards the skin for thermoregulation, potentially depriving the mucosal lining of oxygen. The result can be rapid microbial dysbiosis, compromised gut barrier integrity, endotoxaemia, and the devastating spectre of colic – the condition that took Missy.

Despite this profound physiological dependence, rigorous, scientifically grounded equine microbiome research remains scarce globally and almost non-existent in South Africa. Much of horse health management relies on empirical feeding practices rather than high-resolution microbial data.

We want to change this.

Through the HERD study, we are establishing an intensive longitudinal cohort tracking Adwina and her herd across seasonal extremes, blistering heatwaves, and management transitions. Using the same cutting-edge sequencing and mucosal immunology pipelines we deploy for human health at CERI, we are building South Africa's first comprehensive equine microbiome reference baseline.

Our aim is to create a gold-standard benchmark against which future research on gut health, heat resilience, and disease prevention in South African horses can be measured.

HERD embodies the true spirit of One Health – the understanding that mucosal resilience and climate stress connect all living species.

But on a personal level, it is a full-circle healing journey. It honours Missy's memory, celebrates the sacrifices made for family, and finds purpose in the paddock with Adwina. We are finally able to give these beautiful creatures the rigorous science they deserve.



Unlocking Africa's Microbial Wealth for Women's Health

Prof Jo-Ann Passmore on why African-led microbiome research, biobanking, and manufacturing are essential to developing better treatments for women.

Africa is home to extraordinary human genetic and microbial diversity, yet less than 2% of the bacterial strains held in global culture collections originate from the continent. This imbalance has serious implications for women's health, particularly given the enormous burden of reproductive health conditions such as HIV, bacterial vaginosis (BV), HPV-related disease, cervical cancer, and adverse pregnancy outcomes.

The vaginal microbiome, the community of microorganisms that naturally live in the vagina, plays an important role in protecting against many of these conditions. Yet much of what we know about it comes from studies in Europe and North America, where the microbial, genetic, and environmental contexts can differ significantly.

We are therefore trying to understand and treat African women using an incomplete biological reference. Diagnostics, probiotics, and other therapies are only as good as the biology on which they are developed. If African women are poorly represented in the underlying science, there is a real risk that these products will not work as well for them.

This was a central message of my presentation at the Global Microbiome Conservancy Meeting, where I highlighted the need for African-led microbiome research, locally governed biobanks, and manufacturing capacity.

Vaginal probiotics and live biotherapeutics, which use living microorganisms to prevent or treat disease, offer promising possibilities for restoring vaginal health. However, an effective bacterial strain must do more than survive in a laboratory. It must compete, persist, and function within a complex vaginal ecosystem.

Many strains used in current live biotherapeutics were originally isolated from women in Europe or North America. They may not be best adapted to vaginal environments in African women, where microbial diversity may be greater, BV-associated bacterial communities more resilient, and physiological exposures such as menstruation and semen frequent.

A strain may perform well in the laboratory but fail to persist after treatment. This is why identifying bacteria from African women who naturally maintain stable, protective vaginal microbiomes is so important. These strains have already demonstrated their ability to survive in that environment.

We established the Vaginal Microbiome Research Consortium for Africa (VMRC4Africa) in 2021 to ensure that African women and scientists participate in microbiome discovery from the beginning, rather than simply providing samples for research conducted elsewhere.

Our work focuses on three areas. First, through partnerships with the Desmond Tutu Health Foundation in Cape Town (Dr Katherine Gill and Prof Linda-Gail Bekker) and the Kenya Medical Research Institute (KEMRI) in Kisumu (Dr Serah Gitome and Prof Elizabeth Bukusi), we have established longitudinal cohorts in which women are followed weekly over ten weeks, providing two vaginal samples per week. This helps us understand how vaginal microbiomes change and which protective strains remain stable.

Second, we are building African bacterial strain collections for reproductive health. Under the leadership of the ever talented but humble Dr Brian Kullin, soon to be joining CERI as Associate Professor, we have



already isolated thousands of vaginal bacteria, including potentially important *Lactobacillus* strains and bacteria associated with BV.

Third, we are testing how these strains function, including their ability to produce protective metabolites, inhibit harmful bacteria, support the mucosal barrier, reduce inflammation, and withstand physiological stresses.

Our goal is to move beyond describing the African vaginal microbiome towards identifying strains that could eventually become new live biotherapeutic products.

However, scientific discovery is only part of the challenge. Biobanking, patent regulations, and manufacturing infrastructure all influence whether African research can progress into treatments.

For me, one of the biggest barriers is local manufacturing. Africa has the scientific expertise, clinical cohorts, and laboratory capacity to discover promising bacterial therapeutic strains, but developing these into clinical-grade products still depends largely on specialised manufacturers in Europe or North America.

This creates prohibitive costs, delays, and questions around ownership and biological sovereignty. African biological material often has to leave the continent before it can become a product.

We need investment in African Good Manufacturing Practice (GMP) capacity for live biotherapeutics, including fermentation, formulation, and quality control. Without it, we risk remaining dependent on others to turn our discoveries into medicines. Strengthening local biobanking and addressing international patent regulations are also essential to protecting Africa's microbial resources.

Looking ahead five years, success for African women would mean access to affordable, effective treatments for conditions such as recurrent BV. Ideally, these would do more than repeatedly suppress harmful bacteria with antibiotics, helping instead to restore and maintain a healthy vaginal microbiome.

I am grateful to have helped develop the VIBRANT live biotherapeutic product to treat bacterial vaginosis in women, which included novel vaginal *Lactobacillus crispatus* strains from African women. Seeing it progress through clinical development and demonstrate lasting benefits would be an important achievement, but affordability must remain central.

For African science, success would mean establishing the entire development pathway on the continent: discovery, strain isolation, functional testing, clinical development, and eventually manufacturing.

Ultimately, I want African scientists to be recognised not simply as partners who recruit participants or provide samples, but as leaders discovering, developing, and testing the next generation of microbiome-based medicines.

More Than a Seat at the Table

An evening of storytelling and conversation brought African scientists, entrepreneurs, funders, and investors together in Cape Town to explore new opportunities for collaboration through SWEAT Africa.

What could we build together that none of us could build alone? This was the question posed to guests attending The Ecosystem Table, an intimate dinner held at the Dorp Hotel in Cape Town's historic Bo-Kaap neighbourhood on 20 October 2026, alongside the Africa Health Research and Innovation Funders Forum (AHRIFF).

The idea was inspired by a similar gathering in New York organised with Open Startup International, explains Prof Tulio de Oliveira, one of the driving forces behind SWEAT Africa.

The intention was to bring people from across the innovation ecosystem together to explore how they could contribute to the success of entrepreneurship and innovation in Africa. "We wanted to create a kind of relaxed environment for discussion and engagement, rather than having a meeting in a meeting room," he said.

Rather than beginning with presentations and pitches, the organisers invited guests to experience Cape Town's

culture, music, and storytelling.

The evening began on the journey to the venue, where Yanga Gijani, founder of Yang Steezy Travel, introduced guests to the wider ecosystem they were gathering to discuss. At the hotel, rapper and creative artist Uno July invited participants to share what the word "ecosystem" meant to them, weaving their responses into an improvised spoken-word performance accompanied by Jesse on saxophone.

The inclusion of arts and culture was deliberate, explained Bushra Razack, who helped shape the evening. "We wanted people to arrive as people first. Music and storytelling relax a room and give everyone a shared experience before anyone starts talking about their work."

The Bo-Kaap setting was equally intentional, offering guests an opportunity to experience a neighbourhood with a rich history and living culture.

A short panel discussion featured Bheki Dube, founder and CEO of Curiocity Africa; Brandon Paschal, Head of Stellenbosch University LaunchLab; and Dr Ross Vermeulen, COO of Fluorobiotech. The discussion explored the idea of the "keystone species" of African science and innovation: what essential element, if lost, could undermine the entire ecosystem?

Their reflections centred on community, networks, and collaboration, reinforcing the importance of trust in connecting people, ideas, and resources.

For Houda Ghozzi of Open Startup, the dinner provided an opportunity to connect with investors and experts who could help address some of the challenges involved in turning scientific discoveries into viable businesses. "Navigating scientific development, patenting, university negotiations, and market entry requires very different skills, expertise, and networks," she noted.

The evening allowed her to exchange ideas, receive feedback on positioning innovations for the market, and explore potential collaborations. One particularly valuable conversation involved representatives of Wellcome and the possibility of a future partnership.

The gathering also provided an opportunity to introduce more organisations to SWEAT Africa 2027, which will bring together African startups, investors, researchers, and ecosystem partners in the Cape Winelands on 16 and 17 March.

Andrew Douglas, producer of SWEAT Africa 2027, attended with a particular interest in connecting with funders and investors working in health and life sciences. "AHRIFF brought many of the continent's health research and innovation funders to Cape Town in the same week, and the dinner gave us a relaxed setting to meet them, hear what they fund, and talk about where SWEAT fits."

He emphasised that health startups face particular challenges, including regulatory requirements, clinical evidence, and manufacturing, making access to patient capital and knowledgeable partners especially important.

Through the Road to SWEAT competition, startups will have opportunities to pitch their innovations and participate in pre-booked meetings with investors matched to their sector and stage of development.

"Organisations we met that week have asked how their ventures from across the continent can be considered for SWEAT 2027, and how they might run a Track. That is what the evening was for: a dinner conversation that turns into founders in front of funders next March."

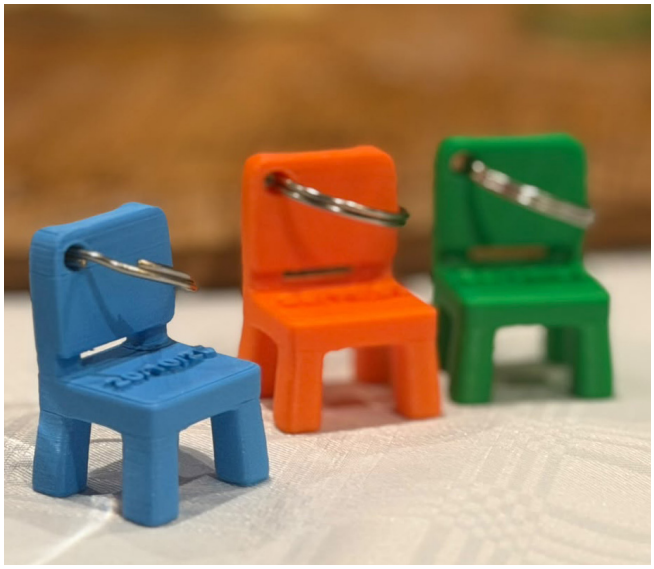
For Prof de Oliveira, the ambition extends well beyond the next festival.

"We want to become the most fun, investable, and impactful innovation festival in the whole world, but made in Africa," he said.

His vision is to bring leading technology experts, ambitious young innovators, and investors together in the Cape Winelands to develop technologies that can benefit both Africa and the wider world.

He sees Africa's young population as one of its greatest advantages. With the continent set to account for an increasingly large share of the world's young people, he believes Africa has an important opportunity to shape the future of global innovation.

For Razack, the evening reinforced a principle at the heart of SWEAT Africa's approach. "Ecosystems aren't built through transactions. They're built through relationships, and culture is one of the fastest ways to start them."



International Award for AI Research

A multidisciplinary research team at CERI has won the Health and Life Sciences category of the Nature Awards AI for Discovery, recognising its innovative application of artificial intelligence (AI) to some of the world's most pressing infectious disease challenges.



Led by Prof Houriiyah Tegally, the team is developing and applying machine learning approaches to analyse pathogen genomes, investigate how infectious diseases evolve and spread, and identify environmental conditions that may increase the risk of outbreaks.

By combining expertise in genomics, epidemiology, evolutionary biology, environmental science, and computational research, the team is finding new ways to extract meaningful information from complex datasets. Its work could make genomic analysis faster and more accessible, improve understanding of disease transmission, and ultimately support earlier identification of emerging public health threats.

"I believe AI gives us an opportunity to ask bigger questions and tackle health challenges in ways we couldn't before," says Prof Tegally. "For us, it's about using that opportunity to push the boundaries of scientific discovery and, ultimately, make a difference to people's lives. I'm incredibly proud of what our team is building, and I know this is just the beginning."

The Nature Awards AI for Discovery recognise research teams using AI to advance scientific discovery and address major societal challenges. Prof Tegally will travel to London to receive the award on behalf of the team.

African Leadership in AI and Health Discovery

Prof Tulio de Oliveira, Director of CERI, says the award reflects a strategic decision to invest in AI research and build the expertise needed to develop new computational approaches.

"Four years ago, well before the breakthrough of ChatGPT brought artificial intelligence into the global spotlight, we made a bold decision to embrace AI in our research. It took years of hard work to build a world-class team capable not only of using AI, but of developing entirely new AI models to track and predict epidemics."

The team's research builds on CERI's established expertise in infectious disease genomics and large-scale genomic surveillance, including its contributions during the COVID-19 pandemic. Although that surveillance was not itself AI-driven, it helped establish the scientific foundation, data expertise, and collaborative networks now supporting the development of new AI approaches.

The work also reflects the importance of developing AI technologies within Africa, where infectious diseases remain a substantial public health challenge. Rather than relying exclusively on technologies developed elsewhere, African researchers are contributing to how these tools are designed, trained, and applied to address regional health priorities.

Central to this effort is a multidisciplinary team combining biological understanding, computational expertise, and public health experience. The collaboration is helping strengthen African scientific capacity in a rapidly developing field with growing importance for infectious disease research.

New Approaches to Infectious Disease Research

For the CERI researchers, AI is not a replacement for established scientific methods, but a way to investigate biological and environmental relationships that would be difficult to analyse using conventional approaches alone.

One area of research focuses on making pathogen genomic analysis faster and more accessible. Identifying and classifying viruses using conventional methods can require substantial computational resources and specialist expertise. The team is developing machine learning approaches that analyse genomic sequences using alternative representations of genetic information, potentially bypassing some of the computationally intensive steps involved in traditional analysis.

These approaches could make genomic research more scalable, particularly in settings with limited computational resources.

Another focus is understanding where infectious diseases are more likely to circulate and spread. The researchers are using deep learning to investigate how environmental and geographical conditions influence diseases such as dengue. By examining broader spatial patterns, these approaches can capture complex relationships between climate, landscape, and disease suitability that conventional methods may overlook. The team is also combining machine learning with phylogenetics and phylodynamics to investigate pathogen evolution and transmission. Integrating genomic, geographical, and environmental information could provide new insights into how pathogens move between populations and the factors influencing their spread.

Graeme Dor, a member of the research team, explains how AI is expanding the possibilities for analysing these complex relationships.

"In my experience, AI-based approaches, particularly deep learning methods, are enabling us to develop models that integrate and explore high-dimensional datasets, including genomic, environmental and epidemiological information, in ways that were previously difficult to achieve," he says.

"These models have the potential to better capture the complexity of real-world transmission dynamics across different spatial and temporal scales, ultimately improving our understanding of pathogen spread and supporting more informed public health responses."

Together, these research areas contribute to CERI's longer-term ambition of developing predictive epidemic intelligence. By integrating genomic, epidemiological, climate, and environmental data, the researchers hope to identify where and when infectious disease risks may increase, helping public health authorities anticipate emerging threats and respond earlier.

"By combining vast datasets from satellites, human mobility, climate and the environment, we are moving beyond understanding how epidemics spread to predicting where new pathogens may emerge, how they will spread, and which populations will be most affected," says Prof de Oliveira.

"Our ambition is to move from reacting to epidemics to anticipating and preventing them. This award is a wonderful recognition of our team's dedication and demonstrates how cutting-edge science developed in Africa can help make the entire world safer."

For Prof Tegally, the recognition also highlights the potential of African scientists to contribute to advances in AI-driven health discovery.

"There is extraordinary scientific talent and potential in Africa. I hope our work shows what is possible when we combine that expertise with new technologies like AI, and create solutions that can make a difference far beyond our own borders."

Media Coverage

Our work showcased in videos and featured on radio/TV.

The Global Microbiome Conservancy

Professor Jo-Ann Passmore was among the international researchers invited to speak at the Global Microbiome Conservancy's 10th anniversary celebration. Her presentation, From Description to Restoration: The Next Decade of Vaginal Microbiome Research, formed part of the session Microbiome Science Across Borders, which brought together scientists exploring the role of microbiomes in human health.

Watch the full video here: https://www.youtube.com/live/tcYFjlwBxi0





Newzroom Afrika: New HIV Study

A major study published in The Lancet warns that the decline in new HIV infections in rural KwaZulu-Natal has largely stalled since 2019, despite years of progress in treatment and prevention. Researchers say trends differ across age groups, with gains among younger adults offset by stalled or rising infections among older adults. Professor Frank Tanser, the study's senior author, weighs in.

Watch the full video here: https://www.youtube.com/watch?v=9lEQXV5Hkfk

Africa in The World: How Africa Works

Joe Studwell, author of How Asia Works and the new How Africa Works, will share some eyebrow-raising ideas about Africa's development in conversation with Feyi Fawehinmi.

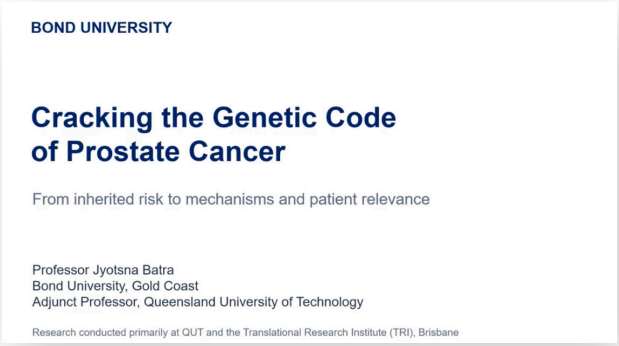
Watch the full video here: https://www.youtube.com/live/hgOl0zGk8ZI



Cracking the Genetic Code of Prostate Cancer

At a CERI seminar on 8 October 2026, Professor Jyotsna Batra of Bond University, Australia, presented her research on prostate cancer genetics, highlighting advances in biomarker discovery, potential treatment targets, and improved diagnostic tools. She also emphasised the need for more diverse genetic studies, particularly in African populations.

Watch the full video here:
https://www.youtube.com/watch?v=9LfgGYS-2Bw





The Future of Enzyme Manufacturing in Africa

In this African STARS Seminar, Dominic Nicholas, co-founder and CEO of Immobazyme, shares the company's journey from a Stellenbosch University spin-out in 2019 to a team of 20 producing proteins, peptides and enzymes for the food, cosmetics, agriculture and cell culture markets.

Watch the full video here: https://www.youtube.com/watch?v=2gollypd6zM

International One Health Day Webinar

To mark International One Health Day on 3 November 2026, CERI and the University of Pretoria brought together experts to explore how a One Health approach can strengthen South Africa's response to emerging infectious diseases.

Watch the full video here:
https://www.youtube.com/watch?v=L0mCMETWQUk



The Future of Genomics is Being Shaped in Africa



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