

Centre for Epidemic Response and Innovation (CERI) & KwaZulu-Natal Research Innovation and Sequencing Platform (KRISP)



Introduction:

In our January/February issue of 2022, we focus on the visit of **our president Cyril Ramaphosa and minister Dr. Blade Nzimande to CERI's new facilities at Stellenbosch University**. We also highlight two students that graduated with a PhD and a MMedSci *Cum Laude* at KRISP at UKZN and the new papers and news about Omicron variant. We also show how the world lauded the variant hunters in South Africa and how South Africa is becoming a leader in pandemic and epidemic response and the selection of Prof. Tulio de Oliveira as one of the ten people who helped to shape science in 2021 by Nature.

CERI and KRISP want to challenge the status quo and create a scientific environment that drives innovations in global health and reverses the brain drain in Africa...

Highlights:

News: **Ramaphosa lauds SU's world-class CERI set to lead global epidemic response**

Capacity Building in Africa: **A New Doc to Change the World and a Cum Laude MMedSci student**

Science: **Where did Omicron come from? Three Key Theories**

Nature's 10: **Ten people who helped to shape science in 2021**

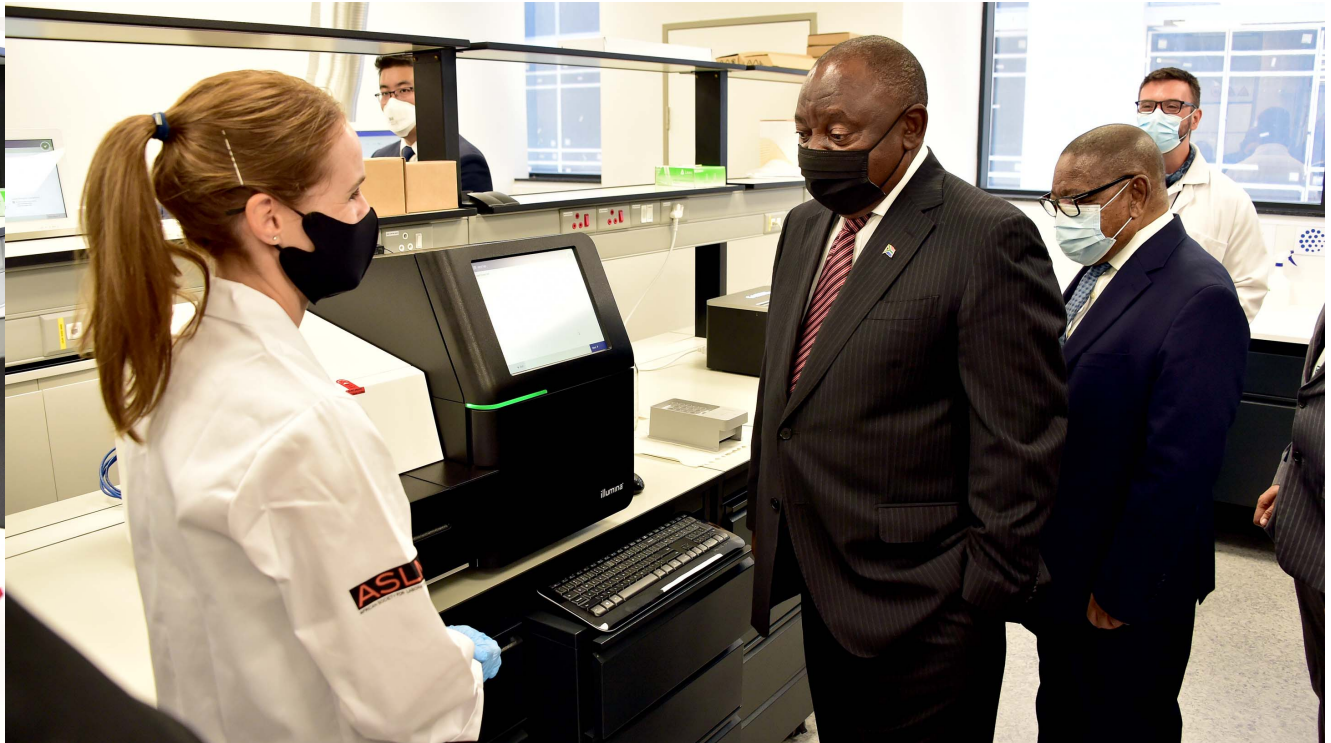
NY Times: **The Variant Hunters: Inside South Africa's Effort to Stanch Dangerous Mutations.**

Twitter Science: **The new way to quickly communicate scientific results! Please follow us for real-time updates**

Talk: **Collaboration in South Africa to lead the world on the discovery and characterisation of SARS-CoV-2 variants, 2 Feb 2022**



News: Ramaphosa lauds SU's world-class CERI set to lead global epidemic response



President Cyril Ramaphosa, along with the Minister of Higher Education, Science and Technology, Blade Nzimande, and the biotech investor of NantAfrica (a division of NantWorks), Dr Patrick Soon-Shiong, visited the Stellenbosch University (SU) Biomedical Research Institute (BMRI) on 19 January 2022 to view the cutting-edge facilities of the Centre for Epidemic Response and Innovation (CERI), which will provide the genomic sequencing for the development and evaluation of vaccine therapies in South Africa. CERI is to be officially launched later this year.

CERI is envisioned to be the largest genomics facility in Africa and is headed by Prof Tulio de Oliveira, world-renowned bioinformatician and professor of bioinformatics at the School for Data Science and Computational Thinking at SU. The visit to the centre preceded the launch of the NantSA vaccine production facilities at Brackengate, Cape Town, and the announcement of the Coalition to Accelerate Africa's Access to Advanced Healthcare (the AAAH Coalition).

Welcoming the president's delegation were Profs Wim de Villiers, SU Rector and Vice-Chancellor; Kanshukan Rajaratnam, head of the School for Data Science and Computational Thinking; Elmi Muller, dean of SU's Faculty of Medicine and Health Sciences, and De Oliveira.

The BMRI, where CERI is located, is a large infrastructural investment of more than a billion rand by SU (DSI) and the Department of Science and Innovation (DSI). It is on a par with the most advanced biomedical research facilities in the world and plans to host dozens of world-class research groups in South Africa.

Commenting on this proud moment for SU, De Villiers said the collaboration between the various entities aligned with SU's vision of being Africa's leading research-intensive university, globally recognised as excellent, inclusive and innovative, where knowledge is advanced in service of society. **"Establishing purposeful partnerships and inclusive networks is an ongoing and key strategic theme for the University".**

Link: <https://ceri.org.za/news/?token=528>

Events: Talks and Events at CERI & KRISP



Talk: Collaboration in South Africa to lead the world on the discovery and characterisation of SARS-CoV-2 variants

Speaker: Prof. Tulio de Oliveira

Date: Wednesday, 2 February 2022

Time: 12:00 – 13:00

Venue: Stellenbosch Tygerberg Campus (in-person), Streamed at Nelson R Mandela School of Medicine, UKZN and Zoom.

Capacity Building: How to write competitive grant applications to the National Institute of Health (NIH) in the USA?

Speakers: Dr. Cheryl Baxter & Suzette Grobler,
Heads of Scientific Support and Grants Management at CERI

Date: Thursday, 3 February 2022

Time: 2pm – 3pm

Venue: University of the Free State, Zoom session.



Capacity Building in Africa: A New Doc to Change the World!

We would like to present to you **Dr. Emmanuel James San**. Dr. San has been awarded his Ph.D. in Medicine at the College of Health Sciences, Nelson R Mandela School of Medicine, University of KwaZulu-Natal in January 2022.

The title of his thesis is *“Analysis and Visualization of the Transmission Dynamics, Evolution and Spread of SARS-CoV-2 in African Populations”*. During his PhD, Dr. San published 12 manuscripts, many in top scientific journals, including Nature, Science, Cell and Nature Medicine.

Dr. San developed a network of collaborators and worked closely with CAPRISA, the Network of Genomics Surveillance in South Africa (NGS-SA) and the Africa CDC Pathogen Genomic Initiative (PGI). He is also very committed to capacity building and has taught over 10 workshops on bioinformatics.

We would like to express our sincere congratulations to **Dr. Emmanuel James San** and say that world is now a better place with Dr. San!



Dr. Emmanuel James San

News: CERI and KRISP director in Nature's 10: Ten people who helped to shape science in 2021



Capacity Building in Africa: MMedSci Cum Laude

Congratulations to **Ugochukwu (Jacob) Anyaneji**. Mr **Anyaneji**, who has been awarded a Master of Medical Science (MMedSci) *Cum Laude* at the School of Laboratory Medicine and Medical Sciences College of Health Sciences, Nelson R Mandela School of Medicine, University of KwaZulu-Natal in January 2022.

The title of his thesis is ***“Implementation of an efficient SARS-CoV-2 specimen pooling strategy for high throughput diagnostic testing.”*** During his MMedSci, Anyaneji published 5 manuscripts, including a first author publication at Nature Science Reports and a co-authored paper at Nature and Science. It is not surprising that Anyaneji got awarded his degree *Cum Laude*!

Anyaneji worked very close with the National Institute for Theoretical Physics (NITHEP), the African Institute for Mathematical Sciences (AIMS) and with international collaborators in the USA and the U.K.

We were really fortunate to have such a bright student and we are working with Anyaneji to continue his studies with a Ph.D.



Ugochukwu (Jacob) Anyaneji

Where did Omicron come from? Three Key Theories



By Smriti Mallapaty, 28 Jan 2021, Nature News

Little more than two months after it was first spotted in South Africa, the Omicron variant of the coronavirus SARS-CoV-2 has spread around the world faster than any previous versions. Scientists have tracked it in more than 120 countries, but remain puzzled by a key question: where did Omicron come from?

There's no transparent path of transmission linking Omicron to its predecessors. Instead, the variant has an unusual array of mutations, which it evolved entirely outside the view of researchers. Omicron is so different from earlier variants, such as Alpha and Delta, that evolutionary virologists estimate its closest-known genetic ancestor probably dates back to more than a year ago, some time after mid-2020 (ref. 1). **"It just came out of nowhere,"** says Darren Martin, a computational biologist at the University of Cape Town, South Africa.

The question of Omicron's origins is of more than academic importance. Working out under what conditions this highly transmissible variant arose might help scientists to understand the risk of new variants emerging.

Ahead of that report, scientists are investigating three theories. Although researchers have sequenced millions of SARS-CoV-2 genomes, they might simply have missed a series of mutations that eventually led to Omicron. Alternatively, the variant might have evolved mutations in one person, as part of a long-term infection. Or it could have emerged unseen in other animal hosts, such as mice or rats.

But because Johannesburg is home to the largest airport on the African continent, the variant could have emerged anywhere in the world — merely being picked up in South Africa because of the country's sophisticated genetic surveillance, says Tulio de Oliveira, a bioinformatician at the University of KwaZulu-Natal in Durban and at Stellenbosch University's Centre for Epidemic Response and Innovation, who has led South Africa's efforts to track viral variants, including Omicron.

Link: <https://www.nature.com/articles/d41586-022-00215-2>

The Variant Hunters: Inside South Africa's Effort to Stanch Dangerous Mutations.



By Stephanie Nolen, NY Times

NTUZUMA, South Africa — A few months ago, Sizakele Mathe, a community health worker in this sprawling hillside township on the edge of the city of Durban, was notified by a clinic that a neighbor had stopped picking up her medication. It was a warning sign that she had likely stopped taking the antiretroviral tablet that suppresses her H.I.V. infection.

That was a threat to her own health — and, in the era of Covid-19, it might have posed a risk to everyone else's. The clinic dispatched Ms. Mathe to climb a hill, wend her way down a narrow path and try to get the woman back on the pills.

Ms. Mathe, as cheerful as she is relentless, is part of a national door-to-door nagging campaign. It's half of a sophisticated South African effort to stanch the emergence of new variants of the coronavirus, like Omicron, which was identified here and shook the world this past week.

Link:

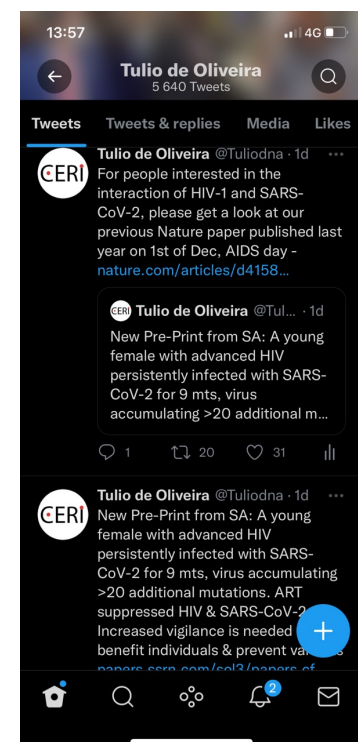
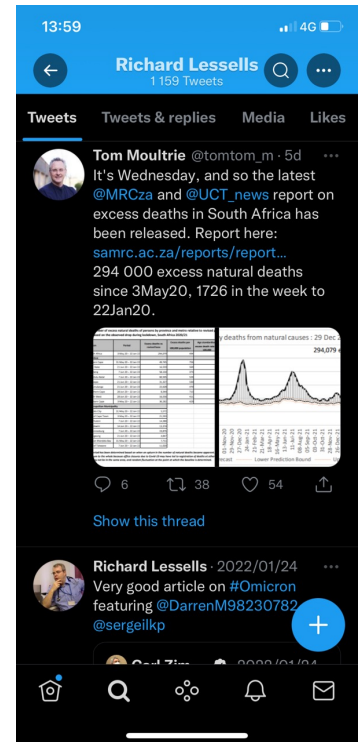
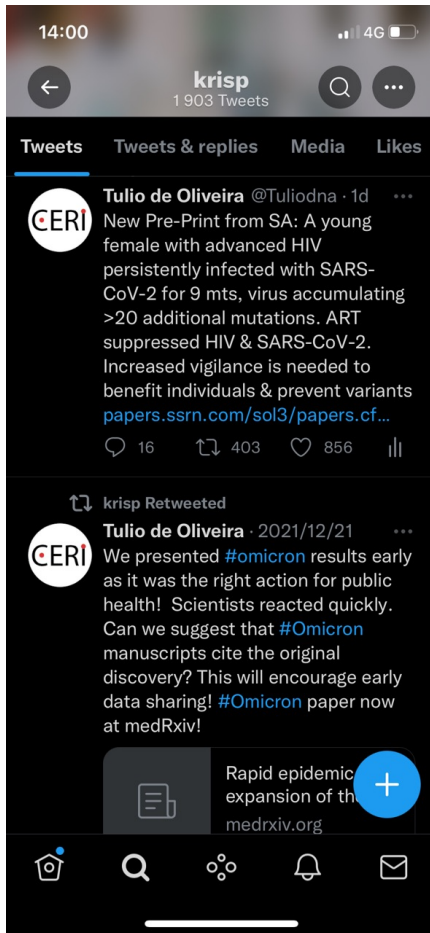
<https://www.nytimes.com/2021/12/04/health/covid-variant-south-africa-hiv.html>

The other half takes place at a state-of-the-art laboratory 25 miles down the road. At the KwaZulu-Natal Research Innovation and Sequencing Platform in Durban, scientists sequence the genomes of thousands of coronavirus samples each week. The KRISP lab, as it is known, is part of a national network of virus researchers that identified both the Beta and Omicron variants, drawing on expertise developed here during the region's decades-long fight with H.I.V.

This combination of high tech and grass roots represents one of the front lines in the world's battle against the evolving coronavirus. On Friday, the research network in South Africa reported to a world waiting anxiously for new information that the new variant appeared to spread twice as quickly as Delta, which had been considered the most contagious version of the virus.

The researchers at KRISP are global leaders in viral phylogenetics, the study of the evolutionary relationship between viruses. They track mutations in the coronavirus, identify hot spots of transmission and provide crucial data on who is infecting whom to help tamp down the spread...

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Twitter accounts from our teams:

CERI at Stellenbosch
KRISP at UKZN
Houriiyah Tegally
Dr. Eduan Wilkinson
Dr. Richard Lessells
Prof. Tulio de Oliveira
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UKZN

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@houzhou
@EduanWilkinson
@rjlessells
@tuliodna
@StellenboschUni
@UKZN



Rapid epidemic expansion of the SARS-CoV-2 Omicron variant in southern Africa.

Viana R, Moyo S, Amoako DG, Tegally H, Scheepers C, Pillay S, Ramphal Y, Ramphal U, San JE, Tshiabuila D, Tsui J, van Wyk S, Preiser W, Treurnicht F, Venter M, Williamson C, Pybus OG, Bhiman J, Glass A, Martin DP, Rambaut A, Gaseitsiwe S, von Gottberg A, de Oliveira
Nature (2022), doi: 10.1038/s41586-022-04411-y



T cell responses to SARS-CoV-2 spike cross-recognize Omicron.

Keeton, R., Tincho, M.B., Ngomti, A, Giandhari J, Naidoo Y, Pillay S, Tegally H, de Oliveira T, Bekker L-G, Gray G, Ueckermann V, Rossouw T, Boswell MT, Bihman J, Moore PL, Sigal A, Ntusi NAB, Burgers WA, Riou C. **Nature (2022), <https://doi.org/10.1038/s41586-022-04460-3>**



The political theatre of the UK's travel ban on South Africa.

Mendelson M, Venter F, Moshabela M, Gray G, Blumberg L, de Oliveira T, Madhi SA,
The Lancet (2021), [https://doi.org/10.1016/S0140-6736\(21\)02752-5](https://doi.org/10.1016/S0140-6736(21)02752-5)..



Track Omicron's spread with molecular data.

Scott L, Hsiao NY, Moyo S, Singh L, Tegally H, Dor G, Maes P, Pybus OG, Kraemer MUG, Semenova E, Bhatt S, Flaxman S, Faria NR, de Oliveira T
Science (2021), DOI: 10.1126/science.abn4543 .:



Africa: tackle HIV and COVID-19 together.

Msomi N, Lessells RJ, Mlisana K, de Oliveira T,
Nature (2021), 600, 33-36, doi: <https://doi.org/10.1038/d41586-021-03546-8>..

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