

CERI & KRISP Newsletter

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Introduction

Welcome to the latest edition of the CERI/KRISP newsletter. As we enter the winter season in South Africa, our focus shifts to the northern hemisphere. In May, we had the privilege of attending the World Health Assembly, WHO, and the United Nations in Geneva, Switzerland, where we had the opportunity to participate in the launch of the International Public Health Surveillance Network (IPSN). Additionally, Professor Tulio engaged in significant discussions with the Medical Center for International Diseases (MCID) in Bern and the Geneva 2030 Genomics program.

At CERI and KRISP, we acknowledge the crucial role that climate change plays in the severity and transmission of pathogens. Therefore, we are delighted to announce the official establishment of the CLIMADE Consortium. This initiative places us and our partners at the forefront of global research on the influence of climate change on infectious diseases, encompassing not only Africa but also the rest of the world.



NEWS: WHO launches global network to detect and prevent infectious disease threat, Geneva, 20 May 2023



From L-R: Dr Naveen Rao, Rockefeller Foundation; Björn Kümmel, Federal Ministry of Health, Germany; Dr Sarah Hersy, WHO; Dr Chikwe Ihekweazu, WHO; Prof Leo Yee Sin, National Centre for Infectious Diseases; Singapore; Dr Mario Moreira, President, Fiocruz, Brazil; Dr Josefina Campos, ANLIS Malbrán, Argentina.; Dr Alexander Pym, Wellcome Trust; Dame Jenny Harries, Chief Executive, UK Health Security Agency; Prof Tulio de Oliveira, CERI/KRISP, South Africa; Dr Jean Kaseya, Director-General, Africa CDC

WHO and partners are launching a global network to help protect people from infectious disease threats through the power of pathogen genomics. The International Pathogen Surveillance Network (IPSN) will provide a platform to connect countries and regions, improving systems for collecting and analyzing samples, using these data to drive public health decision-making, and sharing that information more broadly.

Pathogen genomics analyzes the genetic code of viruses, bacteria and other disease-causing organisms to understand how infectious they are, how deadly they are, and how they spread. With this information, scientists and public health officials can identify and track diseases to prevent and respond to outbreaks as part of a broader disease surveillance system, and to develop treatments and vaccines.

The IPSN, with a Secretariat hosted by the WHO Hub for Pandemic and Epidemic Intelligence, brings together experts worldwide at the cutting-edge of genomics and data analytics, from governments, philanthropic foundations, multilateral organizations, civil society, academia and the private sector. All share a common goal: to detect and respond to disease threats before they become epidemics and pandemics, and to optimize routine disease surveillance.

The goal of this new network is ambitious, but it can also play a vital role in health security: to give every country access to pathogen genomic sequencing and analytics as part of its public health system," said WHO Director-General Dr Tedros Adhanom Ghebreyesus. "As was so clearly demonstrated to us during the COVID-19 pandemic, the world is stronger when it stands together to fight shared health threats."

COVID-19 highlighted the critical role pathogen genomics plays in responding to pandemic threats. Without the rapid sequencing of the SARS-COV-2 genome, vaccines would not have been as effective, or have been made available so quickly. New, more transmissible variants of the virus would not have been as quickly identified. Genomics lies at the heart of effective epidemic and pandemic preparedness and response, as well as part of the ongoing surveillance of a vast range of diseases, from foodborne diseases and influenza to tuberculosis and HIV. Its use in monitoring the spread of HIV drug resistance, for example, has led to antiretroviral regimes that have saved countless lives.

Link to full article:

<https://www.who.int/news/item/20-05-2023-who-launches-global-network-to--detect-and-prevent-infectious-disease-threats>

FEATURE: Visit to the Health 2030 Genomics Centre in Geneva



By Riley Griffin, Bloomberg, 20th April 2023

Prof. Tulio de Oliveira had the opportunity to visit the Health 2030 Genomics Center in Geneva on the 22 May 2023, where he was able to present some of the research being undertaken at CERI and KRISP.

The Health 2030 Genome Center is a multi-institutional hub established to promote genomic medicine in Switzerland and provide sequencing and analysis services to the research and clinical community. The Center was conceived as a hub for genetics and genomics research to foster collaboration, increase communication, and promote the sharing of ideas, allowing for the long-term development of major initiatives.

The creation of the Health 2030 Genome Center was supported by a private Geneva-based foundation, the Personalized Health and Related Technologies of the Swiss Federal Institute of Technology Domain and the Health 2030 initiative in personalized health. The Health 2030 is located at the Biotech Campus in Geneva, which is a few hundred meters from the United Nations Building.



Isabella Eckerle @EckerleIsabella · May 22

Inspiring talk from @Tuliodna today at Campus Biotech: A lot to learn for the global north on how to do surveillance, quick response & communication during outbreaks. Thanks to @ixenario for inviting me! #emergingviruses



Top: Health 2030 location, **Right:** Tweet from Prof. Isabella Eckerle about Prof. Tulio de Oliveira's presentation in Geneva.

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NEWS: Visit to Multidisciplinary Center for Infectious Diseases, Bern University



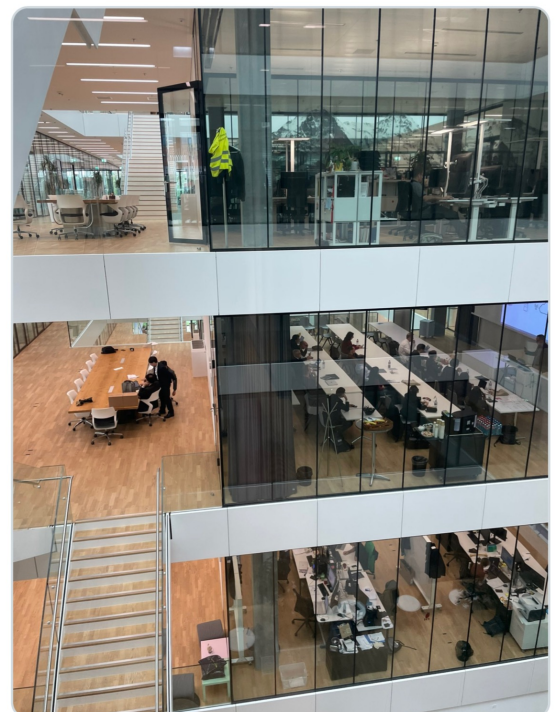
Strategic meeting at MCID at the University of Bern to discuss the Cluster of Excellence in Genomics in Africa. This discussion was led by Prof. Tulio de Oliveira (lead of the CoE from ARUA – far left) and Prof Hugues Abriel (Vice-rector of Research at University of Bern – far right)

Professor Tulio visited Bern University in Switzerland and met with the team from the MCID (Multidisciplinary Center for Infectious Diseases). During his visit, they discussed potential collaborations on topics related to pandemic preparedness and emerging infectious diseases. In addition, discussions focused on how to expand genomics to rare diseases and cancer. The discussions focused on addressing important global health challenges and bringing together experts from different institutions to work towards common goals. Part of the discussion centred around the new Cluster of Excellence (CoE) on Genomics in Africa that is a large African and European Collaboration between ARUA (African Research Universities Alliance) and The Guild of European Research-Intensive Universities.



Tulio de Oliveira @Tuliodna · May 24

A scientific building in Switzerland 🇨🇭 almost as good as ours in South Africa 🇿🇦. Fun to realize that we can as high level science as the most advanced places in the world!



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Right: MCID (Multidisciplinary Center for Infectious Diseases) is in an impressive scientific building in Bern and Prof. de Oliveira tweet about it.

NEWS: New biomedical research facility to advance African health science



By Engela Duvenage, Nature Africa, 6 May 2023

Nature Africa, 6 May 2023. Largest biomedical research complex in the southern hemisphere officially opened in South Africa.

A new Biomedical Research Institute (BMRI) at Stellenbosch University (SU) will aim to be an incubator for solutions to prevent and treat health challenges in Africa — from tuberculosis, and HIV, to rare genetic disorders, heart diseases, neurological, and fertility problems.

“The BMRI is dedicated to understanding the genetic and bio-molecular basis of disease, with an African focus,” says Nico Gey van Pittius, vice-dean of research and internationalisation at SU’s Faculty of Medicine and Health Sciences (FMHS).

Most of the funding for R1.2 billion (US\$66 million) 13,938m² facility on SU’s Tygerberg Medicine and Health Sciences campus in Cape Town came from the university, with support from South Africa’s National Dep of Higher Education, Science and Innovation.

BMRI provides workspace for more than 500 biomedical researchers and students in the fields such as tuberculosis (both in humans and animals), neuroscience, epidemic response and innovation, cardio-metabolics, rare disease genomics, clinical mycobacteriology and epidemiology, Parkinson’s disease, and reproductive health research.

“In our planning we asked our top researchers what they thought would be needed in the next 20 years or more. We designed BMRI with the future in mind, and to host the technology of the future,” says Gey van Pittius, who since 2012 has steered the project, along with Eben Mouton, FMHS’s director for business management.

“Plans around BMRI’s building were among the reasons why I decided to establish CERI, the Centre for Epidemic Response and Innovation, at SU,” says Prof. Tulio de Oliveira, the scientist who first identified the Omicron variant of the virus that causes COVID-19.

For Biobanking, specimens can be safely stored and retrieved through a truck-sized Hamilton Bios, while the automated robotic biological storage system can house some 3.5 million samples. **“It was the first automated storage system of this scale to be commissioned in the Southern Hemisphere,”** says Rubeshan Nayager, manager of the BMRI Biorepository Unit.

Link: <https://www.nature.com/articles/d44148-023-00112-4>

OPINION: A pathogen surveillance network will strengthen global health



Photo credit: WHO Media

By Dr. Chikwe Ihekweazu, 22nd May 2023

The COVID-19 pandemic clearly demonstrated the value that pathogen sequencing played in developing diagnostics within weeks, vaccines within months, and therapeutics in less than two years. To ensure we don't backtrack on one of the few positive developments to come out of the pandemic, a pathogen surveillance network launched just last week.

Pathogen genomic surveillance, or PGS, is the ongoing collection, sequencing, and analysis of the genetic code of viruses, bacteria, and other disease-causing pathogens. It is a critical tool for the management of threats to public health. Without the rapid sequencing, analysis, and sharing of the genomic data of COVID-19, we would not have been able to develop vaccines as quickly as we did; neither would we have been able to develop therapeutics that were adapted to successive variants as they emerged.

During the COVID-19 pandemic, countries invested substantial resources in scaling up PGS capacity. At the height of the pandemic, more than 67,000 genomes were being deposited in public viral genome data repositories each day.. COVID-19 is just one of many risks that PGS seeks to address.

Globalization, climate change, and antimicrobial resistance will create opportunities for the emergence of new diseases, and new geographies for existing ones. A robust and flexible PGS system is essential to manage these risks.

The IPSN will bring together disease surveillance groups around the world that will solve common challenges collectively, including working on standards and protocols for data and data sharing, determining how to increase PGS capacity in countries, testing new innovations, and contributing to the global knowledge base. It will be a global voice that advocates for quality disease surveillance, supported by sustainable financing.

PGS serves clinical, research, and public health needs. It provides data to determine optimal treatment regimens, such as for patients with tuberculosis and HIV; it can detect and monitor AMR; identify the source of outbreaks; and support the creation of vaccines for seasonal viruses such as flu.

Link to full opinion:

<https://www.devex.com/news/opinion-a-pathogen-surveillance-network-will-strengthen-global-health-105557>

Press Release: Rockefeller Foundation, WHO and CLIMADE

The Rockefeller Foundation and the World Health Organization (WHO) have announced a new partnership to strengthen the WHO Hub for Pandemic and Epidemic Intelligence. As part of the collaboration, the Foundation is investing US\$ 5M in partners working with WHO to cultivate global networks for pathogen detection and strengthen pandemic preparedness capabilities, including broadening surveillance for diseases worsened by rising temperatures and extreme weather.

Established in 2021, WHO Hub for Pandemic and Epidemic Intelligence facilitates a global collaboration of partners from multiple sectors to address future pandemic and epidemic risks with better access to data, better analytical capacities, and better tools and

insights for decision-making.

The partnership with The Rockefeller Foundation will accelerate these efforts with catalytic funding and technical assistance.

"The Covid-19 pandemic underscored that disease surveillance, collaboration between stakeholders, and data sharing were absolutely essential ingredients for health security – and the global community was unprepared," said Dr. Chikwe Ihekweazu, WHO Assistant Director-General and head of the WHO Hub for Pandemic and Epidemic Intelligence. "

The Rockefeller Foundation will support projects under the WHO Hub for Pandemic and Epidemic Intelligence's stewardship, including:

- Scaling global capacity for genomic surveillance through the newly launched International Pathogen Surveillance Network.
- Developing a digital platform in partnership with Data.org, to enable real-time communication and collaboration between public health analysts and researchers across the globe to scale evidence-based, field-tested epidemic tools.
- Developing user-centered product strategies for existing WHO epidemic intelligence solutions to better support global public health agencies.
- Improving outbreak detection through the Global.health data science initiative, in partnership with the University of Oxford and Boston Children's Hospital, among others.
- Rockefeller Foundation was also a founding funder of the Climate Amplified Disease and Epidemics (CLIMADE) consortium. CLIMADE was created to leverage the power of data science to predict, track, and control diseases whose impact has been amplified by climate change.

PRESS RELEASES /

The Rockefeller Foundation and World Health Organization Announce Partnership To Expand Global Pandemic Preparedness in Era of Climate Change

05.23.23



TRAINING: CERI & KRISP Fellows Short Videos:



Genomics Africa Fellows

CERI: Centre for Epidemic

58 videos 273 views Updated today

Here you will find sort videos of some of the fellows that spent time in training at CERI and KRISP.

I found the training very interesting, I'm grateful and or me I'd say that it has come at

Play all

Shuffle



Alex Mwanyongo
Medical Laboratory Scientist

Hi, my name is Alex Ansaye Mwanyongo. I come from Malawi.

CLIMADE: Alex Ansaye, Public Health Institute of Malawi in South Africa for Cholera & TB genomics

CERI: Centre for Epidemic Response & Innovation • 73 views • 3 days ago



I found the training very interesting, I'm grateful and or me I'd say that it has come at

CLIMADE: Ester Kasisi Adamson, SACIDS Foundation for One Health training in genomics surveillance

CERI: Centre for Epidemic Response & Innovation • 98 views • 6 days ago



meet the international standards in genomics and bioinformatics

CLIMADE: Julius Sseruyange from Uganda training in Genomics & Epidemic Response in South Africa

CERI: Centre for Epidemic Response & Innovation • 63 views • 6 days ago



that is rare in our continent, in Africa particularly.

CLIMADE: Francine Berlangue from Cameroon genomics training at CERI, South Africa

CERI: Centre for Epidemic Response & Innovation • 122 views • 6 days ago

https://www.youtube.com/playlist?list=PLp9seXOoIQGUF4I--Mw_sBTol32MgxQZ



FEATURE SEMINARS: The rise (and fall?) of South Africa's HIV epidemic & Will climate Change Fuel the Next Pandemics?



This month's seminar at CERI, Stellenbosch University and KRISP at UKZN featured Prof. Frank Tanser. Overall, the seminar provided fascinating insight into the research journey he has been on as well as the ongoing efforts to combat HIV in South Africa and the progress that has been made in recent years. It was an excellent opportunity for attendees to learn from a leading expert in the field and engage in discussions on the latest research and prevention strategies for addressing the HIV epidemic. **Date:** Wednesday 31st May. **Location:** CERI at BMRI, Tygerberg Campus & Streamed at KRISP at Nelson R Mandela School of Medicine, UKZN.

SHARED HUMANITY
SESSION 4: HEALTH SCIENCES
16 MAY 2023 | 17H00-19H00

PROFESSOR TULIO DE OLIVEIRA
Professor Tulio de Oliveira is a Scientist in Global Health and Bioinformatics at Stellenbosch University, University of KwaZulu Natal & University of Washington.

SHARED HUMANITY PROGRAM AT STELLENBOSCH UNIVERSITY:

Shared Humanity is an interdisciplinary module that provide students with a unique opportunity to engage with world-renowned leaders to provide the ability to think critically about your point of view, its implications, and the consequences to oneself, others, and society. The Shared Humanity module gives the opportunity to over 400 first year students to develop tools and skills that will enable them to contribute towards shaping environments for the emergence of social justice.

Lecturers includes **Prof. Thuli Madonsela, Prof. Tulio de Oliveira & Prof. Jonathan Jansen.**

Will Climate Change Fuel The Next Pandemics?



FEATURE: Training Program at KRISP with DIPLOMICS & ThermoFisher



Figure 1: Fellows and trainees at the entrance of the KRISP's seminar room at K-RITH Building

KRISP, DIPLOMICS and Thermo-Fisher Scientific collaborate to produce a Science Technology Engineering and Mathematics (STEM) Education training series. The Thermo-Fisher team and the training facilitator, Dewald Eygelaar ran a course on Introductions to Bioinformatics for Molecular Biologists in May 2023.

Training is open to postgraduate students and technical staff of academic labs. This course is offered free of charge to participants.

Join us for the next training from 19-22 June 2023.

Sign up for the next training here:

<https://docs.google.com/forms/d/e/1FAIpQLSdyQ0XI3XS76W5VktIxuN7MWPUjfnB483aHAhYkCfc1U8I5Bw/viewform>

STEM Education	INTRODUCTION TO qPCR COURSE
	<p>COURSE OUTLINE: Quantitative PCR (qPCR), also referred to as Real-Time PCR, is an established method used in many research labs for the detection, quantification and typing of DNA and/or RNA.</p> <p>This introductory course will provide you with the knowledge needed to set-up, run and analyze experiments using qPCR. The course is suitable for lab users with little or no experience with qPCR and will include presence/absence runs, absolute quantification, relative quantification as well as theoretical overviews of other applications of qPCR.</p> <p>The first three days of the course will include theory and wet lab sessions covering sample preparation, setting up a qPCR run, absolute and relative quantification. The fourth and final day will be theory only and will focus on data analysis and other applications of qPCR such as genotyping and gene expression. Please note that you will be required to attend all 4 days of training.</p>
	<p>ENROLL NOW: Training is open to postgraduate students and technical staff of academic labs. Please use the following link to complete the sign-up survey by 9 June 2023: https://forms.gle/sX4JhZWGRAwITVB1A Participant numbers are limited and successful applicants will be notified by email by 12 June 2023.</p>
	<p>DATE: 19-22 June 2023 (9:00 – 16:00)</p>
	<p>LOCATION: K-RITH Building, Nelson R Mandela School of Medicine, 719 Umbilo Road, Durban, South Africa</p>
	<p>COST: This course is offered free of charge to participants. Refreshments will be provided. Travel, hotel and other incidental expenses relating to the training are the responsibility of the attendee.</p>



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Next Generation Sequencing (NGS) Service



NGS can address a broad range of research topics involving genomes exploration in basic, applied, and clinical research.

Applications include:

- Whole Human Genomes
- Whole Human Exomes
- Animals and Plants Genomes
- Targeted genomic regions
- RNA sequencing (RNA-Seq)
- Bacterial and fungi sequencing
- Microbiome (16S and ITS)
- Viral sequencing
- Metagenomics

Short-read technology Illumina (NovoSeq, NextSeq, MiSeq)

Illumina has developed high-throughput sequencing systems that produce high quality data, for varied mid-throughput or high-throughput applications including whole-genome sequencing (WGS), whole-transcriptome sequencing (RNA-Seq), exome sequencing, metagenomics (16S and ITS), targeted DNA resequencing and amplicon sequencing.

Long-read technology Oxford Nanopore Technology

The systems that we use (MinION and GRIDION) generates up to 250 gigabases (Gb) of sequence data. The portable sequencer produces ultra-long reads (tens to hundreds of kilobases (Kb) which enables the assembly and accurate characterisation of complete genomes, pathogen detection/microbiome analysis.

Sample collection and shipment service

As part of our field support, we offer sample collection regionally, nationally and internationally. For more information about shipment and for quotations suitable to your needs please contact us.

**Turnaround time:
10 days**

For quotes:



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CERI & KRISP Papers



SARS-CoV-2 spike protein diversity at an intra-host level, among SARS-CoV-2 infected individuals in South Africa, 2020 to 2022.

Subramoney K, Mtileni N, Davis A, Giandhari J, Tegally H, Wilkinson E, Naidoo Y, Ramphal Y, Pillay S, Ramphal U, Simane A, Reddy B, Mashishi B, Mbenenge N, de Oliveira T, Fielding BC, Treurnicht FK. PLoS One. 2023 May 30;18(5):e0286373. doi: 10.1371/journal.pone.0286373.



Molecular Epidemiology of SARS-CoV-2 during Five COVID-19 Waves and the Significance of Low-Frequency Lineages.

Subramoney K, Mtileni N, Giandhari J, Naidoo Y, Ramphal Y, Pillay S, Ramphal U, Maharaj A, Tshiabuila D, Tegally H, Wilkinson E, de Oliveira T, Fielding BC, Treurnicht FK. Viruses. 2023 May 18;15(5):1194. doi: 10.3390/v15051194. PMID: 37243279; PMCID: PMC10223853.



High prevalence of self-reported sexually transmitted diseases among older adults in Tanzania: results from the list experiment.

Kim HY, Rohr J, Leyna GH, Killewo J, Tomita A, Tanser F, Bärnighausen T Ann Epidemiol. 2023 May 16:S1047-2797(23)00086-8. doi: 10.1016/j.annepidem.2023.05.001. Epub ahead of print.



International epidemiology Databases to Evaluate AIDS (IeDEA) Southern Africa. Abacavir safety and effectiveness in young infants with HIV in South African observational cohorts.

de Waal R, Rabie H, Technau KG, Eley B, Sipambo N, Cotton M, Boulle A, Wood R, Tanser F, Fatti G, Egger M, Davies MA Antivir Ther. 2023 Feb;28(2):13596535231168480.

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CERI



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