The 20th Meeting of the

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H3Africa
Human Heredity & Health in Africa

NIH National Institutes of Health

wellcome

SCIENCE FOR AFRICA FOUNDATION

IN THIS ISSUE

EDITORIAL TEAM:

Shumi Chimombe
Jennifer Troyer
Michelle Skelton
Barbara Sina
Editor-in-Chief: Olaitan I. Awe

I-HAB acquires Liquid Nitrogen Plant

Authors: Kareemah Suleiman and Emmanuel Jonathan

The Institute of Human Virology Nigeria (IHVN) Biorepository (I-HAB) procured a liquid nitrogen generating plant M280X2 (Fig. 1) to support the research and storage of mononuclear cells. The plant was installed at the International Research Center of Excellence (IRCE). Supporting ancillary equipment such as uninterrupted power supply modules was also procured to ensure the smooth running of the plant. The installation took into consideration the location, base, ventilation check and a 20kva backup system. The plant has the capacity to generate 80 litres of liquid nitrogen within a 48-hour period.

Staff were trained in an overview of a liquid nitrogen generator, safe handling, and the use of liquid nitrogen.

The machine was test run for functionality and liquid nitrogen generation over a 24-hour period with uninterrupted power supply. At the end of the test run, the liquid nitrogen generator was implemented and certified by IHVN Biotech engineers.

The successful implementation of the liquid nitrogen plant provides I-HAB with the capacity to store viable cells, partner with more investigators and clientèle for genetic work, and provide liquid nitrogen sample storage.

As part of the I-HAB's sustainability plan, liquid nitrogen will be made available to researchers, IVF facilities, hospitals and universities. Liquid nitrogen is now available at I-HAB (Fig. 2) at an affordable and competitive rate. I-HAB will provide liquid nitrogen within 24 hours of request and payment confirmation to states within North Central Nigeria. Further states will have supply within 24 to 48 hours.

Figure 1: Liquid Nitrogen Plant M280X2

Figure 2: Liquid Nitrogen Dispensal

TOOLS, TRAINING, AND RESOURCES

A Covid-19 data dashboard for Africa

Authors: Walt Adamson, University of Glasgow

The focus of my work currently is on parasites. However, I have a background in respiratory viruses and worked on research and assay development in the wake of the 2009 swine flu pandemic. During March and April 2020, I made a few amateurish attempts at modelling data related to Covid-19 cases and deaths. Soon afterwards, John Frace, a Scottish college student, developed the Scotland Coronavirus Tracker website (https://www.travellingtabby.com/scotland-coronavirus-tracker/). It quickly became a go-to source of data for Covid-19 in Scotland and was a far better package than anything that my entry-level computing skills were capable of!

Antibody seroprevalence surveys are a useful way of determining how many people in a population have been exposed to a pathogen. Although thousands of SARS-CoV-2 (the virus that causes Covid-19) seroprevalence surveys had been performed elsewhere in the world, such data was extremely limited for Africa. To address this, researchers in the H3Africa TrypanoGEN network collaborated to conduct surveys in several African countries. To accompany this, I began planning a website that would operate similarly to the Scotland Coronavirus Tracker but focusing on Africa.

I worked with students from the University of Glasgow School of Computing Science to create the Afridata website (www.afridata.info). The students have created a lovely interface that allows data such as infections, deaths, and vaccinations to be tracked for each African country across the pandemic, and to compare rates across multiple countries. The site was launched at the same time as much of Europe was ending Covid-19 restrictions.

However, interest in the site has remained steady, with regular traffic from Africa. Perhaps unsurprisingly, Malawi and Nigeria - the two countries where I have significant collaborative links, have visited the most.

As Covid-19 restrictions ease worldwide, testing requirements and rates decrease, and accurate data on infection rates in Africa becomes more difficult to obtain, I am considering the best way forward for what has become a well-developed site. With minor modifications it could be used to track all kinds of data relevant to Africa, and to react to health emergencies such as Ebola outbreaks. As a parasitologist, extending the site to data on diseases like trypanosomiasis, schistosomiasis, and malaria might represent a good starting point. Additionally, making the site available in more languages that are relevant to Africa is a priority.

Please take a moment to visit the site. I would be most grateful for any feedback that you have on it.

Contact me at Walt.Adamson@glasgow.ac.uk

AFRIDATA COVID-19 TRACKER
www.afridata.info

(See figure on next page)

TOOLS, TRAINING, AND RESOURCES

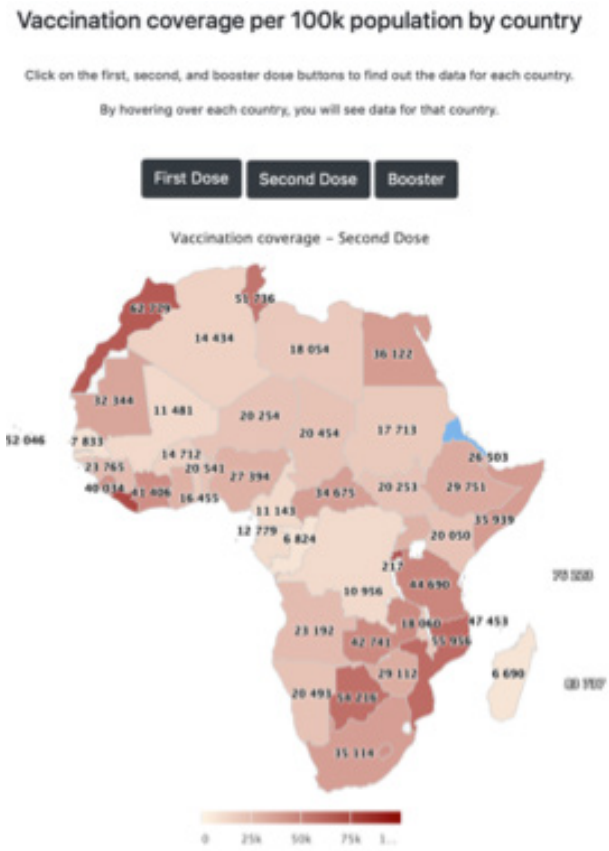
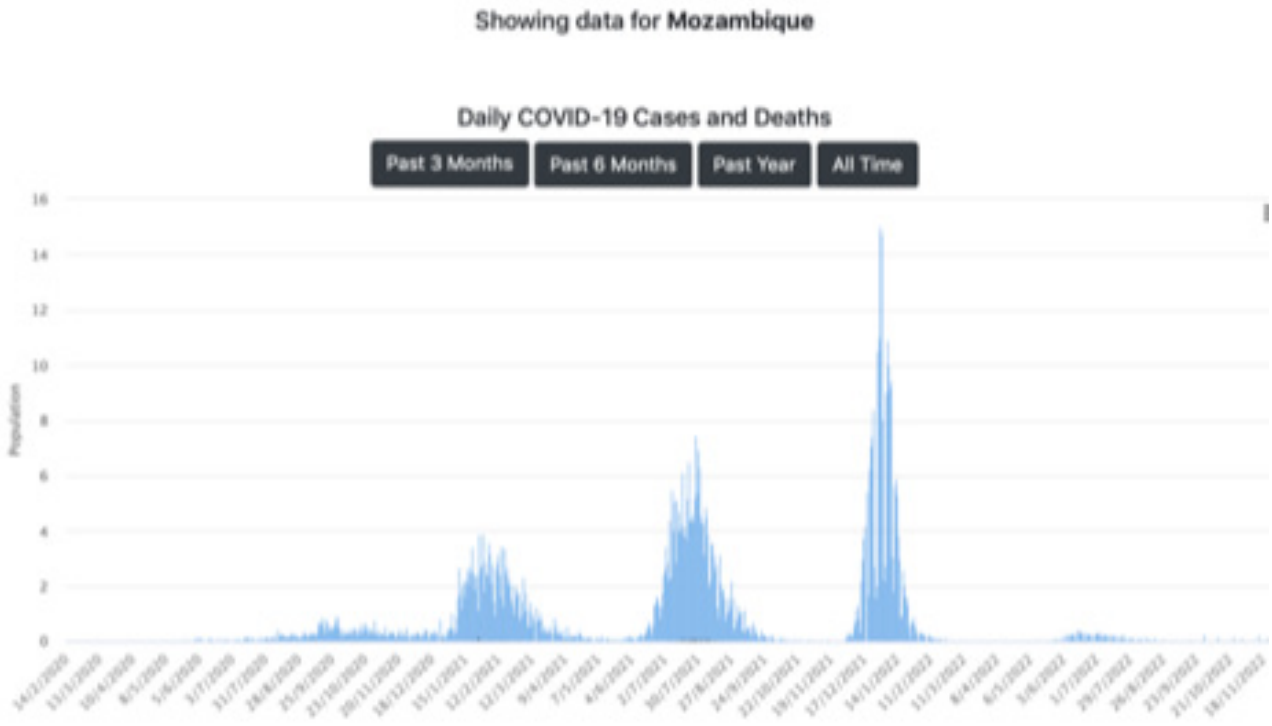


Figure: examples of data displayed on the site: (above) coverage of second Covid-19 vaccination doses per 100,000 population; (below) cases per 100,000 population



ACEGID installs new equipment to enhance its genomic surveillance

Author: Fikayo Oyewale, ACEGID, Redeemer's University, Ede, Nigeria

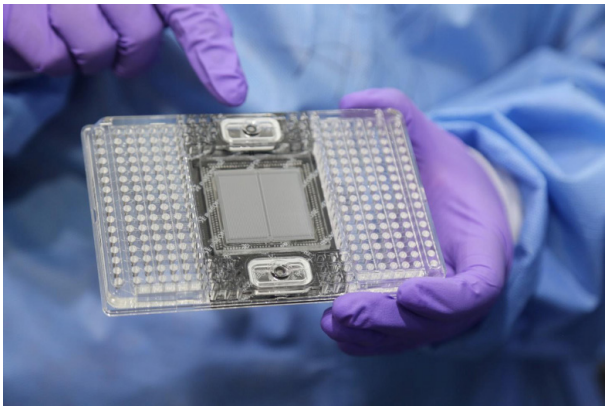
The African Centre of Excellence for Genomics of Infectious Diseases (ACEGID) has recently acquired a series of automation equipment and a multiplex pathogen identification platform.

We installed a new Labcyte Echo 525, an equipment that automates and miniaturizes the library preparation process (reduces the quantities of samples, reagents, etc. used in the process) thereby facilitating efficiency and speed. The Echo 525 can run 384 (4 times the usual 96) samples simultaneously. It also has a good turnaround time in that it takes less than a minute to complete each step in the library construction process (sample transfer, cDNA synthesis, tagmentation and barcoding), making the total time spent on library construction very short.

We also ramped up our diagnostics capabilities by installing some automation equipment from KH Medical. These include the RADI Prep Plus (for automated extraction of DNA/RNA), the Radi PCR 96 (automated PCR) and the RADISPENSER (for automated preparation and dispensing of master mix).

We installed the CRISPR-based multiplex pathogen identification platform called mCARMEN (microfluidic Combinatorial Arrayed Reactions for Multiplexed Evaluation of Nucleic acids). It is a surveillance detection technology that can simultaneously distinguish multiple pathogens from multiple samples in one run.

mCARMEN is a core detection technology in our Sentinel pandemic prevention framework. With it, public health workers can distinguish between viruses that present similar symptoms but require different public health responses. It is being optimised to be an accessible, compact, and robust technology that can analyze many samples simultaneously to identify circulating pathogens. The mCARMEN is run on the Fluidigm Biomark HD instrument.



Celebrating 10 Years of AWI-Gen and Closeout Meeting

Authors: Furahini Tluway, AWI-Gen Project Manager, Sydney Brenner Institute for Molecular Bioscience (SBIMB), University of Witwatersrand

From 18 to 21 October 2022 the AWI-Gen team gathered at the Wits Rural Campus in the Mpumalanga province of South Africa to celebrate the project's achievements over 10 years and to plan for the future. The meeting was attended by the Principal Investigator, the NIH Project Manager, representatives from each study site, project leads, the community engagement core team and the SBIMB projects office team. Thirty people participated in person and five virtually.

During the meeting AWI-Gen successes were highlighted, challenges and lessons learned were discussed, and the completion of remaining activities was planned. We agreed on how to manage resources (data and biospecimens) following the end of the formal funding cycle in June 2023 and the delegation of authority for sustainable governance. Consensus was reached on how to manage future publications, collaborations, and funding opportunities.

We reflected on the anticipated and unexpected benefits at our partner institutions, and celebrated a partnership that is responsive, agile, informed, and willing to work together. This brings opportunities to expand our network of young and established researchers across the continent and the globe. We have skilled and upskilled at different levels, from project management to field work, to sample collection, processing, storage, and shipping, to data management, storage, analysis, and interpretation, and in genomics and bioinformatics.

We discussed and assessed the merits of a third wave of AWI-Gen data and sample collection and expanding our research platform and research questions. While considering our strengths, potential research models, limitations, and challenges, we came up with ideas about expanding and enriching our cohorts, strengthening our networks, and providing more opportunities to our young investigators and all those who support our projects.

AWI-Gen Group picture, 18 October 2022.

NOTABLE NEWS

The AWI-Gen team expressed their deep gratitude for the support of the H3Africa Programme Manager at NIH Jennifer Troyer, and for the inspiration and guidance provided by Mark Guyer during the first phase of the project. We are grateful for the partnership with H3ABioNet, a key catalyst for developing the genomics capacity for H3Africa and AWI-Gen, and for the wonderful 6-monthly H3Africa Consortium meetings hosted by the Coordinating Centre.

Ready for the meeting

One of the breakout sessions to prioritize future publications

Team building and down time at Manyeleti Game Reserve, 20 October 2022

NOTABLE NEWS

A new inductee into the African Academy of Science affiliate membership

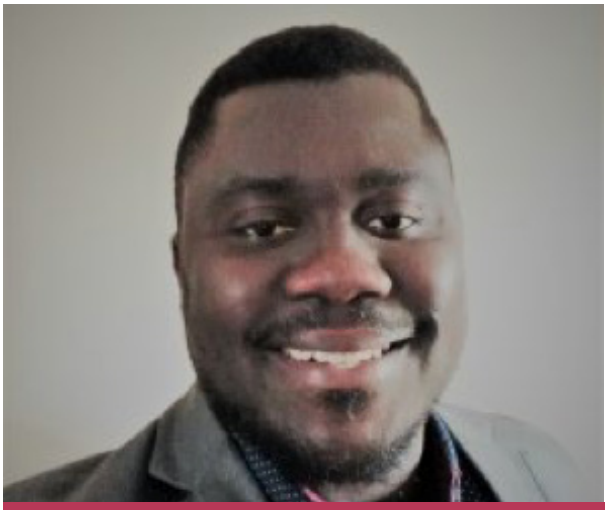
Author: Femi G. Oluwole, PhD. Wellcome Centre for Human Genetics, University of Oxford,

It is with great pleasure that we announce that Dr Femi G. Oluwole of the Wellcome Centre for Human Genetics at the University of Oxford has been inducted as an Affiliate Member of the African Academy of Sciences (AAS) for the period 2022 to 2026.

The process of identifying AAS Affiliates is a highly competitive one. Dr Femi is affiliated with the University of Cape Town, South Africa and more recently the University of Oxford, United Kingdom. He is a geneticist, and he contributes to research in neuropharmacology and neurogenomics.

Dr Oluwole made remarkable achievements in the nutraceutical industry in Nigeria while organising pre-clinical studies on bioactive compounds. Dr Oluwole now investigates the genetics of Parkinson's disease, neurostress, and hearing impairment. Of note, Dr Oluwole is one of the few Y-rated researchers by the National Research Foundation of South Africa. He is an ardent reviewer for top scientific journals. He was recently appointed an Editor for Open Medicine Journal (De-gruyter & Springer).

He contributes to genomic medicine in Africa to address the diagnosis, prognosis, prevention, and treatment aspects of medicine thanks to his collaboration and mentorship by the H3Africa, NIH, Wellcome and AAS. The purpose of AAS Affiliates is to support the professional growth of young and early-to-mid-career scientists.



Dr Femi G. Oluwole

New PhD graduate from ACEGID

Author: Fikayo Oyewale, ACEGID, Redeemer's University, Ede, Nigeria

Congratulations to Dr. Idowu Olawoye of the African Centre of Excellence for Genomics of Infectious Diseases (ACEGID) who graduated, completing his PhD in Molecular Biology and Genomics. He specialized in bioinformatics and studied antimicrobial resistance in tuberculosis. He developed the Bacteria Genome Pipeline (BAGEP), which is an automated, scalable workflow for bacteria genomes. He also facilitated several bioinformatics workshops for ACEGID during his doctoral studies.

Dr. Idowu Olawoye

PhD student speaks about her journey as an emerging film maker

Authors: Lebogang Montewa, University of Cape Town

Lebogang Montewa is a final year PhD candidate in the Wonkam Group department of Human Genetics at the University of Cape Town. She is also a part time network coordinator in the Ethics Lab, Neuroscience Institute.

Her PhD work seeks to pioneer innovative and creative community engagement practices that foster ethical conversations for feedback of findings in genomics research. She is also a science communicator and an emerging film maker who was awarded a National Geographic Society-funded story and diving lab fellowship with NEWF (Nature, Environment Wildlife Filmmakers) https://www.newf.co.za/

Her recent trip to Kenya was to learn about impact of film-making with Dr Paula Kahumbu, an ecologist and multi award winning filmmaker who was recently listed by the Financial Times as one of the 21 most influential women in the world for 2022.

Lebogang recently co-produced a short community film on the importance of coral reef restoration to boost marine life that directly affects local fisherman in Kuruwitu, Vipingo Kilifi county. Her latest film under the NEWF fellowship which is currently in production documents the journey of a young man who lived with Cleft palate for 21 years and his experiences with stigma, isolation, disappointments with the healthcare system, determination, perseverance and ultimately triumph.

Her vision is to create ground-breaking work on ethical approaches to community engagement practices in research and the role of the environment in human health. Her areas of interest are feedback of findings, narrative genomics, science communication, community engagement, ethics, environment pollution and underwater film-making. Her first short story memoir titled "Dusty Township Memories" is to be published by the UCT Centre for Extra Mural Studies in January 2023.

Inspired by the prominent African author Chinua Achebe, who in his 1994 interview with Paris Review said, "Until the lions have their own historians, tales of African hunting will always glorify the hunter", Lebogang believes that her life's work is to utilise creative and engaging approaches to foster and highlight important African work in research and emerging scientific technologies.

Lebogang Montewa

H3Africa Represented at ICDA Plenary Meeting

Authors: Dr. Fouzia Radouani, Institut Pasteur du Maroc and Ruth Nanjala, EANBT

H3Africa members, Dr. Fouzia Radouani of the Research Department, Chlamydiae and Mycoplasma laboratory, Institut Pasteur du Maroc, Morocco, and Ruth Nanjala of the Eastern Africa Network for Bioinformatics Training (EANBT), represented the Consortium at the International Common Disease Alliance (ICDA) Scientific Plenary meeting from 6 to 7 December 2022. The event took place in Copenhagen, Denmark.

The ICDA works to advance the prevention, diagnosis, and treatment of common diseases for the benefit of people worldwide. It does this by accelerating discovery from genetic maps to biological mechanisms to physiology and medicine.

The focus of the ICDA 2022 plenary meeting was to showcase and discuss the innovative and ambitious project proposals stemming from the four core ICDA groups - CellMap, BodyMap, DiseaseMap, and GeneticMaps. The keynote speeches and panel discussions featured leaders from academia and industry who highlighted the challenges and opportunities that have emerged in moving from maps to mechanisms to medicine at scale.

Fouzia and Ruth held discussions with different participants in the meeting and with members of the ICDA organizing committee to explore opportunities for partnerships with H3Africa. They also showcased the Consortium's achievements in research, education, and training. In addition, they indicated H3Africa's willingness to be active members of ICDA by participating in its activities and working groups.

What can be learned from ICDA scientists to achieve some H3Africa scientific community goals

- Learn how to make infrastructure for shared cell models from diverse ancestries
- Consider connectivity to diverse biobanks
- Acquire the ability to work across diseases for shared loci and pathways

Fouzia commented that her interest to implement the topics which were presented and discussed during the event grew substantially.

Dr. Fouzia Radouani

Ruth Nanjala

"What inspired me was the diversity of topics that enables mapping persons from genomics to diseases and body. The technologies in genomics were at an up-to-date level. In addition, all participants showed a lot of benefits In collaboration and partnership within the frame of ICDA."

Ruth is a bioinformatician with a research focus on the computational analysis of the Human Leukocyte Antigen (HLA) region and its relationship to complex immune-mediated diseases. She commented that the event was very inspiring, and the keynote speakers were stellar in showcasing their innovative and transformative project proposals.

"Some ICDA working groups showed keen interest in expanding their scope of work to HLA research. I foresee key collaborations in the future thus advancing my career in HLA research. What stood out for me was the harnessing of small biobanks as they tend to be overlooked due to the presence of large biobanks. The small biobanks may have complete phenotypic information which may be useful in mapping mechanisms to disease."

Find out more about the ICDA on their website https://www.icda.bio/

African research showcased at the ASHG annual meeting in California

Author: Shumi Chimombe, H3Africa Coordinating Centre, University of Cape Town

H3Africa was in the spotlight at the annual meeting of the American Society of Human Genetics (ASHG) held in Los Angeles, California, from 25 to 29 October 2022. The event is the largest human genetics and genomics meeting and exposition in the world and last year, a total of 7,002 registrants including 1,407 exhibitors stemming from 84 countries and 49 states + Washington DC and Puerto Rico attended according to the ASHG website.

One of the highlights, the 2022 Presidential Symposium, showcased some of the significant research that is coming out of Africa in the field of human genetics and genomics, and celebrated the major advances, new directions and goals, emerging scientific leadership, and exciting investment in technology infrastructure that is emerging from the continent.

In his opening address at the Presidential Symposium, ASHG President, Charles Rotimi, PhD said: "Today we want to discuss the wonderful progress that we have made in Africa in bringing genomics home, and in interacting with the various communities across the continent. From the days of HapMap and 1000 Genomes to where we are today, we can begin to see that we are approaching a moment in genomics studies where we are beginning to approach the number of over 200 000. So we want to be key players in genomics, and today we are going to hear wonderful progress that has been made especially under the umbrella of H3Africa – Human Heredity and Health in Africa – but there are other initiatives that going on across the continent".

The panel of H3Africa speakers and the titles of their presentations were:

- Christian Happi, PhD African Centre of Excellence for Genomics of Infectious Disease (ACEGID), Nigeria – "Genomic Characterization and Surveillance of Microbial Threats in West Africa" and shared case studies of how African genome

MEETING HIGHLIGHTS

sequencing addressed major health challenges including the Ebola and Yellow Fever outbreaks, and Covid-19

- Julie Makani, PhD, SickleInAfrica Clinical Coordinating Centre, Muhimbili University of Health and Allied Sciences (MUHAS), Tanzania – "Can Human Genetics Improve Health" and shared the work and experiences they have been doing to look at gene therapy for Sickle Cell disease in Africa.
- Mayowa Owolabi, MD, Centre for Genomic and Precision Medicine, University of Ibadan, Nigeria – "Unravelling and Combating Stroke in Africa: Precept upon Precept" – and featuring the H3Africa project Stroke Investigative Research & Educational Network (SIREN)
- Nicola Mulder, PhD, H3ABionet, University of Cape Town, South Africa – "Empowering African Scientists to Embrace Genomics" – the key to genomics is the data; H3ABionet works to address all things data through capacity building and infrastructure development.

To access the full recording of the Presidential Symposium, the presentations, and discussions, please go to these links.

YouTube: https://www.youtube.com/watch?v=BpFTPKKIESc&t=2926s

ASHG website: https://www.ashg.org/

H3Africa represented at ASHG: (from left) – Ambroise Wonkam, Nicola Mulder, Charles Rotimi, Victor Jongeneel and Christian Happi

MEETING HIGHLIGHTS

DS-I Africa hosted its 2nd Consortium Meeting in October

The Harnessing Data Science for Health Discovery and Innovation in Africa (DS-I-Africa) held its first in-person Consortium meeting from 29 October to 3 November 2022 in Cape Town. The event took place at the Protea Hotel Breakwater Lodge and the University of Cape Town Graduate School of Business on the V&A Waterfront.

The meeting kicked off with a two-day Do-athon on 29 and 30 October. This was designed to take advantage of the diverse expertise of the consortium to collaboratively work on projects related to data science across multiple data types.

The eLwazi Open Data Science Platform (ODSP) & Coordinating Centre (CC) PI's Nicola Mulder and Michelle Skelton based at UCT presented in the opening session on 31 October. Invited guest speakers on the day included His Excellency Todd P. Haskell, Consul General for US Embassy in Cape Town, Associate Professor Lionel Green-Thompson, Dean of the UCT Faculty of Health Sciences; Dr Rizwana Mia, South African Medical Research Council (SAMRC); Dr Roger Glass, Director of the US Fogarty International Centre and Dr Laura Povlich, DS-I Africa NIH Program Director.

This was followed by a full programme https://dsi-africa.org/dsi-2nd-consortium (sessions can be viewed on YouTube) on 1 and 2 November with presentations on subjects such as Cross border data sharing to harness data science for health in Africa; The State of African Data Sharing: A Vision for an African Data Corridor; Legal clarity for developing standards and agreement for African data sharing; and Engaging key stakeholders for informing African data sharing.

There was also a Networking Exchange on 2 November which was open to data science related organizations. During this event consortium members, early career researchers and other stakeholders presented posters related to their projects and allowed participants to get to know DS-I Africa and interact with Consortium members.

Funded by the US National Institutes of Health (NIH) under its Harnessing Data Science For Health Discovery and Innovation in Africa programme, DS-I Africa aims to develop data science, innovation and health discoveries across Africa through its current network of 19 funded projects across the continent. Please check the website for DS-I Research Pilot Project funding calls.

To learn more about DS-I Africa please visit the website https://dsi-africa.org/

MEETING HIGHLIGHTS

The DS-I Africa Coordinating Centre team: (from left) – Rolanda Julius, Francis Agamah, Confidence Mothiba, Michelle Skelton, Tanian Natus-Isaacs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