

KwaZulu-Natal Research Innovation and Sequencing Platform



Introduction:

The concept behind this newsletter is that anyone with 15 minutes to spare can learn about the work of the KwaZulu-Natal Research Innovation and Sequencing Platform (KRISP), which is hosted at University of KwaZulu-Natal (UKZN), Durban, South Africa

KRISP wants to want to challenge the status quo and create a scientific environment in South Africa that drives innovations in global health and reverses the brain drain. A critical function of KRISP will be to make genomics, epigenetics and bioinformatics accessible to academic, industrial and commercial users.

In our May-June issue of 2018, we would like to bring attention to a KRISP participation on the BIO international convention and Global SPARK meeting, our new services areas and talks and innovation events arising...

Highlights:

BIO International Convention: KRISP is invited to take part of the official South African delegation to BIO 2018!

Services: Precision medicine, cancer genomics, exomes, microbial whole genomes and drug resistance in Africa

Innovation: Durban SPARK Innovation Breakfast - Diagnostic Innovations: Gaps & Opportunities, 6 June 2018

News: KRISP learns about Intellectual Property when Fostering Innovation and Entrepreneurship

KRISP Toys: Equipment available for collaborative research, training, diagnostics & sequencing services

KRISP Tools: Genome Detective: An Accurate, Fast and Automated System for Virus Identification from High-throughput NGS data.



UNIVERSITY OF
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

KRISP is part of the official South Africa Delegation!



KRISP takes part of the South African delegation attending the Bio International Convention.

KRISP and the South African DST, SAMRC and TIA showcase South Africa in the BIO 2018 as one of the most sophisticated, diverse and dynamic emerging market that is open to investment...

South Africa is becoming one of the most popular trade and investment destinations in the world. The biotechnology sector is growing since the 2001 Biotechnology Strategy was launched.

South Africa and KRISP will have a large exhibition at pavilion 2743

KRISP is also featured in the Booklet of the South African BIO 2018 delegation and on the South African Open for Business booklet, Both are found below and can be downloaded from our website: <http://www.krisp.org.za>



KRISP is a member of Stanford SPARK Innovation Program



KRISP at UKZN partner with Stanford University on a global innovation program.

As part of this program, an open meeting to foster innovation and entrepreneurship in Durban is held monthly. The Durban SPARK Innovation Breakfast meeting aims to ensure that Durban is in a position to seize the opportunities and manage the challenges of rapid advances in technology, such as artificial intelligent, robotics and biotechnology.

South Africa needs to urgently develop capabilities in the areas of science, technology and innovation. This was highlighted in the recent State of the Nation address (SONA) by President Cyril Ramaphosa. The development of innovation, small businesses and entrepreneurship should be the cornerstones of development in order to alleviate poverty and improve health on the African continent.

The SPARK at Stanford program has an unusual very high success rate of transfer of technology to commercial products, with a staggering 62% rate of transfer of technology to commercial partners, where the norm is less than 10%. One of the main reasons for this success is described by the Stanford SPARK director **Dr. Daria Mochly-Rosen** is because ***'the involvement of the private sector and academics in an open meeting without hierarchy towards transferring biomedical technology to society and the provision of seed funding and mentorship to move scientific ideas to products'***

KRISP will participate in the Spark Global Meeting that is taking place in Berlin, 21 and 22 of July 2018.

Events arising: KRISP Talks & Innovation Breakfast



KRISP Talks: Microbiome and Human Health in Women in Africa

Speaker: Dr. Lenine Liebenberg

Date: Tuesday, 11 June 2018

Time: 15.00 - 16.00

Venue: K2 Seminar room, K-RITH tower building, Durban, South Africa

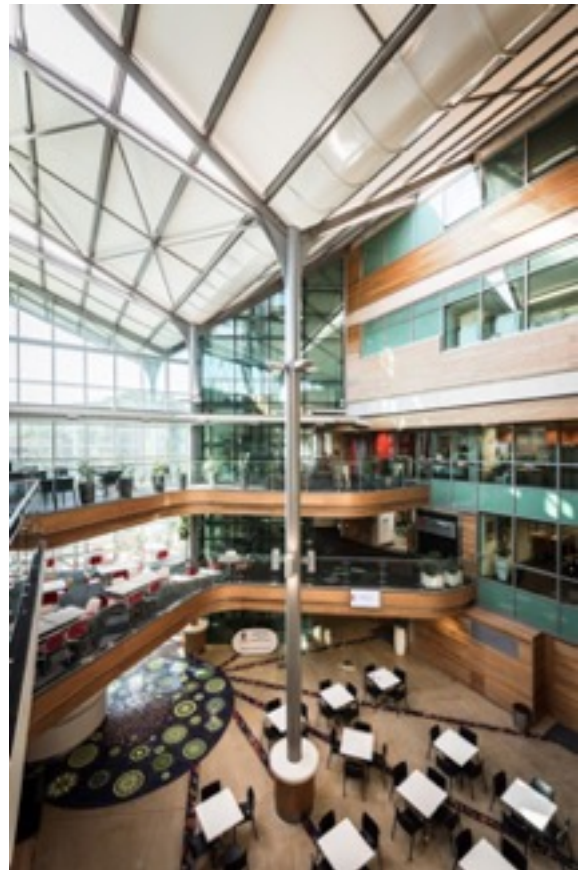
KRISP run a monthly meeting to foster innovation and entrepreneurship in Durban in collaboration with Stanford SPARK program.

As part of this program, an open meeting to foster innovation and entrepreneurship in Durban is held monthly. The Durban SPARK Innovation Breakfast meeting aims to ensure that Durban is in a position to seize the opportunities and manage the challenges of rapid advances in technology, such as artificial intelligent, robotics and biotechnology.

Next week's meeting, 6 June 2018, is presented by **Dr Richard Lessells** and **Dr. Veron Ramsuran** on the topic of: **Diagnostics Innovation: Gaps & Opportunities.**

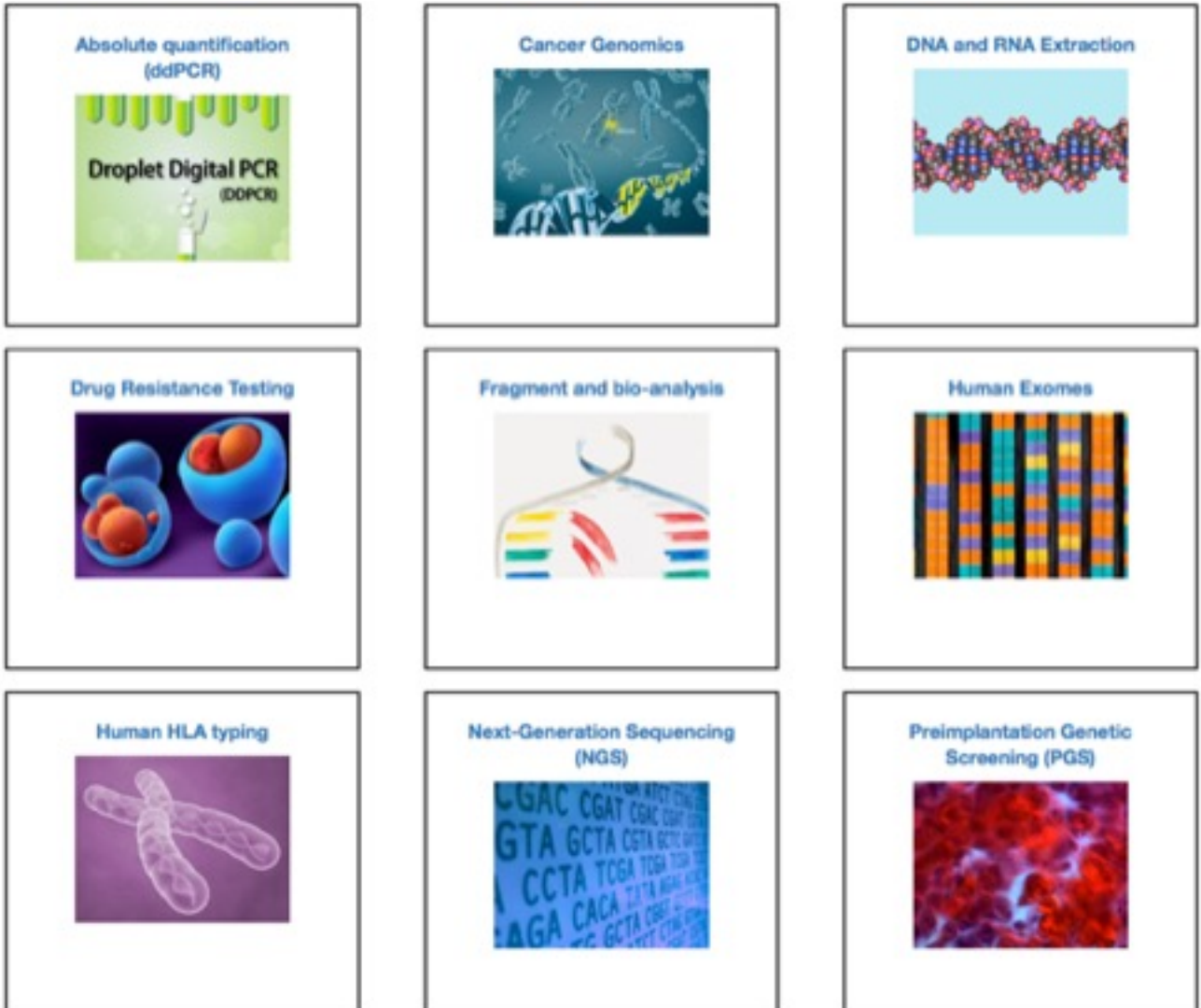
We really encourage the participation of the private sector, government and civil society. **Meetings are open to everyone and run from 7:30-8:30am on the first Wednesday of the month**, with breakfast provided before and after the meeting.

The Durban SPARK Innovation Breakfast meeting is associated with the SPARK Global Program at Stanford University, which is one of the most successful innovation programs in the Silicon Valley, USA.



The meeting takes place in the KRISP building at the **Nelson R Mandela School of Medicine, UKZN, (719 Umbilo Road, Durban).**

KRISP Services: ddPCR, cancer genomics, drug resistance testing, Exomes, HLA typing, NGS, PGS and other precision medicine testing in Africa



KZN Research Innovation and Sequencing Platform (KRISP), which is a Flagship Research Program of the South African Medical Research Council (SAMRC) and a technology platform of the Technology Innovation Agency (TIA) at the University of KwaZulu-Natal (UKZN).

KRISP wants to challenge the status quo and create a scientific environment in (South) Africa that produces **world class science, drives innovations and reverses the brain drain**. A critical function of KRISP is to make **genomics, epigenetics and bioinformatics technology** accessible to academic, industrial and commercial users, who might not otherwise pursue these technologies or use alternative international resources.

Services include on-demand next generation sequencing (NGS), cancer genomics, HIV, TB and antimicrobial resistance testing, Exomes, HLA typing and absolute quantification (ddPCR)."

KRISP Toys: Equipment available for collaborative research, training, diagnostics & sequencing services

Sequencers



Ion S5 next-generation sequencing

NGS of Amplicons, Microbial Whole Genomes, Exomes, Transcriptomics, 16S RNA, Microbiome

Sequencers



Ion Chef

NGS library preparation, microbial genomes, exomes, transcriptomics

Sequencers



Illumina MiSeq

NGS of Amplicons, Microbial Whole Genomes, Exomes, Transcriptomics, 16S RNA, Microbiome

Sequencers



Oxford Nanopore MinION

NGS of Amplicon, Microbial Whole Genomes, Human Genetics, Cancer & Environmental samples

Sequencers



ABI Sanger 3130xl Genetic Analyzer

Sanger Sequencing: Amplicon, Drug Resistance, HLA typing

RNA/DNA/Protein extraction



KingFisher Flex extraction system

RNA/DNA, protein, cell, purification & extraction

RNA/DNA/Protein extraction



QIAGEN QIAcube

RNA and DNA purification & extraction

PCR



QuantStudio 7 Flex Real-Time PCR System

PCR quantification, Gene expression, High Resolution Melting (hRM)

PCR



ProFlex 3x32-Well PCR System

PCR, gene amplification

PCR



BioRad QX200 Droplet Digital PCR System

ddPCR, absolute quantification, DNA, RNA, alleles

PCR



Applied Biosystems Veriti Thermal Cycler

PCR, DNA and RNA amplification, polymerase chain reaction

PCR



Applied Biosystems Thermal Cycler 2720

PCR, DNA and RNA amplification, polymerase chain reaction










KRISP Bioinformatics Tools: 100s of software applications

KRISP Tools: Bioinformatics software for collaborative research, training & consultancy services

Search installed software

search installed tools

Latest Installed Software

 migrate-4.2.14 Sequence Analysis/Generic	 clustal-omega-1.2.4 Sequence Analysis/Multiple Sequence Alignment	 migrate-3.6.11 Sequence Analysis/Generic
 ruby-2.5.0 Development/Languages	 bowtie2-2.3.4 Assembler and Aligner/Aligner	 singularity-2.4.2 Development/Generic
 Primer3-2.4.0 Sequence Analysis/Generic	 gnu-build-7.0.2 Development/Build Tools	 Bridger_Assembler Assembler and Aligner/Assembler

KRISP can provide computational services to both academic and to industrial partners (within the context of collaboration, grants contracts or consultancy services). **We have access a wide range (> 300) of standard life science software applications and databases.** Additional applications or databases can be hosted on request. Arrangements can also be made to secure proprietary data. We have access to four high processing computer clusters (HPCs) to perform high-throughput analysis of BIG DATA. Please contact us for further information...

List of tools available at <http://www.krisp.org.za/tools.php>



Genome Detective: An Accurate, Fast and Automated System for Virus Identification from High-throughput next generation sequencing (NGS) data.

Genome Detective is an easy to use web based software application that assembles the genomes of viruses quickly and accurately. The application uses a novel alignment method that constructs genomes by reference-based linking of de-novo contigs by adding amino-acids and nucleotide scores.

It needs no telling that analyzing Next-Generation-Sequence meta-genomic datasets is increasingly complex due to large data files, the need for large and regularly updated reference databases, and complex bioinformatics processing. Using Genome Detective, you can more quickly extract meaningful information from your sequence data.

Genome Detective at <http://www.genomedetective.com>

KRISP Papers



Renewing Felsenstein's phylogenetic bootstrap in the era of big data.

Lemoine F, Entfellner JBD, Wilkinson E, Correia D, Davila Felipe M, de Oliveira T, Gascuel O
Nature (2018), doi:10.1038/s41586-018-0043-0



Microwave Assisted Green Solid-Phase Peptide Synthesis using γ -Valerolactone (GVL) as Solvent

Kumar A, Jad YE, Collins JM, Albericio F, de la Torre B. **ACS Sustainable Chem. Eng.** (2018) doi: 10.1021/acssuschemeng.8b01531



Longitudinal Trends in the Prevalence of Detectable HIV Viremia: Population-Based Evidence From Rural KwaZulu-Natal, South Africa.

Vandormael A, Bärnighausen T, Herbeck J, Tomita A, Phillips A, Pillay D, de Oliveira T, Tanser F. **Clin Infect Dis.** (2018) 66(8):1254-1260. doi: 10.1093/cid/cix976.

KRISP Meetings

BIO: Biotechnology Innovation Organization, International Convention 2018, Boston, MA, USA, 04 - 07 Jun, 2018

SPARK Global Meeting, Berlin, Germany, 21-22 July, 2018

For more information please contact:

Prof Tulio de Oliveira, KRISP, Nelson R Mandela School of Medicine, University of KwaZulu-Natal, Durban, South Africa. Tel : +27 31 260 4898, e-mail : & tuliodna@gmail.com & deoliveira@ukzn.ac.za. Web: www.krisp.org.za

Funded by:



Disclaimer: KRISP at UKZN wishes to express its gratitude to the following funders for their generous support for the production of this report: Technology Innovation Agency (TIA), South African Medical Research Council (SAMRC) University Flagship Program, European Commission (EC), Centers for Disease Control and Prevention, Swiss / South Africa Joint Research Initiative and the U.K. Royal Society. The newsletter is published as open access under a Creative Commons ShareAlike 3.0 Unported (CC BY-SA 3.0) license (<http://creativecommons.org/licenses/by-sa/3.0/>) and is available in printed format as well as electronically as PDF, Web-format, etc The contents of this report and the opinions expressed herein are solely the responsibility of the authors and do not necessarily represent the official views or policies of any of the funders.