



Training the Next Generation of Scientists in Africa



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 UKZN, Durban, South Africa

In our first issue of 2019, we focus on **KRISP training the next generation of scientists and positions available for PhDs and Post-Doctoral research at a Flagship program of UKZN**. We also highlight publications on TB next generation sequencing and diagnostics, ethics and trans-disciplinary perspectives on HIV research and new phylodynamics models to characterize viral outbreaks.

KRISP wants 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 in Africa.

Highlights:

KRISP Talks: The Power of Diversity – Being Inclusive Gives Teams a Competitive Edge in Science

Bioinformatics Training: NextStrain & Genome Detective: From NGS data to real-time tracking of viruses' outbreaks, Durban, South Africa, 24-25 January, 2019

Hands on Lab Training I: KRISP & Thermo Sanger Sequencing Training Workshop, Durban, South Africa, 25-26 March, 2019

Hands on Lab Training II: KRISP & Thermo Sanger Sequencing Microsatellite Training Workshop, Durban, South Africa, 28-29 March, 2019

Post-Doc and PhD Fellowships I - Precision Medicine and Prevention Approaches to end the HIV and TB epidemic

Post-Doc and PhD Fellowships II - Precision Public Health & Big Data Analysis of HIV, TB and Cancer Epidemics



UNIVERSITY OF
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Events arising: KRISP Talks

KRISP Talks: POWER OF DIVERSITY: BEING INCLUSIVE GIVES TEAMS A COMPETITIVE EDGE IN SCIENCE.

Speaker: Prof. Tulio de Oliveira, UKZN & KRISP

Date: Thursday, 31 January 2019

Time: 11:00 – 12:00

Venue: K-RITH tower building, Durban, South Africa



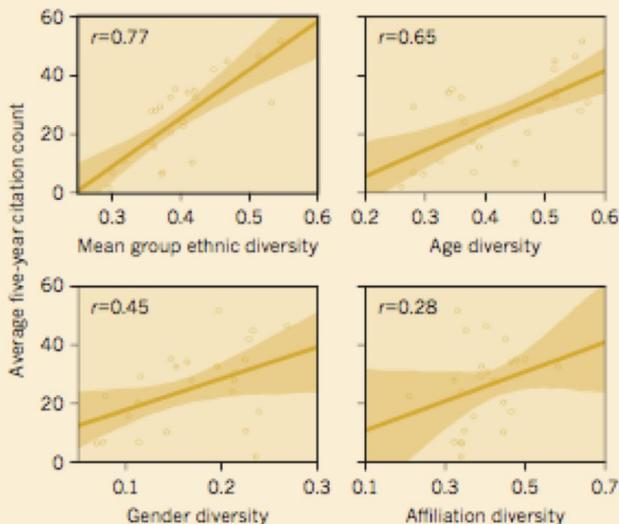
KRISP Learn about the Power of Diversity and Scientific Impact!

A variety of studies have tracked different types of diversity — ethnic, gender, nationality and scientific discipline — and suggest that particularly diverse groups publish a higher number of papers and receive more citations per paper than average^{1,2}.

Diverse groups also seem to achieve better community participation when studying populations, and they often benefit from the different ideas and perspectives that the team members can bring. *Nature has presented a series of papers on this subject in 2018*, with will be covered in our first KRISP talk of 2019...

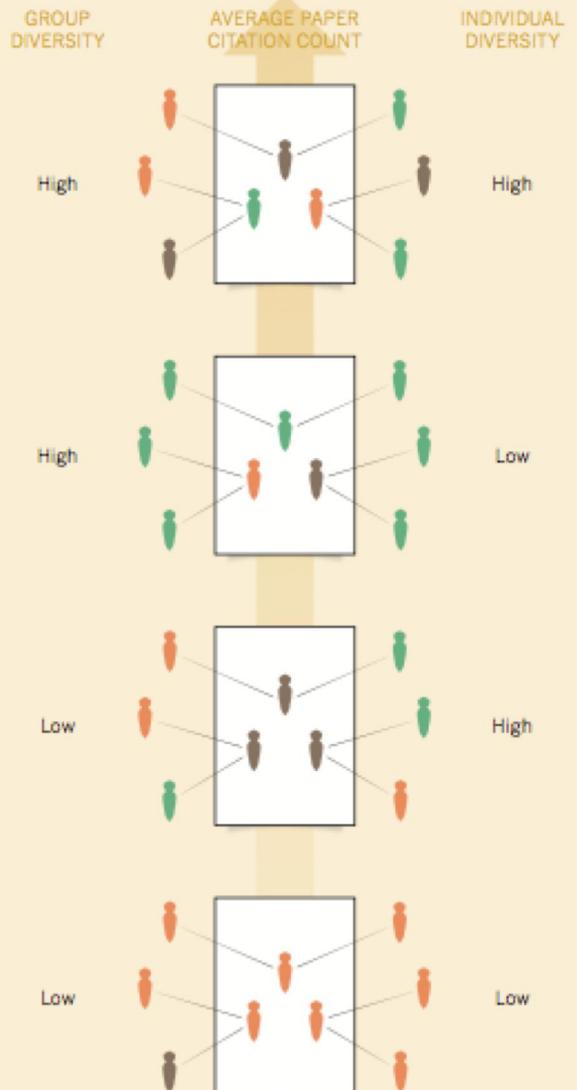
DIVERSITY'S IMPACT

Ethnic diversity correlates more strongly (r) with citation counts than do diversity in age, gender or affiliation, according to an analysis of more than 1 million papers in 24 academic subfields (circles).

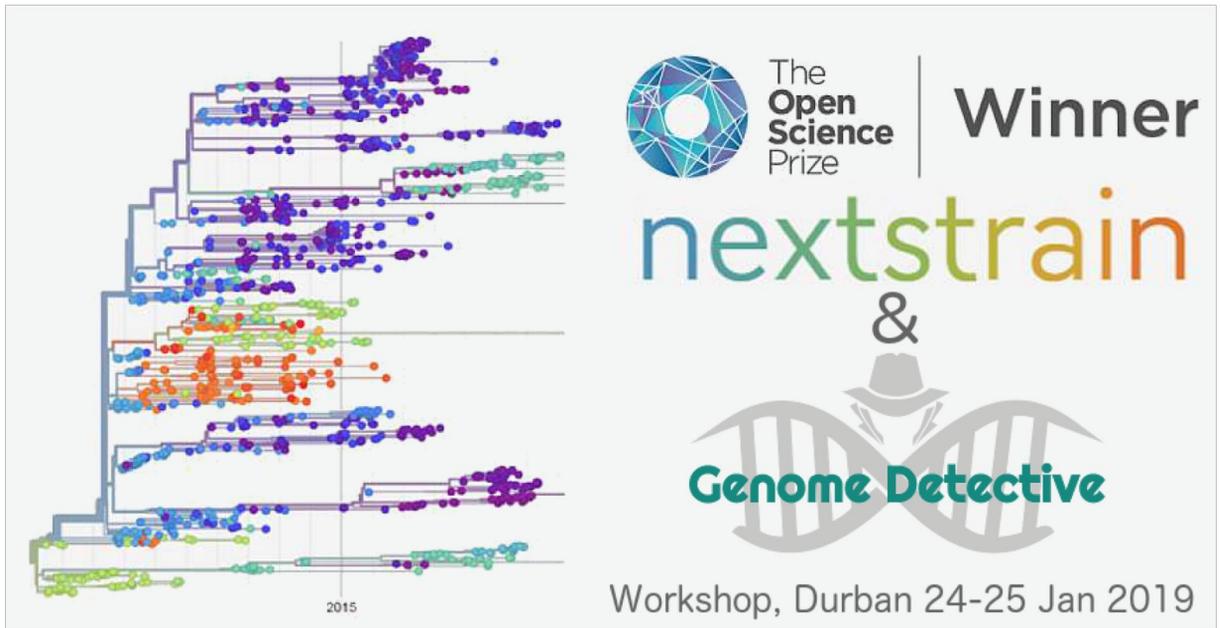


GROUP VERSUS INDIVIDUAL DIVERSITY

Diversity within the list of authors on a paper (group diversity) has a stronger effect on citation count than does individual diversity, the measure of diversity in a researcher's network of collaborators.



NextStrain & Genome Detective Workshop, KRISP, Durban, South Africa, 24-25 January 2019



From NGS data to real-time tracking of viruses' outbreaks workshop:

Download application form from krisp.org.za website (deadline for application 10 January 2019).

Please submit application forms to:

- Mrs Gugulethu Cynthia Mkhize
- Tel: +27 31 260 4198
- Email: MkhizeG5@ukzn.ac.za

Instructors:

Prof. Richard Neher, Biozentrum, University of Basel

Dr. Emma Hodcroft, Biozentrum Basel, University of Basel

Prof. Tulio de Oliveira, KRISP at UKZN,

Dr. Yumna Moosa, KRISP at UKZN and AHRI

Dr. Benjamin Chimukangara, KRISP at UKZN

Dr. Jennifer Giandhari, KRISP at UKZN

Dr. Eduan Wilkinson, KRISP at UKZN

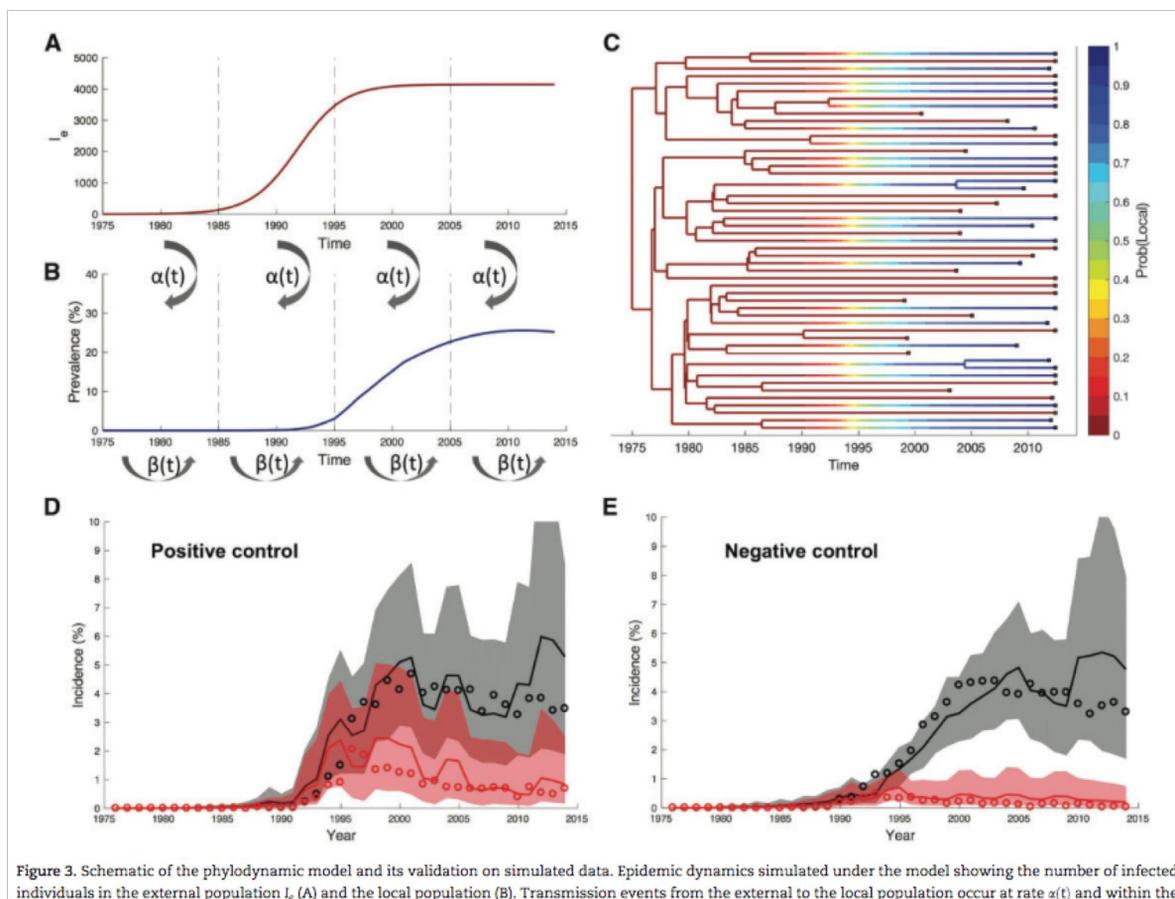
This training provides an overview of next generation sequencing (NGS) data assembly, phylogenetic analysis, and dynamic visualization. The workshop will be focused on the use of Genome Detective and Nextstrain.

Genome Detective is an automated bioinformatics system for virus identification from high-throughput next generation sequencing data.

Nextstrain is an open-source project to facilitate phylodynamic analysis, data integration, and visualization of large data sets of viral and bacterial pathogens. The analysis results can be visualized on your own computer or shared on the web. The Nextstrain team maintains a collection of continually-updated analyses of publicly available data for a number of pathogens at nextstrain.org

Training is free to post-graduate students of UKZN and members of the H3ABioNet Bioinformatics Network.

KRISP Papers



Title: Tracking external introductions of HIV using phylodynamics reveals a major source of infections in rural KwaZulu-Natal, South Africa

Authors: Rasmussen DA, Wilkinson E, Vandormael A, Tanser F, Pillay D, Stadler T, de Oliveira T.

Journal: *Virus Evolution*,4(2): vey037: (2018)

ABSTRACT: Despite increasing access to antiretrovirals, HIV incidence in rural KwaZulu-Natal remains among the highest ever reported in Africa. While many epidemiological factors have been invoked to explain such high incidence, widespread human mobility and viral movement suggest that transmission between communities may be a major source of new infections. High cross-community transmission rates call into question how effective increasing the coverage of antiretroviral therapy locally will be at preventing new infections, especially if many new cases arise from external introductions. **To help address this question, we use a phylodynamic model to reconstruct epidemic dynamics and estimate the relative contribution of local transmission versus external introductions to overall incidence in KwaZulu-Natal from HIV-1 phylogenies.** By comparing our results with population-based surveillance data, we show that we can reliably estimate incidence from viral phylogenies once viral movement in and out of the local population is accounted for. Our analysis reveals that early epidemic dynamics were largely driven by external introductions. More recently, we estimate that 35 per cent (95% confidence interval: 20–60%) of new infections arise from external introductions. These results highlight the growing need to consider larger-scale regional transmission dynamics when designing and testing prevention strategies.

Positions



Postdoctoral and PhD Fellowships Available Flagship Research Project in Durban, SA.

“Flagship projects, which are trans-disciplinary in scope, are an institution’s highest impact and most prestigious research project. They are essentially big ideas, big science for big impact!” UKZN’s Vice Chancellor Oct 2018.

Post-Doc and PhD fellowships in Precision Medicine I

This project has three main aims: i) To characterize host and viral genetic and epigenetic mechanisms associated with acquisition of HIV; ii) To determine the clinical consequences, including HIV acquisition, disease development, morbidity and mortality; and iii) To design and develop precision health approaches to prevent acquisition and progression of disease, and emergence of drug resistance. As part of this project the fellows will get hands-on experience in the analysis of epidemiological, clinical, social and genomic data. We are looking for clinicians, bioinformaticians, statisticians, epidemiologists and/or social scientists with great potential.

Post-Doc and PhD fellowships in Precision Public Health II

This project aims to generate large geographically indexed HIV, TB and cancer datasets in South Africa. The Post-Doc and PhD fellows will apply advanced geospatial analysis techniques and molecular epidemiology and geographical analysis techniques to identify “hotspots” in space-time and describe the characteristics of HIV, TB and HPV transmission networks and its impact on the development of cancer. These results will be combined with detailed demographic information in order to identify patterns of inter- and intra-community transmission in the study populations. We are looking for geographers, statisticians, public health epidemiologists and/or phylogeneticists with great potential.

He/she will be mentored by leading scientists, who commonly publish in some of the top biomedical journals (i.e. Science, Nature, Lancet and NEJM) and who have access to high quality data. Postdoctoral and PhD fellows will be awarded a fellowship that include a competitive salary (tax free) and have access to cutting edge facilities. For Interested applicants send an application, which should contain a CV and a motivation letter (max. 500 words) **by 15 February 2019** to Mrs. Gugulethu Mkhize Email: MkhizeG5@ukzn.ac.za, Tel: 031 260 4198

In total, this Flagship program, are advertising 10 Post-Docs and 10 PhDs fellowships that can be taken in different departments at UKZN. **More info: www.krisp.org.za**

Hands-on Laboratory Training I

STEM Education

krisp and thermoscientific

Capillary Electrophoresis (i.e. Sanger Sequencing) Training Workshop I

This hands-on course is a 2-day intensive overview of DNA sequencing. Course topics include application workflow setup and optimization; an overview of instrument hardware, operation and maintenance; use of data collection software; preparation and running of samples and standards; analysis software tutorials, and troubleshooting discussions. Students will run, analyze and troubleshoot sequencing samples. Applied Biosystems 3500 instruments will be used for lab practicals.

Enroll now:

Training is open to post-graduate students and for technical staff of commercial and academic labs

Date:

25-26 March 2019 (8:30am-4:30pm).

Location:

Thermo & KRISP laboratory, K-RITH Building, 719 Umbilo road, Durban, South Africa.

Cost:

ZAR 2,500 (Scholarships available to previously disadvantaged South Africans). Tuition includes laboratory reagents, consumables, course materials, teas and coffee, and lunch. Travel, hotel, and other incidental expenses relating to the training are the responsibility of the attendee.



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Hands-on Laboratory Training II

STEM Education

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DNA Sequencing Fragment Analysis (i.e. Microsatellite) Training Workshop II

This hands-on course is a 2-day intensive overview of Fragment Analysis (i.e. Microsatellite). Course topics include application workflow setup and optimization; an overview of instrument hardware, operation and maintenance; use of data collection software; preparation and running of samples and standards; analysis software tutorials, and troubleshooting discussions. Students will run, analyze and troubleshoot fragment analysis samples. Applied Biosystems 3500 instruments will be used for lab practicals.

Enroll now:

Training is open to post-graduate students and for technical staff of commercial and academic labs

Date:

28-29 March 2019 (8:30am-4:30pm).

Location:

Thermo & KRISP laboratory, K-RITH Building, 701 Umbilo road, UKZN, Durban, South Africa.

Cost:

ZAR 2,500 (Scholarships available to previously disadvantaged South Africans). Tuition includes laboratory reagents, consumables, course materials, teas and coffee, and lunch. Travel, hotel, and other incidental expenses relating to the training are the responsibility of the attendee.



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Mycobacterium tuberculosis Next-Generation Whole Genome Sequencing: Opportunities and Challenges

Iketleng T, Lessells R, Dlamini MT, Mogashoa T, Mupfumi L, Moyo S, Gaseitsiwe S, de Oliveira T, **Tuberculosis Research and Treatment** (2018), <https://doi.org/10.1155/2018/1298542>:



Experts' Perspectives on Key Ethical Issues Associated With HIV Phylogenetics as Applied in HIV Transmission Dynamics Research

Mutenherwa F, Wassenaar DR, de Oliveira T, **J Empir Res Hum Res Ethics** (2018), 1556264618809608. doi: 10.1177/1556264618809608:



Community engagement with HIV drug adherence in rural South Africa: a transdisciplinary approach

Treffry-Goatley A, Lessells RJ, Moletsane R, de Oliveira T, Gaede B, **BMJ Med Humanit** (2018), 44:239–246

KRISP Talks & Training

NextStrain & Genome Detective Workshop: From NGS data to real-time tracking of viruses' outbreaks, UKZN, Durban, South Africa, 24-25 January, 2019

KRISP Talks: Power of Diversity, UKZN, Durban, South Africa, 31 January, 2019

DNA Sequencing Fragment Analysis (i.e Microsatellite) Workshop, KRISP, Nelson R Mandela School of Medicine, UKZN, Durban, South Africa, 28-29 March, 2019

For more information please contact:

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