

The Improper Scientist

Official Magazine of the African Society for
Bioinformatics and Computational Biology
Issue 29 August 2019

From the Editor's desk

Dear Reader

The months rush by as we proceed through the third term in the southern hemisphere and the post summer break for our colleagues who follow a September-August academic year. Despite the ever-increasing demands placed on students and staff at academic institutions, I hope you did not snooze while African leaders met to report on progress regarding the African Continental Free Trade Area (AfCFTA). This agreement will ensure "...free movement of business persons and investments...".



For us in the research space, we still hold onto the incremental strides to achieve a One African passport – you can guess I was again trying to get a visa to travel in Africa.

I do hope you enjoy reading the bioinformatics activities in Africa that we report in this issue. Regional bioinformatics nodes are gaining momentum as seen by the over-subscribed training workshops. We also feature Ms Tracey Calverts-Joshua in the women-in-data science section.

Our plans for the Bi-ennial conference of the African Society of Bioinformatics and Computational Biology are well underway and will be held from 11-15 November 2019 in Kumasi, Ghana. The call for submissions is open as well as travel fellowships for students.

Please visit the conference website for more details about the programme and also the exciting workshops that will be on offer back-to-back with the conference (<https://www.iscb.org/iscbafrica2019>).

A handwritten signature in black ink, appearing to read 'A. Christoffels'.

Alan Christoffels (Editor)
@alangchris

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Save The Date!!

1. ASBCB and ISCB 6th joint Bioinformatics African conference in Kumasi, Ghana from November 11th to the 13th (<https://www.iscb.org/iscbafrica2019>).
2. Introduction to Bioinformatics Training 2019, Dates: 13 August – 30 November 2019; Every Tuesday and Thursday from 10:30 CAT to 14:30 CAT.
<https://h3abionet.org/categories/training/introduction-to-bioinformatics-training-2019>
Registration for classrooms and participants have already closed.
3. First international congress of the Moroccan Society of Genomics and Human Genetics (SM2GH), in Agadir from the 19th to the 21st of December 2019. “Bridging Gaps between Genomics and Medicine in Africa” is the theme-
4. 24th International Bioinformatics Workshop on Virus Evolution and Molecular Epidemiology (VEME), The University of Hong Kong, Hong Kong, China, 4-9 August, 2019
5. NEXTFLOW 2019
Nextflow Training: 17th – 18th September 2019
Nextflow Camp: 19th -20th September 2019
<https://www.crg.eu/en/event/coursescrg-nextflow-2019>
6. 16SrRNA Microbiome Intermediate Bioinformatics Training
Dates for the Course: August to October 2019 (exact dates and times to be confirmed)
<https://h3abionet.org/categories/training/16srna-intermediate-bioinformatics-training>
classroom hosting application date closed: 30 June 2019
7. The Genome Access Course (TGAC), November 11 - 13, 2019 Cold Spring Harbor Laboratory, New York
<https://meetings.cshl.edu/courses.aspx?course=TGAC2&year=19>



2nd Bioinformatics Research Symposium

Announcement and Call for Abstracts

“Bioinformatics enhancing scientific research”

VENUE: National University of Science and Technology
Bulawayo

DATE: 9 - 10 October 2019

Symposium Goal
To explore recent advances in Bioinformatics applications for research and industrialisation.

Registration Fees:

Internationals: USD 100

Individuals: TBA

Students: TBA

Exhibition: TBA

Banking Details

Account Name: National Biotechnology Authority

Bank Name: Commercial Bank of Zimbabwe (CBZ)

Branch Name: Kwame Nkrumah

Account Numbers: 01120148930044(ZWL)
:01120148930054(USD)

Important Dates

5 August 2019 : Submission of Abstracts

2 September 2019 : Author Registration

20 September 2019 : Close of “Early Bird” Registration

Conference Days: 9 - 10 October 2019

Registration after 20 September will attract a 20% fee

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ORGANISING PARTNERS







Bioinformatics Capacity

2ND WASLITBRe Postgraduate Bioinformatics Workshop

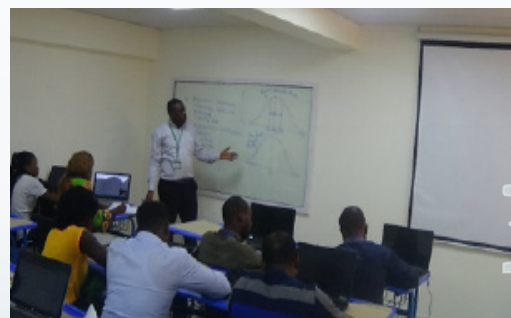


One of the objectives of the West African Sustainable Leadership & Innovative Training in Bioinformatics Research (WASLITBRe, see waslitbre.org) funded by an NIH Fogarty training grant number 1U2RTW010679 is to select and train postgraduate students in Bioinformatics degree programs, namely MSc and PhD programs. To achieve this objective, the Consortium periodically organizes special intensive trainings for its postgraduate students.

Recently, the Consortium held its 2nd Postgraduate Bioinformatics Workshop between February 18 and March 29, 2019. The 6-week training was held at Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana.

A total number of 13 participants attended the workshop with 7 students from Covenant University (Nigeria), 5 from KNUST (Ghana) and 2 from National Institute of Mathematics Society (Ghana). Facilitators were drawn from reputable institutions in Ghana, Nigeria, South Africa and United Kingdom for the training. Dr Pandam Salifu and Dr Peter Amoako-Yirenky, the co-PIs in KNUST, welcomed all the students

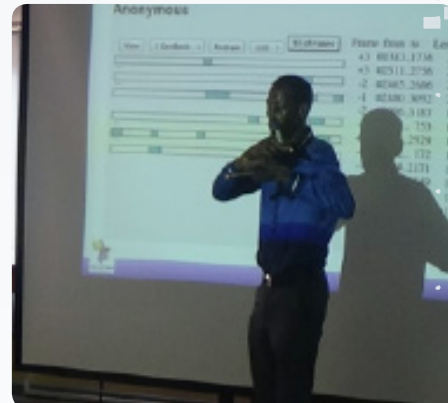
to the workshop in a brief welcome ceremony. Prof Obed Brew (University of West London) took the students on 'Variant Analysis' with special focus on Variant Analysis Workflow and later had practical session with the students using Chipster. On the other hand, Dr. Pandam and Dr. Gowan (KNUST) handled the course 'Genome Analysis'. Some of the outlines covered include; Cell Structure, Central Dogma and DNA structure, DNA replication, Types and Rate of Mutation, Comparative Genomics and Gene Ontology etc. Furthermore, Dr Gowan taught 'Basic Concepts of Population Genetics' and covered the following; Phenotype, Genotype, Methods of obtaining genetic data, Traits & Inheritance pattern, Allele Frequency, Natural Selection, gene flow, Relationship estimation & Identity by descent, In-



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roduction to gene genealogies& coalescent processes and Quantitative Trait Loci (QTL). Other resource persons at the workshop include; Dr. Oladipupo (Covenant University) and Dr. Peter Amoako-Yirenkyi (KNUST) who taught 'Data Mining'. Part of the aspects covered were Classification, Clustering, practical in R, practical in RapidMiner etc. Dr. Nana Frempong (KNUST) assisted by Rydal Esi Eghan (KNUST), treated 'Statistical Analysis in R'. The following outlines were emphasized during the course, Anomaly detection, Data Visualization, Statistical Tests, Regression analysis, Simple Linear Regression, Multiple Linear Regression and Logistic Regression.



The last course during the workshop, 'High Throughput Sequencing', was taken by Dr. Hamilton Ganeson and Acclaim Moila (Inqaba biotech). The areas covered include; Introduction to Sanger and High Throughput Sequencing, PCR Primer Design Guidelines, Second Generation NGS Technology, Third Generation NGS Technology, Nanopore, ION Torrent, PACBio and practical session using CLC genomics. Further details on the courses can be seen on www.waslitbre.org



Bioinformatics Capacity

First Nigerian Bioinformatics Conference: A report on the pre-conference workshops

The Nigerian Bioinformatics and Genomics Network in collaboration with the Nigerian Institute for Medical Research (NIMR) organized the premier bioinformatics conference in Nigeria tagged the First Nigerian Bioinformatics Conference 2019 (FNBC '19). The event held at the NIMR, Lagos from 24th – 26th June, 2019.

The conference featured two pre-conference workshops tagged “A practical guide to writing a grant proposal” and “Assessing Genomic Data using the Ensembl Genome Browser”. The workshops took place on Monday 24th June, 2019 from 9am till 6pm.

The grant writing workshop was taught by Prof. Nicki Tiffin, University of Cape Town, South Africa. The workshop had in attendance twenty (20) participants comprising mostly postdoctoral fellows and advanced doctoral students. The topics covered includes; Finding a grant to apply for, administrative and practical issues, ensuring relevance of your application, scientific structure of a grant proposal: introduction, aims, objectives, methods/activities, summary/abstract and budgeting. The workshop also had practical and feedback sessions. During the practical session, participants were grouped and given a task to formulate aims and objectives on a project of their choice. Afterwards, each group presented their work and got feedback/corrections from the trainer. The workshop was very interactive as participants had the opportunity to ask questions and share from their experiences on previous

grant applications. During the wrap-up session, participants shared how their expectations for attending the workshop had been met, the new knowledge gained and how they were going to apply what they learnt in the future grant applications.

The Ensembl browser workshop was taught by Dr. Benjamin Moore, Ensembl Outreach Officer, European Bioinformatics Institute, Cambridge, United Kingdom. Fifty (50) participants attended the Ensembl Browser Workshop comprising mostly post graduate students and research scientists. Topics covered includes; Introduction to Ensembl and the Region in Detail View, Genes and transcript annotation, Variation data and the VEP, Regulatory data, Comparative Genomics and BioMart. The training materials can be accessed via <http://training.ensembl.org/events/2019/2019-06-24-FNBC>.

The workshops were made possible by generous support from the following; Nigerian Institute of Medical Research (NIMR), European Bioinformatics Institute (EBI), Covenant University Bioinformatics Research (CUBRe), Center for Genomic Research and Innovation (CGRI), African Partnership for Chronic Disease Research (APCDR).

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Women in Data Science



1. Describe your current job.

I am a PhD student at the South African National Bioinformatics Institute (SANBI) at the University of the Western Cape (UWC). Under the supervision of Professor Alan Christoffels, my research is centred on understanding the complexities of virulence in *Mycobacterium tuberculosis*. As if combining biology, computer science and statistics isn't enough, I show how broad my interest in science goes by lecturing Physics to paramedic undergraduates at the Cape Peninsula University of Technology (CPUT).

2. What are your research interests.

I'm interested in data science as a whole. At the moment I'm using Bioinformatics for TB research, but the paradox of the "rabbit hole" and yet, the contrasting sense of order, that cancer cells allow themselves to be governed by, also fascinates me. Overall, I enjoy the entire process of handling data - from critically thinking through the initial hypothesis, to gathering, analyzing and visualizing data towards problem-solving.

3. What was your career path?

My undergraduate studies were in Biotechnology. It was during this time that I developed a taste for Bioinformatics and statistics. I subsequently chose an Honours lab where I could - at that stage - at least tinker with Bioinformatics for half of my project. The bug bit (excuse the double pun) and I went from dilettante to a full transition into Bioinformatics for my MSc.

4. How big is the gender bias in your institution/country and what opportunities are there to promote women.

Just this year, UWC was ranked by the Times Higher Education University Impact Rankings, as one of the top universities across 76 countries for their impact, among others, on gender equality. I've been privileged; in that I have never experienced being treated unjustly by any institution in South Africa based on my gender. Women I have studied with are in leadership roles at various institutions and diverse industries; and I definitely see job postings and public policy implementation, that show a conscious effort towards deliberately choosing women for high-ranking positions and for roles in previously male-dominated industries.

5. Can you get names of a few women computational scientists/Bioinformatics people at your institutions?

SANBI has birthed and reared many Bioinformatics graduates. Some, like myself, Dr Uljana Hesse, Fanechka Esterhuysen, Yamkela Mgwatyu have continued our research at SANBI. Still, others such as my MSc supervisor (Dr Nicki Tiffin), Dr Zahra Jalali Sefid, Dr Imogen Wright etc., have moved on to various other institutions and co-founded software companies.

Hot Off The Press!!

Evolutionary dynamics of ten novel Gamma-PVs: insights from phylogenetic incongruence, recombination and phylodynamic

In the attempt to find the repertoire of Human papillomaviruses (HPVs) Murahwa and colleagues used the sequences of ten novel Gammapapillomaviruses (Gamma-PVs) characterized in previous studies and related HPVs to analyse the evolutionary dynamics of these viruses at the whole genome and individual gene scales.

Read the full paper here:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6518707/>

A Sex-Stratified Genome-Wide Association Study of Tuberculosis Using a Multi-Ethnic Genotyping Array

Sex-differences is an important factor in health and disease, particularly TB an infectious disease which is definitely impacted by socio-demographic and economic factors. Having in mind the admixed South African population structure, Schurz et al employed the Illumina Multi Ethnic Genotyping Array, specifically designed to genotype diverse and admixed populations with a specific focus on sex-stratified autosomal analysis and the X chromosome. The study found likely candidate genes that warrant further investigation although SNP association testing was not statistically significant using a stringent cut-off.

Read the full paper here:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6346682/>

Genomics literacy: an approach to reduce the burden of common genetic diseases in Africa

In this seminal publication, Mboowa and Sserwadda discuss approaches to improve genomics literacy and community engagement within Africa with huge cultural and language diversity. These approaches are geared towards reducing the burden of infectious diseases in Africa.

Read the full paper here:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6625136/>

Rare variant in LAMA2 gene causing congenital muscular dystrophy in a Sudanese family. A case report

In the recent issue of Acta myologica, Amin and colleagues documented the case of a Sudanese family with a rare variant in LAMA2 gene causing congenital muscular dystrophy. This report is definitely one of the growing accounts of clinical application of genomics within Africa.

Read the full paper here:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6598405/>



The effect of interventions on the transmission and spread of HIV in South Africa: a phylodynamic analysis

In one of what seem to be the largest molecular epidemiology study in south Africa, Wilkinson and colleagues identified unique HIV clades from a large sequence dataset of southern African HIV sequences (n = 15,332). Using phylodynamic and phylogeographic methods each clade was characterized to infer their growth through space and time by which differential growth and expansion of HIV clades at different time points were observed. However, it demonstrated that previous interventions generally do not affect the HIV epidemic with major difference between different clades over time and space.

Read the full paper here:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6389914/>

Dissecting in silico Mutation Prediction of Variants in African Genomes: Challenges and Perspectives

In silico detection and analysis of clinically important mutations are requisites for genomic medicine globally. However, in silico mutation prediction tools are fraught with high rates of false positives and negative results. This is much evident when working with African genomes which harbors the highest genetic diversity but disproportionately represented in public databases and reference panels. Here, Bope and colleagues in African research institutions reviewed publicly available genomic databases, in silico mutation prediction tools and several bolts and nuts particularly with analyzing pathogenic variants in African genomes for their use in research and clinical practice.

Read the full paper here:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6603221/>

COSI Corner

Community Of Special Interest Groups

We launched the community of special interest groups at the ASBCB conference in Entebbe in October 2017. It is hard work for individuals to rally support and sustain the momentum felt at the Entebbe conference. I would urge all those who are looking for a smaller community of disciplinespecific scientists to get involved in the COSIs. Here is a reminder of the groups that were initiated and the contact details.

Structural Biology and Drug design (structuralbio@asbcb.org)
Metagenomics group (metagenomics@asbcb.org)
Pathogens group (pathogen@asbcb.org)
Population genomics (popgen@asbcb.org)
System administration (sysadmin@asbcb.org)

Contributors

Alan Christoffels, SANBI - University of the Western Cape,
Campbell Rae, SANBI- University of the Western Cape,
Amel Ghoulia, Institut Pasteur de Tunis,
ThankGod Ebenezer, Earlham Institute (formerly The Genome Analysis Centre - TGAC)
Norwich Research Park Innovation Centre
Ahuno Samuel Terkper, Kwame Nkrumah University of Science and Technology (KNUST)
Ryman Shoko, School of Natural Sciences and Mathematics, Chinhoyi University of
Technology,
Verena Ras, Computational Biology Division, University Of Cape Town

We welcome volunteers who wish to contribute in the following areas fo the magazine:

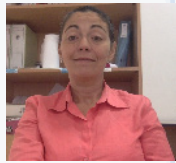
- * Editorial Team
- * Individuals to aid in translating the newetter to French and Portugeuse
- * Layout and Design - we are looking for individuals who wish to exercise their creativity in improving the look and design of the magazine

Please submit all contributions to:
contact @asbcb.org

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Vision

To facilitate the development of African scientists as leaders in bioinformatics and computational biology

Mission

To be a scholarly society dedicated to advancing, developing and promoting bioinformatics and computational biology in Africa.

Serve a global membership through distribution of valuable information about training, education, employment and relevant news from related fields.

Encourage the application of bioinformatics in Africa to improve the livelihood of people.

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