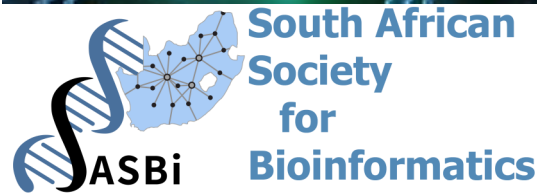


SASBi

Newsletter

Inside the Issue



BIOINFORMATICS @ The UNIVERSITY of the WESTERN CAPE

The South African National Bioinformatics Institute (SANBI) has been teaching bioinformatics and contributing to internationally competitive bioinformatics research at the University of the Western Cape for 24 years.

CONTINUED .02

PHA4GE

A UWC SANBI-Affiliated Global Scientific Alliance Uniting Genomics & Public Health

CONTINUED .01

Student PROFILES @ UWC

Insight into the life of a student.

CONTINUED .06

PHA4GE

With more than R10 million in funding from the Bill & Melinda Gates Foundation, the Public Health Alliance for Genomic Epidemiology is a global coalition working to unite public health practices with cutting-edge genomics research and analysis.

As microbial sequencing becomes more routine, access to sustainable bioinformatics capacity has become one of the most critical emerging needs for public health throughout the world. The Public Health Alliance for Genomic Epidemiology (PHA4GE) aims to develop the standards that will meet these needs.

Launched in October 2019 at the [Global Grand Challenges](#) meeting in Addis Ababa, Ethiopia, the global PHA4GE programme brings together partners including US Centers for Disease Control and Prevention (CDC), Africa CDC, Oxford University, Washington University, the University of Melbourne, University of British Columbia and BC Centre for Disease Control, the Broad Institute in Boston, and H3Africa. SANBI-UWC will serve as secretariat for the global programme, and will form part of the steering committee to be formed this month to provide over-



PHA4GE (continued)

“access to sustainable bioinformatics capacity has become one of the most critical emerging needs for public health”

sight for the various PHA4GE activities.

PHA4GE is working to establish consensus standards, to document and share best practices, to improve the availability of critical bioinformatic tools and resources, and to advocate for greater openness, interoperability, accessibility and reproducibility in public health microbial bioinformatics.

Take epidemics such as the Ebola crisis in West Africa in 2014-2016 or the current COVID19 pandemic. Ideally, you want to be able to analyse virus samples to better understand the spread of disease or predict when an outbreak will occur. Unfortunately, much of this technical skill sits in academia and not in public health centres where policy is being shaped. We want to more closely align academic analytical tool development with policy makers and implementers.

The scope of this alliance is broad, including public health infectious diseases bioinformatics development and data management efforts, throughout the world - and a focus on the ethics of data (and technology) sharing.

For more information go to www.pha4ge.org. We look forward any participation in the working groups that underpin the activities in PHA4GE.

by Prof Alan Christoffels

Bioinformatics @ UWC

Hocine Bendou Senior Researcher, SA Medical Research Council

Doctor Bendou is a recent addition to SANBI. He joins the faculty described in a prior issue of the SASBi Newsletter. Hocine is interested in the application of next-generation sequencing (NGS) to a variety of cancers and develops software tools for the analysis of NGS data to speed up the use of these data.

Hocine describes his research interest as follows:

In my research group, our interests lie in the area of genomics focusing on identification of genetic abnormalities driving the genesis and progression of human cancer, using bioinformatics. My group is working on developing bioinformatics pipelines, and applying RNA-Seq and whole-genome sequencing (WGS) methods in analysing different types of cancer including: neuroblastoma, acute myeloid leukemia and diffuse large B-Cell lymphoma. The group works with external collaborators to identify the role of integrated viral DNA in oesophageal cancer by using WGS combined with ERVCaller tool.



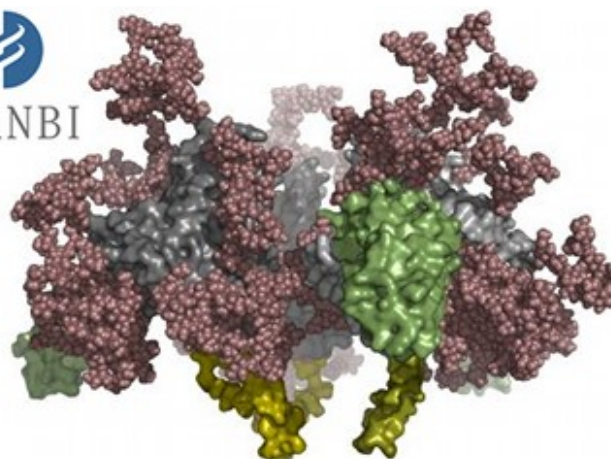
Hocine Bendou



UNIVERSITY of the
WESTERN CAPE



SANBI



SANBI
South African National
Bioinformatics Institute

ONLINE BIOINFORMATICS

Bioinformatics training in Africa during the COVID-19 pandemic

The COVID-19 pandemic has forced a rapid - and unplanned - shift towards online events instead of the usual roster of face-to-face seminars and conferences. One of these was the BCC2020 conference - a combination of the annual Bioinformatics Open Source and Galaxy Community Conferences (BOSC and GCC). The organisers' experience is reported in a [blog post](#). One part of the conference was a series of online tutorials on topics from community building to Galaxy internals to doing bioinformatics in the cloud and more. The attendance roster at these tutorials illustrated an advantage of the shift to online presentation: I have been to many GCC conferences and a couple of BOSC ones, and their locations in Europe and North America (BCC2020 was scheduled to be in Toronto, Canada) means that they are largely inaccessible for African participants due to travel costs and visa restrictions. At BCC2020 tutorials saw people from the Philippines, India, Kenya, Mali, South Africa and more.

One of these was Boi Kone, PharmD student from Bamako, Mali. His attendance of BCC2020 was interrupted periodically because of power problems in his hometown. He highlighted the way that going online allows participation at much less cost to the climate than jetting around the world. "BCC2020 is a good example that shows that with a bit of organization online meetings can be beneficial and promote open science."

I got my first chance to teach online later in July at the Bioinformatics Hub of Kenya's online meeting, where I introduced Galaxy to students from East Africa (Kenya, Uganda, Tanzania) and [beyond](#). One of the frustrations of teaching online is the lack of student feedback - it feels rather like one is talking to a void. Luckily the event featured break-out rooms where I had an opportunity to virtually meet students working on HIV, IBDV and the P. falciparum parasite and, on a more technical note, we were able to track students' progress through the material I was teaching using the usegalaxy.eu Training Infrastructure as a Service ([TlaaS](#)) dashboard. The dashboard confirmed what I and my fellow instructors (Tracey Calvert Joshua, Susan Alicia Fernol, Kamohelo Direko and Beatriz Serrano-Solano) suspected: students were largely passive during my tutorial demo and did not actively complete the steps of the tutorial themselves. The Carpentries [blog](#) features a number of posts about lessons learned in online training and online training is sure to be discussed at the next Galaxy Training Network ([GTN](#)) event in November. (And perhaps [H3ABionet](#) will share lessons learned from organising their 1000+ student, 44 classroom Intro To Bioinformatics class soon?)

Finally, the SASBi Student Council organised its first online symposium in August and also attracted students from [near and far](#), not only as participants and also as presenters. One of these was Khadija Elamin from Khartoum in Sudan. She writes that "this was one of my most memorable online events, because it's the first time I've [attended a] symposium not in Sudan plus that online event so this is my first time also" and also

"perhaps we can continue the conversation - online!"

"the topics raised have helped me. I liked the activities and questions; it's really cool". Speakers at the symposium ranged from South Africa through the Democratic Republic of Congo and all the way to Libya. One problem that was apparently though was that the while one can view a Zoom call on a mobile device, presenting essentially requires a laptop. And, of course, online events require a stable and strong Internet connection, a significant data budget and a quiet home environment to participate from. As H3ABionet Training Coordinator Verena Ras [reminds us](#), these things are very unevenly distributed in South Africa and the rest of our continent.

Students who are left out or further disadvantaged by the shift to online events are likely to be Black, female, and poor. We need engagement with and guidance from such students in how best to address their needs. Some suggestions include online attendance [bursaries](#), and not pretending that online events need to be carbon copies of in-person ones: we could 'blur the (time) boundaries' of events in time through pre-posting recorded content (as e.g. H3ABionet IBT does), reserving event time for interaction, not watching presentations. The [Open Life Sciences programme](#) is also experimenting with models of remote mentorship, something that can be a model for maintaining the kind of in-person connections we suddenly lost when the whole world moved online.

2020 has been, as they say, a lot. It has been an immense privilege to take part in some of the extensions of training and collaboration that that online world allows us. Has your experience been different to mine? Then perhaps we can continue the conversation - online!



By Peter van Heusden



Science Bytes

BRIDGE an open platform for reproducible high throughput free energy simulations

Senapathi, T et al. J. Chem. Inf. Model, August 18, 2020

PMID: [32810405](#) DOI: [10.1021/acs.jcim.0c00206](#)

Biomolecular Reaction and Interaction Dynamics Global Environment (BRIDGE) is an open-source web platform developed with the aim to provide an environment for the design of reliable methods for, and to conduct reproducible, biomolecular simulations. It is built on the well-known Galaxy bioinformatics platform.

Structural Comparison of Diverse HIV-1 Subtypes using Molecular Modelling and Docking Analyses of Integrase Inhibitors

Isaacs, D. et al. Viruses 2020, 12:936
[10.3390/v12090936](#)

The authors applied computational methods of molecular modelling and docking to analyse the effect of naturally occurring variants on the full-length integrase structure. They identified 13 variants in the Cameroonian and 17 variants in South African HIV sequences. Analysis suggests that these variants are unlikely to contribute to development of resistance to integrase inhibitors in combination antiretroviral therapies.

Molecular dynamic simulations investigate structural impact of drug resistance mutations in HIV-1C

Molecular dynamic simulations to investigate the structural impact of known drug resistance mutations on HIV-1C Integrase-Dolutegravir binding

Chitongo, R et al. PLoS One 2020, 15:e0223464
PMID: [32379830](#) PMCID: [PMC7205217](#) DOI: [10.1371/journal.pone.0223464](#)

Used the consensus wild type HIV-1C integrase sequence to build an accurate 3D model to understand the effect of three known mutations on Dolutegravir drug binding in a South Africa context.

Africa needs another million PhD scientists to develop home grown solutions

Christoffels A. Quartz, May 28, 2018
<https://qz.com/africa/1290710/africa-needs-one-million-more-scientists/>

Prof Christoffels argues for greater investment into bioinformatics.

Accelerating genomics-based surveillance for COVID-19 response in Africa

Tessema, SK et al. Lancet Microbe, August 18, 2020
DOI: [10.1016/S2666-5247\(20\)30117-8](#)

Early findings from genome sequencing have shown that SARS-CoV-2 strains circulating in Africa are assigned to 20 imported lineages, ranging from three lineages in Nigeria to ten in Kenya. The majority of the SARS-CoV-2 sequences are of B.1 (65%) and B.1.1 (15%) lineages, which are thought to be predominantly of European origin (appendix). The next most predominant lineage was A (5%), which originated in China. Therefore, sequencing has revealed that multiple lineages have been introduced into the continent.



Save the Date – Conferences

SEPTEMBER 2020

Wellcome Trust Announcement

Virtual Conferences and Courses 2020: Wellcome Genome Campus Courses and Conferences

We're going virtual for the rest of 2020

Advanced Courses and Scientific Conferences is committed to inspiring science and transforming careers. To keep you safe, our programme is going virtual for the rest of 2020. Join us online to keep up-to date with the latest research in your field and continue to build your international networks.

More details on all our events are available on our website. In the meantime, we would like to take this opportunity to share some upcoming highlights with you.

[Full Details](#)

8 to 11 October, 2020: [The 9th National Conference on Bioinformatics and Systems Biology of China](#)

20 October, 2020: Inaugural virtual seminar hosted by SASBi
Speakers: Professors Alan Christoffels and David Tabb

16 to 18 November, 2020: [RECOMB/ISCB Conference on Regulatory & Systems Genomics with DREAM Challenges 2020](#)

15 to 29 November, 2020: [The 19th International Conference on Bioinformatics \(InCoB 2020\)](#)

10 to 13 May, 2021: [The 14th Great Lakes Bioinformatics \(GLBIO\) conference](#)

SU	MO	TUE	WE	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

OCTOBER 2020

SU	MO	TUE	WE	THU	FRI	SAT
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20 SASBi Virtual Seminar	21	22	23	24
25	26	28	29	30	31	

STUDENT PROFILES @

Alicia Fernol

MSc candidate: Bioinformatics (University of the Western Cape)



What is your current project?

I am investigating the genetic basis of a bone disease, called osteogenesis imperfecta (OI), in a South African family of mixed ancestry. This project is interesting because the phenotype observed in the affected members of this family at first glance is characterized as OI type III, however, the affected individuals show a more severe form of this disease.

Please fill us in on your career up to this point:

I completed my undergraduate degree, majoring in genetics and biochemistry at Stellenbosch University. I then applied for Hons in Bioinformatics at UCT and University of Pretoria and Hons in Biochemistry at Stellenbosch. I went to UP, where I completed my Hons in Bioinformatics with Prof. Oleg Reva and Dr. Rian Pierneef as my supervisor and co-supervisor, respectively. My project was a comparative genomic study focusing on the species *Bacillus subtilis*. I had actually really wanted to be part of the SANBI group for my Hons, but at the time they did not offer Hons bioinformatics degrees, only a module as part of Biotechnology. So, when I finished my Hons at UP, I applied for my MSc degree with Prof. Alan Christoffels at SANBI. I was super stoked when I got accepted it was really a dream come true, for me (lol). Now I am here, busy finishing up my Masters, in the project described above, which I have enjoyed working on, even if at times (so many times) I felt overwhelmed, stuck, confused, then excited, relieved and proud. This has just been a roller-coaster of emotions.

If you could give advice to students who are new in the field, what would you say?

Bioinformatics is a vast field and with so many different aspects to it, it is easy to get overwhelmed. But if you are excited by the idea of gaining knowledge that is not limited to a certain area, learning several new skills and adapting to the challenges that comes with being in this field, you are already one foot in the door. Many people are afraid of the coding aspects of the field, but we all started from the bottom, not knowing anything and worked our way up or at least to where we are. So, don't be intimidated or afraid of the idea of this field, there is so much knowledge and skills that comes with being in this field, which will keep you 'fired-up' for more.

When did you first realize you love science/computers?

I was in grade 9 when I first fell in love with science, I became interested because at the time it all sounded amazing my brain could believe all that it was learning. And it wanted more. I was introduced to programming (Java) in grade 10. This blew my mind, the possibilities of coding were exciting, I was hooked instantly.

If you were an animal – what would you be and why?

I would want to be an eagle. I think it is a very majestic and fears animal. The idea of being able to fly and the freedom that comes with that feeling would be amazing.

Lynley Abdol

MSc Candidate: Bioinformatics (University of the Western Cape)

What is your current project?

Genetic diversity in NAT1 and NAT2 regulation among Southern African population groups.

Please fill us in on your career up to this point:

I have completed my undergrad and Honours in Medical Bioscience and the University of the Western Cape. I then started my MSc in Bioinformatics at SANBI, which I am currently completing. I also have a part time position as a teaching assistant at the Cape Peninsula University of Technology.

If you could give advice to students who are new in the field, what would you say?

Firstly, you have chosen a field that is constantly growing and expanding so you are definitely in the right place. Secondly, this field requires you to be consistent, so make sure you are challenging yourself each and every day.



If you could preach about something to other scientists, what would it be?

Be confident in your research! No one knows your research better than you do. Also, imposter syndrome is real. When you do encounter it don't be to hard on yourself you were granted this opportunity for a reason. You deserve to be where you are right now.

What are your hobbies/activities you do in your free time?

Well my second love would definitely be fitness. I believe that a healthy mind is coupled with a healthy body and lifestyle. I am also an outdoors type: I love trying and experiencing new hiking trails.

Do you have a favourite computer language?

It would have to be Python.



(Continued on page 6)

Peter Abiodun

MSc candidate: Bioinformatics (University of the Western Cape)



What is your current project?

Information security compliance and policies at South African higher education institutions – implications for biomedical research .

In response to rising threats of information vulnerabilities, South Africa will implement a regulation called the Protection of Personal Information Act (POPIA), similar to the European Union General Data Protection Regulation (GDPR), which seeks to mitigate cybercrime and information security vulnerabilities. The extent to which African institutions, especially in South Africa, have embraced and responded to these two information security regulations remains vague, making it a crucial matter for biomedical researchers. The core activities of biomedical research are the collection and processing of PII data to perform health-related research, which can be geared towards the diagnosis, prevention, and treatment of diseases, the study of disease epidemiology, and research into the genetics of disease.

So, in my project, I used the technology, organizational, and environmental (TOE) framework to investigate the factors which may influence the effectiveness of information security in three South African universities. I checked whether these universities have proper and reliable information security measures, practices, policies, and management in place and whether they are in line with both POPIA and GDPR.

Please fill us in on your career up to this point:

I went to high school and did my undergraduate studies in Nigeria. I obtained my bachelor's and honours degree in Computer Science at Adekunle Ajasin University. Because of my desire, enthusiasm, and love for an academic career in teaching and research, I decided to come to South Africa. Eighteen months after I got to South Africa, I obtained another honours degree, this time in information systems at the University of the Western Cape. Then, I published my research work together with my supervisor in the international peer-reviewed even, at an honors level. This progress is like a dream coming through for me – it gave me the hope and kindled the fire of my career aspirations within me.

If you could give advice to students who are new in the field, what would you say?

My sincere advice to students who are new in this field or planning to join this prestigious field in the nearest future is that everything worth doing takes time and effort. Meaning, if you want to go somewhere meaningful and rewarding in life, there are no shortcuts. So you have to invest your time and effort by doing what others are not willing to do. For instance, most students aren't willing to do the extra assignment, read articles, and put their phones away when it is time to focus, and concentrate on studies or delete the distracting apps on their phones. Be the student who is willing to do those things- and more. If you adopt this mindset, you are almost guaranteed to become successful in this field.

Save the Date – SASBi-SAGS Biennial Conference 2021

26 to 29 September, 2021



Please make a note of the meeting dates in your calendar and plan to attend!

For additional information, including registration and a draft programme please visit: [BIO2021](#)



UNIVERSITY of the
WESTERN CAPE