

# The Improper Scientist

Official Magazine of the African Society for Bioinformatics and Computational Biology  
Issue #5 September 2018

Greetings to a growing number of subscribers to The Improper Scientist. It has to be the most exciting time for \*omics research on the African continent. The past quarter has been packed with Pan-African initiatives aimed at strengthening scientific (human and natural sciences) capability to be at the forefront of knowledge production instead of knowledge consumption. In this issue of The Improper Scientist we report on regional activities that pertain to H3Africa (H3Africa Bioinformatics Network), Agricultural Bioinformatics in East Africa, and Biosecurity driven through the GET Consortium. We continue to profile women in data science and for this newsletter we introduce our readers to Dr Maryam Diarra, a Biostatistician from Senegal.



We introduce a new topic as of this month namely data science publications by African scholars. We encourage you to let us know of any data science papers that should be highlighted in future newsletters.

While we celebrate the data science progress in Africa, we stop to remember the tragic loss of one of Africa's leading scholars, Professor Bongani Mayosi. He was undoubtedly among the leading scholars of our time, and he has unapologetically strived for transformation in the medical profession. During this time of mourning, much has been written about Professor Mayosi' scholarly contribution and even more about his compassion and humility- a man who acknowledged others and mentored the next generation of scientists. Yet one article stands out for me, namely one written by Professor Xolela Mangcu, Professor of Sociology at George Washington University who makes reference to the difference between intellect and intelligence. Professor Mangcu reminds us not to lose sight of Professor Mayosi' intellect while focusing on his intelligence. Mangcu goes further to quote Richard Hofstadter, "Intelligence is an excellence of mind, but in a fairly limited area of expertise. Intellect, on the other hand, involves the critical, creative, contemplative side of the mind.". It is this "intellect" that Mangcu recalls about Mayosi.

May many more scientists rise up in Africa with the "critical, creative and contemplative side of the mind" because finding solutions to the challenges facing us as a society demands nothing less.

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

Alan Christoffels (Editor)  
@alangchris



## *Save The Date!*

- ★ Leveraging Genomic Diversity to Promote Animal and Human Health at Speke Resort & Conference Centre, Kampala, Uganda.  
Organised by Keystone Symposia Global Health Series, supported by the Bill & Melinda Gates Foundation, Scientific Organizers: Michèle Ramsay, Han Brunner and Appolinaire Djikeng.  
Funding is available.
- ★ Role of the Genital Tract Microbiome in Sexual and Reproductive Health at Southern Sun Cape Sun, Cape Town, Western Cape, South Africa on December 11—15, 2018. Organised by Scientific Organizers: Janneke van de Wijgert, Jeanne Marrazzo, Douglas Kwon and Jo-Ann Passmore.  
Funding is available.
- ★ Advanced Next Generation Sequencing Bioinformatics (Johannesburg, South Africa) at University of the Witwatersrand, Johannesburg, South Africa 27 January–1 February 2019. Application and Bursary Deadline: 11 October 2018. Organised by Wellcome Trust, H3Africa Bioinformatics Network and the University of the Witwatersrand, Johannesburg.  
Funding is available.
- ★ Next Generation Sequencing Bioinformatics (Santiago, Chile) at Pontificia Universidad Católica de Chile in Santiago, Chile on 20–25 January 2019. Application and Bursary Deadline: 18 October 2018. Organised by Wellcome Genome Campus and Pontificia Universidad Católica de Chile in Santiago, Chile.  
Funding is available.
- ★ Bioinformatics training on ENSEMBL, Browser Workshop at Kwame Nkrumah University of Science and Technology, Ghana on 8 October 2018. Organised by EMBL-EBI, H3aBionet (KNUST node), NIMS. Funding is available.
- ★ Bioinformatics Training on ENSEMBL, REST API Workshop at Kwame Nkrumah University of Science and Technology, Ghana on 9th October 2018. Organised by EMBL-EBI, H3aBionet (KNUST node), NIMS. Funding is available.

- ★ Bioinformatics Training on ENSEMBL, REST API Workshop at Kwame Nkrumah University of Science and Technology, Ghana on 10th October 2018. Organised by EMBL-EBI, H3aBionet (KNUST node), NIMS. Funding is available. <https://events.nims.edu.gh/event/137/>
- ★ International Data week Gaborone, Botswana on November 5-8 2018 Organised by CODATA <http://internationaldataweek.org>
- ★ Africa Open Science training is in Nairobi, Addis Ababba, Entebbe and Khartoum on 12-23 November 2018. Organised by Mozilla foundation and H3ABionet. Catering provided. Contact [Amel.ghouila@pasteur.tn](mailto:Amel.ghouila@pasteur.tn) for more information
- ★ Practical Aspects of Drug Discovery: At the Interface of Biology, Chemistry and Pharmacology. Cape Town, South Africa. 07-12 April 2019. Application and bursary deadline 18 Dec 2018 (at 23:59 UTC). Wellcome Centre for Anti-Infectives Research (WCAIR), Drug Discovery and Development Centre (H3D), UCT
- ★ 4th Annual International Remote Conference: Science and Society February 9-10th 2019. November 30th 2018. Beyond Science Initiatives, Harvard University. Infectious Disease Consortium, University of Toronto, Trinity College. This is a free event.

[https://docs.google.com/forms/d/e/1FAIpQLSfWmDd656ZEIHapCdOGbrloL9dDmK-G7G\\_2eIAC7bI9wssjaA/viewform](https://docs.google.com/forms/d/e/1FAIpQLSfWmDd656ZEIHapCdOGbrloL9dDmK-G7G_2eIAC7bI9wssjaA/viewform)

# Bioinformatics Capacity



University of Sciences, Techniques and Technologies  
of Bamako  
Faculty of Pharmacy  
Department of Epidemiology of Parasitic Diseases



Who are we?

Our vision - A Malaria Free Africa

Our mission - Training Leaders for a Malaria Free Africa

Background

The Developing Excellence in Leadership and Genetics Training for Malaria Elimination in sub-Saharan Africa (DELGEME) is a training programme of DELTAS Africa initiative. The DELTAS Africa Initiative is an independent funding scheme of the African Academy of Sciences (AAS)'s Alliance for Accelerating Excellence in Science in Africa (AESA) and supported by the New Partnership for Africa's Development Planning and Coordinating Agency (NEPAD Agency) with funding from the Wellcome Trust and the UK government. The lead institution is University of Science Techniques and Technologies of Bamako Mali (USTTB). Partner institutions include Medical Research Council (MRC) Unit in The Gambia, The United States Army Medical Research Directorate (USAMRD-K)/KEMRI Kenya, The Noguchi Memorial Institute for Medical Research (NMIMR)-Navrongo Health Research Centre, Ghana, The National Institute of Medical Research (NIMR) Tanzania, Université des Sciences de la Santé of Libreville, Gabon, Benhard-Nocht Institute for Tropical Medicine (BNITM) Germany/Kumasi Centre for Collaborative Research (KCCR) Ghana, and the University of Oxford/Wellcome Trust Sanger Institute UK.



Our Objectives

DELGEME aims to enrich the pool of African Scientists working in African institutions with relevant expertise to leverage big genetics and genomics data in the drive for malaria elimination in sub-Saharan Africa.

Over the five years of the Grant, DELGEME will be providing short-term and degree training (MSc, PhD, Post-doctoral) to at least 90 young African scientists.

Fellowships will be hosted at an African institution with a curriculum in genetics, genomics, bioinformatics, biostatistics, data science and ethical issues in genetics/genomics. DELGEME fellows are expected to develop a research proposal that explore critical gaps in malaria genetics and molecular epidemiology to aid the malaria elimination agenda. Dedicated computational facilities will be available for fellows at the USTTB, the MRC-Gambia, and USAMRD/KEMRI.

## Our governance

Our governance structure ensures a smooth running of the Program by an Executive arm with oversight from two advisory bodies. This is designed to help the project stay on track in delivering while decisions are well informed and unbiased. The oversight bodies include a Scientific and Training Advisory Board (STAB) of up to 7 members, who are experts and respected leaders in our fields of interest but external to the Institutional Partners and the Programme Management Board (PMB) which will include the Principal Investigators of the PDNA.

The Executive Board (EB) includes the Program Director, the Project Officer and the Administration. The final layer includes our 5 Strategic Hubs i.e. i) Training Hub led by USAMRU - Kenya and the MRC Gambia; ii) Research Management Hub led by NMIMR, Ghana; iii) Strategic Leadership and Scientific Citizenship hub led by MRTG, Gabon and NIMR, Tanzania ; iv) Technical support hub, which includes one co-applicant (BNI, Germany) and one strategic collaborator (Kwiatkowski group, Oxford-Sanger, UK).

## Mid-term achievements

DELGEME is already training Sixty one (61) students from 15 African countries including Angola, Burkina Faso, Burundi, Cameroon, Ivory Coast, Ethiopia, Ghana, Gambia, Congo DR, Mali, Mozambique, Nigeria, Kenya and Tanzania Master, PhD, Post PhD, and Leader in Law. DELGEME's students are all enrolled in African Universities, including the USTTB in Mali.

4 Master Fellows including Assetou Diarra, Bakary N'tji Diallo, Rita Boateng and Moussa Djimdé, have completed their Master courses.

About 50 young people including malaria program officers from 15 countries received short-term training and 3 research centers in Africa, including Mali, Gambia and Kenya were equipped with latest generation servers which have at least 140TB of storage capacity each and are functional.

In Mali, an ultramodern R + 3 building dedicated to training in genetics and bioinformatics has been built, which is now called "DELGEME-MRTG-DEAP Permanent Training Facility". This building is endowed with

- A training room in bioinformatics and a visitor's desk on the ground floor,
- Two Laboratories for training in Genetics and Molecular Biology and a 1st floor office,
- The 2nd floor of the building consists of a video conference room and two offices.
- The 3rd floor of the building contains the Computer Server Room and Program Management.
- The roof of the building serves as Cafeteria.

Contact us - DELGEME / University of Science, Technics and Technology of Bamako

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# *Bioinformatics Capacity*

## Agriculture Bioinformatics

Who are your African Partners?

The team:

Dr Joseph Ndunguru, Dr Peter Sseruwagi and Dr Fred Tairo from Mikocheni Agricultural Research Institute, Tanzania

Dr. Titus Alicai from National Agricultural Research Organization, Uganda

Dr Elijah Ateka from JKUAT in Kenya

Dr. Laura M. Boykin, The University of Western Australia

Dr Monica Kehoe Department of Agriculture Western Australia

Dr. Patrick Chikoti, Zambia Agriculture Research Institute (ZARI)

Professor Laura Kubatko from The Ohio State University

When and how did your collaboration start?

In 2013, I attended an agricultural connections workshop in Nairobi, Kenya. I met Dr. Joseph Ndunguru, the leader of the Cassava Disease Diagnostic Project (CDP) (<http://cassavam.blogspot.com>) and we talked cassava viruses. At that time, the CDP team had illumina next generation sequence data from infected cassava plants and they were looking for a partner to work with them on the computational analyses to dig out the virus whole genomes. Dr. Ndunguru and Dr. Sseruwagi visited me and Dr. Monica Kehoe in Western Australia and we began our true partnership. They spent a month in Australia- we found 12 new whole genomes (<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0139321>) we then traveled to Tanzania to visit farmers and learn more about the system and meet more of the team. Dr. Titus Alicai visited Australia and we found that one of the viruses has a fast rate of evolution (<https://www.nature.com/articles/srep36164> ). We had another trip to E Africa to learn more and partner on capacity building in computational biology. Dr. Elijah Ateka then came to Australia and we found an interesting motif in the CBSV sequences and hypothesized there is more than one vector of these viruses (<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0187883> ) . We then went back to E Africa to work with farmers. I hope the picture is clear – we travel back and forth and work together sharing and learning from each other.

It is a true partnership!

What are the main research questions you trying to address?  
What is killing the cassava?

Cassava is the main source of calories for 500 million people in sub-Saharan Africa (800 million globally). It is under attack by whiteflies and the devastating viruses they transmit- leading to 100% yield loss. We have been characterizing the various viruses causing Cassava Brown Streak Disease. In the process, we have developed robust diagnostic tests for these various viruses. Recently, we have been using pocket DNA sequencing (Oxford minion) to sequence whole genomes in the field- under farmers' trees!

Follow along with our stories here: <https://cassavavirusactionproject.com>

Top left image - Dr. Monica Kehoe, Dr. Joseph Ndunguru, Dr. Titus Alicai, Dr. Peter Sseruwagi, Dr. Laura Boykin and Prof. Elijah Ateka

Top right image - Charles Kayuki (MARI) loading the minion under a tree.

Bottom Left image - Farmers in Mbinga, Tanzania

Bottom Right Image - Brenda Muga, Prof. Ateka, Dr. Boykin – tree lab in Kenya





# Conferences



H3ABionet consortium AGM, July 2018, Cape Town

During the last week of July 2018, the H3ABionet consortium members gathered in Cape Town for the Annual General Meeting and Scientific Advisory Board meetings.

H3ABionet is a Pan African Informatics Network to build capacity in Bioinformatics and provide Bioinformatics infrastructure and support to the H3Africa consortium. During this second round, 28 partner institutions spread across 17 African countries are part of the project.

The consortium work is structured in several work packages that aim to provide Bioinformatics trainings, development of Bioinformatics infrastructure to perform Genomics research, provide user help and support and facilitate H3Africa data management as well as develop cutting edge approaches for genomics analysis.

During these meetings, the consortium members discussed the progress of different ongoing projects and organized a couple of workshops, one on the application of Machine Learning techniques to answer different biological questions and a second one focused on mapping Bioinformatics competencies in collaboration with the 4 African teams who have been awarded Fogarty training grants.



# *Biobanking and BioSecurity*

4th African Conference on Emerging Infectious Diseases and Biosecurity  
“Managing the spectrum of data generated during disease outbreaks and  
biosecurity threats ” 26-28 September 2018, Freetown, Sierra Leone



Recently nearly 100 researchers, industry and policy stakeholders gathered in Freetown, Sierra Leone for the 4th African Conference on Emerging Infectious Diseases and Biosecurity. The Global Emerging Pathogens Treatment Consortium (GET) organizes this event annually in a different location.

The meeting in Sierra Leone follows successful conferences in Dakar (2015), Lagos (2016) and Accra (2017). This year’s conference was held at the epicentre of the 2014 Ebola Outbreak. The objective of the conference as quoted by the GET consortium board chairman Prof Diran Makinde, was to “accelerate regional and continental political and public awareness of biological threats and align this with international efforts such as biological Weapons Convention, United National 1540 Security Council Resolutions, (IHR and PVS) and the One Health Paradigm that addresses such threats.”

Central to this conference was the theme of data management during an outbreak. The thematic areas that explored data management include:

Era of Emerging Infectious Diseases (EID)

- Biosecurity
- Biobanking
- Vaccine and Immunological Strategy
- Cultural, anthropological, social and economic impact of EID (CASE)
- Public learning and understanding of science (PLUS)

## Africa's readiness for a pandemic threat

Updates on Biosecurity readiness was presented by lead investigators for Lagos Nigeria, Sierra Leone, Liberia and Guinea. These presentations highlighted the progress made in each of these countries to develop biosecurity and biobanking policies. Arguably these countries are at the forefront of a biosecurity implementation plan.

There remains a need to strengthen our public health system at multiple levels. Examples of disease surveillance systems that incorporate mobile technology as well as community involvement were described in the context of a One Health approach in Senegal. Countries such as a Sierra Leone profiled their community health skills development programme.

## Data Ethics

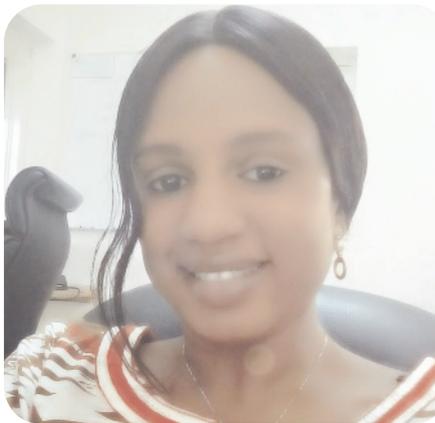
Effective data management cuts across all sectors of public health surveillance. Throughout the conference we had seen African countries grabbing, and responding to data quality control and aggregation of data in different ways. There remains a need to standardize data at different levels with a view to strengthen our health systems – and opportunity for GET and the ASBCB to work together to achieve this harmonisation of data.

The Wellcome Trust funded a session on data management in public health emergencies. This topic extended to a panel discussion on good governance for data management in public health emergencies. This vibrant discussion among conference participants and panellists will be documented and is distributed. The deluge of data (and samples) calls for a framework on data management that places participants (communities) at the center of our engagement. In the context of the activities of the African Society of Bioinformatics and Computational Biology, this is a reminder that any technology that we wish to role out across the African continent requires an awareness campaign in the public space.

Do not miss the next Biosecurity conference hosted by GET in Abuja, Nigeria in 2019. Updated information on this conference will be shared by the GET website – [www.getafrica.org](http://www.getafrica.org).

# Women in Data Science

A little over two decades ago the significant contributions of women to the STEM field were rarely acknowledged. The focus of these contributions are often women working outside the African continent. In Africa, the field of Computational Biology and Bioinformatics is now beginning to gain popularity, attracting more life science investigators, and proving useful in biomedical and agricultural studies. We may be guided to believe that due to the exclusion of women in scientific education and gender-based bias on the continent for several centuries that we would have less women in the field of Bioinformatics. However, this has proven not to be the case. In this issue of *The Improper Scientist* (and over the next several issues), we shall take trips to African research institutions to uncover what African women are doing in science with a focus on Bioinformatics.



The second stop is the Pasteur Institute of Dakar, in Dakar, Western Africa, where we meet Dr. Maryam Diarra. We also went further to ask her about the gender bias in her institution and other female Bioinformaticians in her institution.

Dr Maryam Diarra

## 1. What are your research interests ?

Actually my research is focused on the development of statistical methods and tools for genetic association analysis of infectious diseases traits, genetic data analysis such as linkage analysis, GWAS (genome wide association analysis). I am also interested in developing dynamic mathematical models (example using compartmental models) for the study of epidemics and outbreaks.

## 2. What is your current job description ?

In Pasteur Institute of Dakar, I joined the team of Biostatistics, Bioinformatics and Modeling in February 2016 as Biostatistician. Our research project is titled: "Development of bioinformatics and biostatistical methods and tools for the identification of genetic and environmental factors for multifactorial diseases". This project aims at identifying the environmental and genetic factors as well as their interactions implicated in malaria and arboviral infections. I work on statistical and mathematical data analysis, developing statistical methods and tools for genetic association analysis of infectious diseases traits. I also help our team organizing hands-on statistical and bioinformatics courses and doing teaching using R statistical software analysis even in universities or in Pasteur Institute.

I am also very interested in developing mathematical models for epidemics to predict potential numbers of new cases, evaluating the impact of some strategies of interventions such as the impact of vaccination to limit the spread of the epidemic. I also supervised master students working on biostatistics and mathematical modeling research project. As part of the project member, I am also contributing to write and submit grants to have financial support to do multidisciplinary activities which is the particularity of our research team.

3. Tell us of your career path so far:

I have done all my studies in applied mathematics and informatics at the university Gaston Berger of Saint-Louis, Senegal. I have my PhD (2015) in Applied Statistics and I have specialized in statistical methods applied on medical and veterinary sciences. While doing my PhD, I worked a lot with veterinarians, statisticians and modelers from CIRAD (Centre International de recherche agricole pour le developement) in Montpellier, France; and also from ISRA (Institut senegalais de recherche agricole). After my Phd (2016), I was recruited by Pasteur Institute of Dakar as a Post-doc researcher in the Biostatistics, Bioinformatics and Modeling group.

4. As regards gender bias in my institute and opportunities to promote women. Generally, in Pasteur Institute of Dakar there are as many women as men. But in research area, there are many more men than women. There is not an internal policy to promote women.

5. numbers of women computational scientists involved in Bioinformatics at Pasteur Institute of Dakar:

In our Institute, we don't have many women as computer scientist or Bioinformaticians. To my knowledge, there is Ms Haby Sarr who is the head of the Informatic service. There is also Mareme Seye Thiam (a phd student in our group of bioinformatic, biostatistic and modeling) and myself.

# *Hot Off The Press!!*

THE WOMAN, HER MICROBIOME AND HER CHILD



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Growing evidence suggests that the human microbiome- the microbial communities that live on and in the human body- is an essential part of life. Their roles in human health and diseases, development and even behaviour have been critical research foci in recent years largely supported by the advancement of high throughput technologies and bioinformatics tools and analysis. Of most importance are studies investigating the complex relation between maternal and neonatal microbiota. For example how compositional and functional oscillations of maternal microbiome impact pregnancy outcomes, the colonizing microbial communities on and in progeny and the health of offspring.

In this edition of "Hot of the Press" Nicky Mulder and colleagues at University of Cape Town, University of Ottawa, University of Washington, University of Birmingham, and CNRS-University of Orleans and Le Studium Institute for Advanced Studies- including Donald D. Nyangahu as the first author demonstrated that dysbiosis of the maternal gut microbiome during pregnancy alters infant microbiota and immunity.

Previous hypothesis suggest that colonization of the sterile fetal gut occurs at delivery however the validity of this hypothesis has been challenged by recent findings of low abundance bacteria in fetal membranes, amniotic fluids and placenta. To establish the link between maternal gut microbiome and infant intestinal microbiota and immunity, Nyangahu et al 2018 administered oral vancomycin, which has low bioavailability, to BALB/c mice during gestation, nursing or both and studied its effect on their pups.

Following sequencing of the V6 region of the 16S rRNA gene, the section of DNA found in all bacteria but absent in eukaryotic cells, from intracolonic fecal pellets obtained 14 days after delivery, antibiotic-treated dams (mother mice) and their offspring showed decreased  $\alpha$ -diversity of microbial communities. Conversely, Principal coordinate analysis (PCoA) of  $\beta$ -diversity showed unique clustering among vancomycin-treated dams compared to controls (Mc) but association between dams treated postpartum during nursing (Mn) and those that were treated during gestation and nursing (Mgn). Generally, in microbial diversity, alpha and beta

Following sequencing of the V6 region of the 16S rRNA gene, the section of DNA found in all bacteria but absent in eukaryotic cells, from intracolonic fecal pellets obtained 14 days after delivery, antibiotic-treated dams (mother mice) and their offspring showed decreased  $\alpha$ -diversity of microbial communities. Conversely, Principal coordinate analysis (PCoA) of  $\beta$ -diversity showed unique clustering among vancomycin-treated dams compared to controls (Mc) but association between dams treated postpartum during nursing (Mn) and those that were treated during gestation and nursing (Mgn). Generally, in microbial diversity, alpha and beta diversities are used to describe the diversity of microbial populations within and between samples. Similarly, pups born to antibiotic-treated dams showed distinct microbial communities, dependent on the timing of maternal exposure to vancomycin, after PCoA of  $\beta$ -diversity therefore providing evidence that disruption of maternal gut microbiome also alters offspring intestinal microbiota.

Furthermore, after ruling out oral vancomycin treatment as potential confounding factor, the authors sought to determine whether maternal gut microbiota impacts vaginal and breastmilk microbiota. However, the authors were largely limited by a small sample size and the inability to sample at different time points postpartum to establish differences in vaginal microbiota between intervention and control groups. In addition, an important caveat is the technical challenge associated with harvesting breastmilk from nursing dams. To work around this problem the authors sampled the pup stomach contents shortly after feeding as a proxy for the murine breast milk to show the difference between intervention and control groups.

Moreover, the impact of maternal gut microbiota on infant adaptive immunity was investigated between intervention group and controls. Pups born to vancomycin treated dams showed increased total cell counts in the spleen, numbers of CD4+ T cells, numbers of 19+B220+ cells, FO cell numbers, marginal zone (MZ) B cell compared to control groups. Surprisingly, the pups from the intervention group showed increased total IgG and IgM antibodies even when serum lipocalin-2 concentration, a marker of gut inflammation, were not significantly altered in all groups. This supports the hypothesis that changes in immunity were due to gut microbiota but not systemic inflammation.

Taken together, Nyangahu et al 2018 demonstrated that disruption of maternal gut microbiome is associated with infant microbiota and immunity which add up to growing knowledge that modifying these microbial communities in interventions may improve infant health. However, by extension, further studies may investigate the functional profile of the identified microbial population and implementation in human populations.

To read the entire paper click [here](#)

Nyangahu, D.D., Lennard, K.S., Brown, B.P., Darby, M.G., Wendoh, J.M., Havyarimana, E., Smith, P., Butcher, J., Stintzi, A., Mulder, N. and Horsnell, W., 2018. Disruption of maternal gut microbiota during gestation alters offspring microbiota and immunity. *Microbiome*, 6(1), p.124.



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 discipline-specific 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](mailto:structuralbio@asbcb.org))

Metagenomics group ([metagenomics@asbcb.org](mailto:metagenomics@asbcb.org))

Pathogens group ([pathogen@asbcb.org](mailto:pathogen@asbcb.org))

Population genomics ([popgen@asbcb.org](mailto:popgen@asbcb.org))

System administration ([sysadmin@asbcb.org](mailto:sysadmin@asbcb.org))

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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)

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

\*Editorial Team

\*Individuals to aid in translating the newsletter to French and Portuguese

\*Layout and Design – we are looking for individual who wish to exercise their creativity in improving the look at feel of the magazine

\*Articles – contributions related to any of the themes outlined in the magazine.

Please submit all contributions to  
[contact@asbcb.org](mailto:contact@asbcb.org)

## ASBCB Governing Council

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Alia Benkahla  
Lab of Bioinformatics,  
BioMathematics and  
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Population Sciences,  
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University of Cambridge



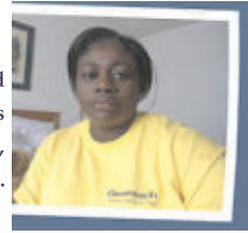
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University of Cape Town



Alan Christoffels  
South African National  
Bioinformatics Institute,  
University of the  
Western Cape



## 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.