



Foreword



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It has been a little while since the last H3ABioNet newsletter as the central team was on a Christmas break and since then we have been working hard on reports, documents, templates and course organization! A lot has been achieved in this period, in particular in training. Five H3ABioNet interns have been selected, some interns are already in place at their host institutes. I believe the interns will benefit enormously as they learn from experts at other nodes or foreign institutes. We also ran a successful Bioinformatics Degree Development Workshop in Botswana, with the main outcome being the establishment of an African Bioinformatics Education Committee. The biggest task has been the organization of the 5-week postgraduate training course which commenced at Covenant University in Nigeria on the 21st April. I also want to congratulate some of the nodes who are doing excellent work with their own local training workshops, such as the Egyptian and Noguchi Memorial Institute for Medical Research Nodes.

Apart from the training activities, the University of Cape Town CBIO team has been busy with: setting up the node assessment data sets and standard operating procedures (SOPs); following up on equipment purchases and support; and improving the H3ABioNet website. An interim Scientific Advisory Board (SAB) meeting was held by conference call in early April and the feedback was positive and very useful. Next on the agenda is to work on the National Institute of Health (NIH) 2nd annual report and the 4th H3Africa Consortium Meeting, let's use these opportunities to showcase what we have achieved in the last 12 months.

Prof. Nicky Mulder.



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• **Education and Training**

Since the H3ABioNet general assembly in October 2013, the Education and Training Working Group (E&TWG) had been working assiduously on H3ABioNet's year 2 training agenda. Three major achievements accomplished during this reporting period are described below:

1) A Bioinformatics Curriculum Development Workshop was held at the University of Botswana (<http://www.h3abionet.org/training-and-education/h3abionet-courses/18-h3abionet-courses/h3abionet-courses-past/115-h3abionet-bioinformatics-curriculum-development-workshop>). There were 24 attendees from 17 institutions from 12 countries: Botswana, South Africa, Nigeria, Kenya, Tunisia, Zimbabwe, Ghana, Uganda, Tanzania, Sudan, Malawi and Switzerland. An MSC curriculum was drafted during this meeting and was then forwarded to the E&TWG curriculum development taskforce for content development. In addition, an African Bioinformatics Education Committee was formed for the following responsibilities:

- Provide general support in designing and reviewing bioinformatics degrees
- Update the H3ABioNet website with teaching and course material
- Organise a train-the-trainer program
- Monitor quality of courses and assessment of the relevance of projects
- Facilitate collaborations between nodes and institutes
- Link to other bioinformatics education initiatives
- Create a tracking mechanism to assess factors that enable or hinder successful acceptance of bioinformatics degree programmes in academic institutes in Africa.

2) A Postgraduate Bioinformatics Workshop commenced on the 21st of April 2014 at Covenant University Bioinformatics Research (CUBRe) Unit, Ota, Nigeria (<http://www.h3abionet.org/training-and-education/h3abionet-courses/17-h3abionet-courses/h3abionet-courses-upcoming/113-h3abionet-postgraduate-bioinformatics-workshop-21st-april-26th-may-2014>). This workshop is aimed at strengthening bioinformatics capacity within different H3ABioNet nodes and H3Africa groups by developing a core set of skills amongst postgraduate students. The workshop will provide students with practical training in a variety of bioinformatics topics to complement their ongoing research and education. The workshop will run for six days a week over five weeks and will cover modules which include:

- Introduction to Linux
- Python programming
- Introduction to bioinformatics resources
- Biostatistics and R
- Database creation and data mining
Bioinformatics workflows
- Introduction to next generation sequencing (NGS) tools and variant calling

3) Applications for the Data Management Workshop which is scheduled to take place immediately after the upcoming 4th H3Africa Consortium Meeting in Cape Town are being processed.



- Infrastructure



The infrastructure working group members have been involved in three task forces working on various aspects of the deliverables for the ISWG:

1) NetMap Task Force

The NetMap project aims to measure bandwidth and map network connectivity between the nodes of H3ABioNet, as well as to other locations that might be relevant when considering transfers of genomic data across the Internet. To paint a clearer picture of the current bandwidth situation, and measure how this changes over time, a set of Python scripts have been developed that run these tests in an automated fashion, submitting the results to a central location for later analysis using the Amazon SQS message queuing system. Currently the tests performed are the two common network tools iperf and traceroute, which provide details on latency, path and actual bandwidth between locations. A trial was performed last year which prompted the design of a client which can be run unsupervised to gain data more regularly. This new client is being installed and tested for any potential bugs between Central, Wits, SANBI, IPT and UVRI before being rolled out to all nodes across the network.

2) Systems Administration Task Force

The systems administration task force has been preparing documentation on how to install Ubuntu and Scientific Linux on servers from scratch in order to create a manual for developmental Nodes to help them administer their servers. This documentation is currently under review by non-systems administrators in terms of its reader friendliness and clarity and should be finalized soon for dissemination.

3) Data Management Task Force

The data management task force has been busy installing and testing various methods for transferring data such as Globus online and have been investigating other utilities such as Grid ftp for the transfer of data. The specifications, architecture and service level agreements for creating an archiving solution for the H3Africa projects are also being worked on with the H3Africa data submission and sharing/access policy to be presented at the upcoming H3ABioNet data management workshop.

In the coming weeks the ISWG will be reviewing their milestones with a view to providing an annual working group report for the NIH.



- **Research**



The research working group has been in discussions to determine nodes which could collaborate based on complementary expertise and data. To this effect, the RSWG developed a template and is in the final stages of signing off on this template. The template aims to capture for each Node the expertise they have and any potential datasets they have that would require specialised bioinformatics analyses to be undertaken in a collaborative framework for the analyses of these data. This will also help the H3ABioNet understand the expertise present within the network and implement strategies to strengthen specific domains in the network which are lacking.

The research working group has been focussing on the various research and collaborative projects which are occurring across the Network with the aim to obtain milestones and implement a method of reporting for these collaborative projects. Templates for the different milestones will be created and presented to the collaborative projects which will be similar to the framework of the NIH reports and the progress and outcomes of these collaborative projects can be monitored and reported on. A summary of collaborative projects is provided in the table below:

Collaborative Project Title	Nodes Involved	People Involved
Design of Phenotype Database and Surveillance Programme for H3Africa projects	IPT / MUHAS / Malawi	Kais Ghedira, Amel Ghouila, Alia Benkhala (Co-PI), Sharon Cox (Co-PI) Evarist Masaki, Freddie Mbuya, Bruno Mmbando, Raphael Sangeda Julie Makani (Co-PI), Dean Everett
Design and Implementation of a Sickle Cell Disease (SCD) database and Analysis modules	IPT / MUHAS	Kais Ghedira, Amel Ghouila, Alia Benkhala (Co-PI), Sharon Cox (Co-PI) Evarist Masaki, Freddie Mbuya, Bruno Mmbando, Raphael Sangeda Julie Makani (co-PI), Dean Everett
Immunoinformatics and nanoantibody binders: Sequence and structural analysis of VHH sequences	RUBi / IPT	Ozlem Tastan Bishop (Co-PI), Balkiss Bouhaouala-Zahar (Co-PI), Ayoub Ksouri, Dr Rahma Ben Abderrazek, Alia Benkahla, . Kais Ghedira
Human metabolic network modelling: contextualization of H3Africa projects high throughput data from pathological and drug-treated states and simulation of these states	CU / CPGR	Ezekiel Adebisi (Co-PI) and Judit Kumuthini (Co-PI)



User Support

- **User Support**

The User Support Working (USWG) continued its efforts to establish the H3ABioNet helpdesk as a world class resource to service partner nodes and other H3Africa projects. The helpdesk is fully operational and is being utilized by various members across Africa. We are excited to announce that work is now underway to expand the scope of services offered by the H3ABioNet helpdesk. A marketing plan to advertise the helpdesk to all H3Africa projects is now in place with pamphlets being designed for the 4th H3Africa Consortium meeting. More importantly, additional experts have been recruited to assist in managing the helpdesk. This helpdesk will provide technical support and information in keys areas such as: analysis of genotyping arrays and NGS data; software development and programming; system administration; website and mailing lists and general project administration. A complete list of areas that the helpdesk will support is available at <http://h3abionet.org/support/areas-of-expertise>

To ensure smooth running of the USWG we updated its terms of references (TORs). In addition, we revised the USWG deliverables after establishing synergies with other H3ABioNet working group activities. These deliverables include: identifying SOPs created by other groups and making these available via the H3ABioNet website; developing workflows for data management and reporting; continually searching for free webinar series and making these available via the H3ABioNet site; and lastly, identifying 'ambassadors' and clarifying their roles and responsibilities. The ambassador scheme was recommended by the SAB and this scheme involves the pairing of various H3ABioNet members to specific H3Africa projects. We envisage that such pairing of skills and interests will further strengthen the bioinformatics capacity of various H3Africa projects.

Dr. Judit Kumuthini.

Dr. Jonathan Kayondo.



- **Node Accreditation**

Node Accreditation

Expanding the scope of the assessment exercises

During the H3ABioNet General Assembly in October 2013, the SAB recommended that the Node Assessment Task Force (NATF) consider expanding its range of assessment exercises to include the analysis of data types other than human genome sequences or genotyping arrays. This recommendation was driven by two main considerations: one being that many nodes were unlikely to be called upon to analyze such datasets, the other being that research projects in the countries where the nodes are located may have needs for other skill sets.

An NATF working group met during the 2013 annual general meeting (AGM) and identified a number of areas of expertise that nodes already had acquired or were eager to develop, which would also be of potential interest to H3Africa research projects. Another consideration was the availability within the consortium of high-level expertise, of SOPs and of test datasets that could be used to develop new exercises. The areas chosen for further development are the processing of 16S rDNA variable sequences for the analysis of bacterial community structures; the assembly and annotation of bacterial or archaeal genomes; and the analysis of RNA-seq data to obtain quantitative estimates of gene expression levels.

The CBIO group at UCT and the HPCBio group at the University of Illinois (UoI) have been working together on the first of these exercises, the analysis of 16S rDNA sequences. An internal SOP was developed by Gerrit Botha from the CBIO group, and will be fleshed out and refined for the exercise. Kiran Donthu from the HPCBio group has collected and tested datasets from the intestinal microbiomes of domestic animals, provided by Prof. Kelly Swanson at the UoI, which document communities complex enough to be interesting while being simple enough not to pose major computational challenges. The two groups are analyzing these datasets independently, to ensure that the methods described in the SOP are robust and reproducible. We fully expect that a full accreditation exercise, with sample and test data, will be ready by mid-2014. It should be noted that several H3Africa projects are planning to generate 16S rDNA sequence data, and therefore that these skills will be needed. We also hope that a module to teach them will be added to the courses organized by the Education and Training work group.

Dr. Victor Jongeneel.



- **Announcements**

Announcements

- The Egyptian node organized a successful workshop entitled ‘Introduction to Bioinformatics from 8-10 April at the Faculty of Agriculture, Minia University. Participants are shown in the picture below.



- H3ABioNet internships were awarded to five members. One of the interns, Lerato Magosi from the Botswana Harvard AIDS Institute Partnership (BHP), has since joined Prof. Scott Hazelhurst at the University of the Witwatersrand to learn about genome wide association studies (GWAS).
- The NMIMR Node in Ghana hosted a successful “Introduction to Bioinformatics” workshop in Ghana which also had participants from the H3Africa projects in attendance.
- The South African postgraduate course, which the H3ABioNet postgraduate workshop is modelled on, was successfully run from the 10th of February to the 28th of March.
- A successful two-day curriculum development workshop was held in Botswana from 11-12 March, the outcomes have been highlighted in the Education and training section of the bulletin.
- The SAB had its first meeting and the minutes have been circulated to the General Assembly mailing list.
- The General Assembly had a conference call on the 17th of April, 2014.
- The Wits bioinformatics group hosted a GWAS workshop and participants from Sudan, Malawi, Botswana, Tanzania and South Africa were awarded H3ABioNet travel fellowships to attend.



- Important Dates

Important Dates

- 9th May: Poster abstract submission deadline for the 4th H3Africa meeting
- 12th May: Individual projects reporting to the NIH return their progress updates
- 14th May: NIH forms for year 3 due for all the Nodes
- 18th May: Working Group Chairs to submit annual working group report for the NIH annual report
- 20th May: Year 2 progress report on milestones due to the NIH
- 30 May – 2 June: 4th H3Africa Consortium Meeting <http://h3africa.org/9-news/140-registration-fourth-consortium-meeting>
- 30th May: H3A Cardiovascular meeting <http://www.h3africa.org/9-news/125-fourth-h3africa-consortium-meeting>
- 2nd June: H3A Genome Analysis Symposium <http://www.h3africa.org/9-news/125-fourth-h3africa-consortium-meeting>
- 3rd – 6th June: H3ABioNet Data management workshop <http://www.h3abionet.org/training-and-education/h3abionet-courses/17-h3abionet-courses/h3abionet-courses-upcoming/130-h3abionet-data-management-workshop-june-3-6-2014>



- Upcoming H3ABioNet Working group meetings

H3ABioNet Working Group Meeting Schedule until July 2014

Working Group	Time	Date and Month	
E&TWG	UTC = 11am	29	April
E&TWG	UTC = 11am	13	May
E&TWG	UTC = 11am	27	May
E&TWG	UTC = 11am	10	June
E&TWG	UTC = 11am	24	June
E&TWG	UTC = 11am	8	July
E&TWG	UTC = 11am	22	July
USWG	UTC = 9am	11	April
USWG	UTC = 9am	9	May
USWG	UTC = 9am	13	June
USWG	UTC = 9am	11	July
RSWG	UTC = 9am	2	May
RSWG	UTC = 9am	20	June
RSWG	UTC = 9am	18	July
RSWG	UTC = 9am	15	August
ISWG	UTC = 1pm	24	April
ISWG	UTC = 1pm	16	May
ISWG	UTC = 1pm	6	June
ISWG	UTC = 1pm	4	July
NAWG	UTC = 1pm	25	April
NAWG	UTC = 1pm	23	May
NAWG	UTC = 1pm	25	July

Summary of H3ABioNet upcoming working group meetings

E&T WG	Education and training working group
USWG	User support working group
RSWG	Research working group
ISWG	Infrastructure working group
NAWG	Node accreditation working group

Acronyms used for the various H3ABioNet working groups

UTC Time Offset	Time Zone Name	Regions / Countries in the Timezone offset
-5 hours (-6 hours)	CDT	Chicago, USA (2nd November, 2014)
-4 hours (-5 hours)	EDT	Boston, USA (2nd November, 2014)
0 hours	GMT	Burkina Faso, Ghana, Mali, Morocco, Senegal
+1 hour	WAT	Cameroon, Chad, Gabon, Namibia, Nigeria, Niger, Tunisia
+2 hours	CAT	Botswana, Egypt, Malawi, South Africa, Sudan, Zambia
+3 hours	EAT	Ethiopia, Kenya, Tanzania, Uganda

Time zone conversion table to UTC for all of H3ABioNet working group meetings