Training Workshop on Viral Pathogen Genome Sequencing and Bioinformatics Analysis

International Livestock Research Institute (ILRI)
Nairobi, Kenya

6th May – 17th May 2024

Day 1: 6th May 2024 – Monday - VA2		
SCHEDULE	**PROGRAMME**	**SPEAKERS**
0830 – 0915	Arrival and Registration	All
0915 - 0930	Training Program overview and House Keeping	Dr. Benard Mware, Consultant, Genomics Platform AHH-ILRI
0930 – 0940	Welcoming Remarks and introductions	Dr. Sam Oyola Senior Scientist - Molecular Biologist – Genomics, ILRI
0940 – 0955	Welcoming Remarks: ILRI	Dr. Siboniso Moyo DDG Research and Development - Biosciences
0955 – 1005	Opening Remarks: ASLM	Dr. Aquillah M. Kanzi Program Manager, African Society for Laboratory Medicine (ASLM)
1005 – 1015	Opening Remarks: Africa CDC	Dr. Gerald Mboowa Implementation Science Expert for Bioinformatics, Africa CDC.
1015 – 1030	Opening Remarks: Kenya MoH	DG Health or Rep MOH
1030 – 1040	Group photo	
1040 – 1100	Coffee Break	
1100 – 1115	Training Overview and expectations	Dr. Benard Mware, Consultant, Genomics Platform AHH-ILRI
1115 – 1215	**Presentation 1** Genomic Epidemiology	Dr. Sam Oyola
1230 – 1330	Lunch Break	

1330 – 1430	**Presentation 2** Genomic Technology	Dr. Sam Oyola
1430 – 1500	**Presentation 3** Wastewater Surveillance for Pandemic Preparedness	Dr. Benard Mware, Consultant, Genomics Platform AHH-ILRI
1500 – 1600	**Presentation 4** Biosafety induction and Biorisk	Priscilla Kinyanjui
1600 – 1620	**Presentation 5** Sample Management	Regina Njeru
1620 – 1630	Coffee Break	
Day 2: 7ᵗʰ May 2024 – Tuesday - VA2 & Lab		
0830 – 0930	**Presentation 6** RNA extraction and Real Time PCR	Reuben Mwangi
0930 – 1030	ILRI Biosciences Facility Lab Tour	Regina Njeru
1030 – 1040	Coffee Break	
1040 – 1200	**Practical exercise 1:** RNA extraction	Reuben Mwangi
1200 – 1230	**Practical exercise 2:** Master mix preparation and PCR setting	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1230 – 1330	Lunch Break	
1330 – 1430	**Practical exercise 3:** cDNA synthesis set up	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1430 – 1600	**Practical exercise 4:** Template Amplicon preparation (Tilling)	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1600 – 1630	**Discussions of learning points of day 1 (in groups)**	Edward Kiritu
1600 – 1630	Coffee Break	
Day 3: 8ᵗʰ May 2024 – Wednesday - VA2 & Lab		
0830 – 0845	Review of Day 2, outline of Day 3 and questions	Reuben Mwangi
0845– 0915	**Presentation 7:** Library prep (Illumina Workflow)	Dr. Eunice Machuka, AHH-ILRI
0915 – 0945	Coffee Break	

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0945 – 1100	**Practical exercise 5:** Library prep (Illumina Workflow)	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1100 – 1300	**Practical exercise 6:** Library prep (Illumina Workflow) continues	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1300 – 1400	Lunch Break	
1400 – 1530	**Practical exercise 7:** Library prep (Illumina Workflow) continues	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1530 – 1600	**Presentation 8:** Quality Control in all workflows	Shebbar Osiany
1600 – 1630	Coffee Break	
Day 4: 9th May 2024 – Thursday - VA2 & Lab		
0830 – 0900	**Discussions of learning points of day 3 (in groups)**	Edward Kiritu
0900 – 0930	**Presentation 9:** Oxford Nanopore Technology (ONT) Workflow	Collins Muli
0930 – 1030	Coffee Break	
0930 – 1100	**Practical exercise 8:** Library prep (ONT Workflow)	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1100 – 1300	**Practical exercise 9:** Library prep (ONT Workflow) Continue	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1300 – 1400	Lunch Break	
1400 – 1630	**Practical exercise 10:** Library prep (ONT Workflow) Continue	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1630 – 1700	**Practical exercise 11:** Loading on Illumina Sequencer	Shebbar Osiany
Day 5: 10th May 2024 – Friday - VA2 & Lab		
0830 – 0900	Review of Day 2, outline of Day 3 and questions	Collins Muli
0900 – 0930	**Practical exercise 12:** Library Prep – Illumina (NEBNext workflow)	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
0930 – 1030	**Practical exercise 13:** Library Prep – Illumina (NEBNext workflow) continues	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli

1030 – 1100	Coffee Break	
1100 – 1300	**Practical exercise 13:** Library Prep – Illumina (NEBNext workflow) continues	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1300 – 1400	Lunch break	
1400 - 1530	**Practical exercise 14:** Loading ONT MinION and Illumina	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1530 - 1600	Coffee break	
Day 6: 13th May 2024 – Monday – Ndama Lounge - Bioinformatics Analysis		
0830 – 1030	**Presentation 10:** Introduction to Unix command line	John Juma
1030 – 1100	Coffee break	
1100 - 1300	**Practical session 1:** Introduction to Unix command line	John Juma, Kennedy Mwangi, Benard Mware, Eunice Machuka, **Gilbert Kibet**
1300 – 1400	Lunch Break	
1400 – 1500	**Practical session 3: Illumina Data** Bioinformatics Project set-up; Data retrieval and Reference Genome Preparation	John Juma, Kennedy Mwangi, Benard Mware, Eunice Machuka, **Gilbert Kibet**
1500 – 1600	**Practical session 3: Illumina Data** Review of Illumina & ONT sequence data	John Juma, Kennedy Mwangi, Benard Mware, Eunice Machuka, Gilbert Kibet
1600 – 1630	Coffee Break	
Day 7: 14th May 2024 - Tuesday – Ndama Lounge		
0830 – 0930	**Presentation 11:** Review of Data QC (FASTQC & FASTP Report)	Kennedy Mwangi
0930 – 1030	**Practical session 4: Illumina Data** Sequence Decontamination: Host Reads Removal	John Juma, Kennedy Mwangi, Benard Mware, Eunice Machuka, **Gilbert Kibet**
1030 – 1100	Coffee Break	

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1100 – 1230	**Practical exercise 5: Illumina Data** Reference Genome Indexing and Reads Alignment	John Juma, Kennedy Mwangi, Benard Mware, Eunice Machuka, **Gilbert Kibet**
1230 – 1330	Lunch Break	
1330 – 1600	**Practical session 6: Illumina Data** Post Read Alignment Analysis: Primmer Trimming; Genome Coverage Analysis; Variant Calling.	John Juma, Kennedy Mwangi, Gilbert Kibet
1600 – 1630	**Questions and Exercises:**	John Juma, Kennedy Mwangi, Gilbert Kibet
1600 – 1630	Coffee Break	
Day 8: 15ᵗʰ May 2024 – Wednesday – Ndama Lounge		
0830 – 0930	**Presentation 12:** Review of Variant Calling File Format	Gilbert Kibet
0930 – 1100	**Practical Session 7:** Variant Annotation and Filtering	John Juma, Kennedy Mwangi, Gilbert Kibet
1100 – 1130	Coffee Break	
1130 –1230	**Practical Session 8:** Consensus Genome Assembly	John Juma, **Kennedy Mwangi**, Gilbert Kibet
1230 – 1330	Lunch Break	
1330 – 1415	**Practical Session 9:** Consensus Genome Phylogenetic Classifications: Pangolin, Nextclade	Gilbert Kibet
1415 – 1600	**Presentation 13:** Phylogenomics Analysis for Epidemiological Surveillance	John Juma
1600 – 1630	Coffee Break	
Day 9: 16ᵗʰ May 2024 – Thursday - Ndama Lounge		
0830 – 1030	**Practical Session 10:** Using Galaxy pipelines to analyse ONT data	**John Juma**, Gilbert Kibet, Kennedy Mwangi
1030 – 1100	Coffee Break	
1100 – 1300	**Practical Session 11:** Using Galaxy pipelines to analyse ONT data Continue	**John Juma**, Gilbert Kibet, Benard Mware, Eunice Machuka, Kennedy Mwangi.

1300 – 1400	Lunch Break	
1400 – 1630	**Practical Session 12:** Using Galaxy pipelines to analyse ONT data Continue	**John Juma**, Kennedy Mwangi, Benard Mware, Eunice Machuka, Gilbert Kibet
Day 10: 17th May 2024 – Friday - VA		
0830 – 0930	**Presentation 14:** Metadata management and submission of data to GISAID and NCBI	Gilbert Kibet
0930 – 1030	Summary Discussion and questions of Practical exercises	John Juma, Kennedy Mwangi, Gilbert Kibet
1030 – 1100	Coffee Break	
1100 – 1200	**Presentation 15:** Presenting Data to Inform Policy	Dr. Sam Oyola
1200 –1300	**Issuance of Certificates and Closing Remarks**	Dr. Sam Oyola
1300 – 1400	Lunch Break	
1400 – 1630	Free afternoon and departure	