

## Training Workshop on Pathogen Genomic Surveillance

**International Livestock Research Institute (ILRI)**  
**Nairobi, Kenya**

6<sup>th</sup> May – 17<sup>th</sup> May 2024

Day 1: 6 <sup>th</sup> May 2024 - Monday		
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	<b>Presentation 1</b> Genomic Epidemiology	Dr. Sam Oyola
1230 – 1330	Lunch Break	

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

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

1030 - 1100	Coffee Break	
1100 - 1300	<b>Practical exercise 13:</b> Library Prep - Illumina (NEBNext workflow) continues	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1300 - 1400	Lunch break	
1400 - 1530	<b>Practical exercise 14:</b> Loading ONT MinION and Illumina	Paul Dobi, Shebbar Osiany, Edward Kiritu & Collins Muli
1530 - 1600	Coffee break	
Day 6: 13 <sup>th</sup> May 2024 - Monday - Bioinformatics Analysis		
0830 - 1030	<b>Presentation 10:</b> Introduction to Unix command line	John Juma
1030 - 1100	Coffee break	
1100 - 1130	<b>Practical session 1:</b> Review of Illumina & ONT sequence data	Gilbert Kibet
1130 - 1300	<b>Practical session 2: Illumina Data</b> Bioinformatics Project set-up; Data retrieval and Reference Genome Preparation	John Juma, Kennedy Mwangi, Benard Mware, Eunice Machuka, <b>Gilbert Kibet</b>
1300 - 1400	Lunch Break	
1400 - 1500	<b>Practical session 3: Illumina Data</b> Sequences Data Quality Controls	John Juma, <b>Kennedy Mwangi</b> , Gilbert Kibet
1500 - 1600	<b>Questions and Exercises:</b> Practicals and Questions	John Juma, Kennedy Mwangi, Benard Mware, Eunice Machuka, Gilbert Kibet
1600 - 1630	Coffee Break	
Day 7: 14 <sup>th</sup> May 2024 - Tuesday		
0830 - 0930	<b>Presentation 11:</b> Review of Data QC (FASTQC & FASTP Report)	Kennedy Mwangi
0930 - 1030	<b>Practical session 4: Illumina Data</b> Sequence Decontamination: Host Reads Removal	John Juma, Kennedy Mwangi, Benard Mware, Eunice Machuka, Gilbert Kibet

1030 - 1100	Coffee Break	
1100 - 1230	<b>Practical exercise 5: Illumina Data</b> Reference Genome Indexing and Reads Alignment	John Juma, Kennedy Mwangi, Benard Mware, Eunice Machuka, <b>Gilbert Kibet</b>
1230 - 1330	Lunch Break	
1330 - 1600	<b>Practical session 6: Illumina Data</b> Post Read Alignment Analysis: Primmer Trimming; Genome Coverage Analysis; Variant Calling.	John Juma, Kennedy Mwangi, Gilbert Kibet
1600 - 1630	<b>Questions and Exercises:</b>	John Juma, Kennedy Mwangi, Gilbert Kibet
1600 - 1630	Coffee Break	
Day 8: 15 <sup>th</sup> May 2024 - Wednesday		
0830 - 0930	<b>Presentation 12:</b> Review of Variant Calling File Format	Gilbert Kibet
0930 - 1100	<b>Practical Session 7:</b> Variant Annotation and Filtering	John Juma, Kennedy Mwangi, <b>Gilbert Kibet</b>
1100 - 1130	Coffee Break	
1130 -1230	<b>Practical Session 8:</b> Consensus Genome Assembly	John Juma, <b>Kennedy Mwangi</b> , Gilbert Kibet
1300 - 1400	Lunch Break	
1400 - 1500	<b>Practical Session 9:</b> Consensus Genome Phylogenetic Classifications: Pangolin, Nextclade	Gilbert Kibet
1500 - 1600	<b>Presentation 13:</b> Phylogenomics Analysis for Epidemiological Surveillance	John Juma
1600 - 1630	Coffee Break	
Day 9: 16 <sup>th</sup> May 2024 - Thursday		
0830 - 1030	<b>Practical Session 10:</b> Using Galaxy pipelines to analyse ONT data	<b>John Juma</b> , Gilbert Kibet, Kennedy Mwangi
1030 - 1100	Coffee Break	

1100 - 1300	<b>Practical Session 11:</b> Using Galaxy pipelines to analyse ONT data Continue	<b>John Juma</b> , Gilbert Kibet, Benard Mware, Eunice Machuka, Kennedy Mwangi.
1300 - 1400	Lunch Break	
1400 - 1630	<b>Practical Session 12:</b> Using Galaxy pipelines to analyse ONT data Continue	<b>John Juma</b> , Kennedy Mwangi, Benard Mware, Eunice Machuka, Gilbert Kibet
<b>Day 10: 17<sup>th</sup> May 2024 - Friday</b>		
0830 - 0930	<b>Presentation 14:</b> 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	<b>Presentation 15:</b> Presenting Data to Inform Policy	Dr. Sam Oyola
1200 -1300	<b>Issuance of Certificates and Closing Remarks</b>	Dr. Sam Oyola
1300 - 1400	Lunch Break	
1400 - 1630	Free afternoon and departure	