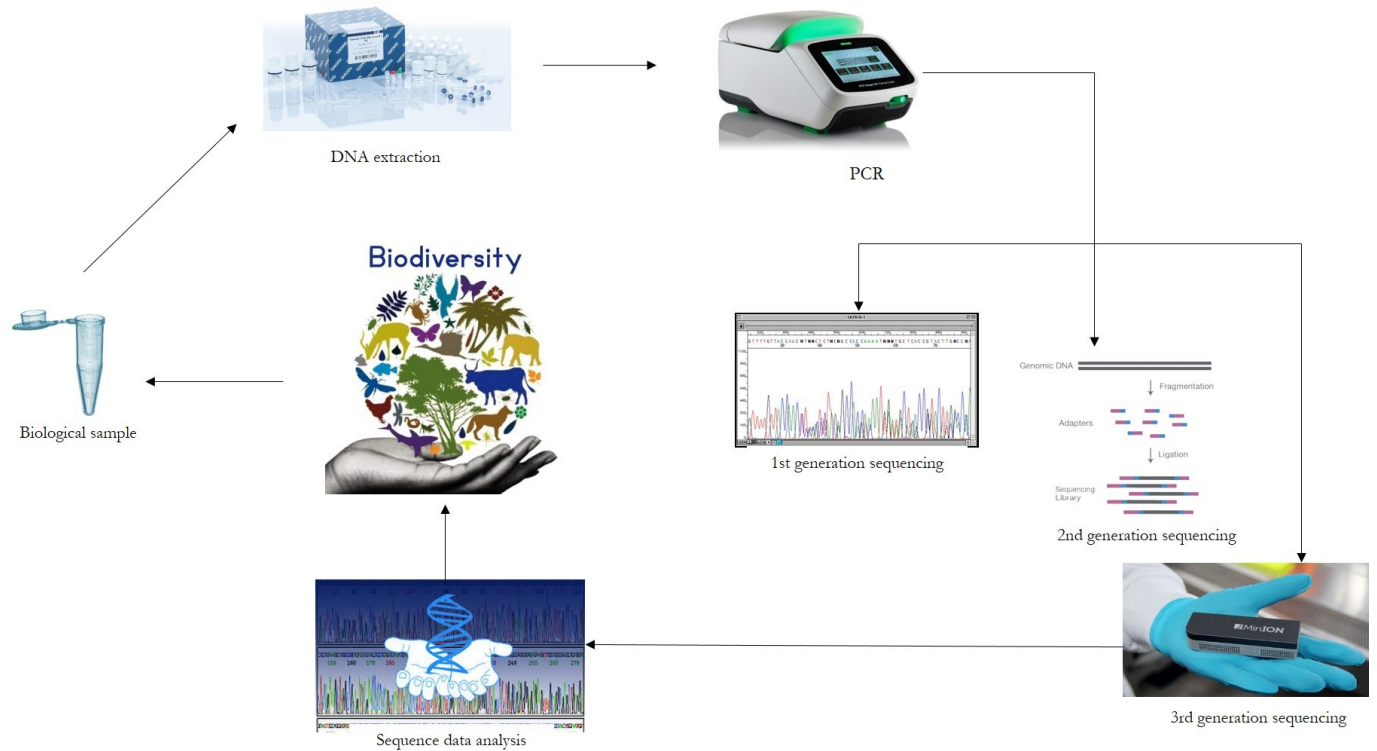


BIOMONITORING OF SPECIES USING DNA TECHNOLOGY



3rd and 7th June 2026

Course contacts: mwauran@gmail.com & mwangiwangui25@gmail.com , 2kipscham@gmail.com



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Brief course introduction:

Identification of specimen to species level is key in biodiversity studies, biomonitoring and conservation. Morphological identification has its limitations including when only parts of an organism are available. The use of DNA techniques has become crucial in species identification. Upcoming sequencing techniques offer rapid and cost-effective sequencing solutions where hundreds of specimens can be sequenced at a go with minimal destruction to voucher specimen. These voucher specimens can then proceed to natural history collections to be used as reference collections for taxonomic work.

Aim of the course:

Participants will be trained on non-destructive way of DNA extraction and downstream analysis using upcoming sequencing techniques.

The technique is:

- Economical – multiple specimens sequenced at once.
- Efficient - Extraction of DNA process so simplified
- Data generated can form reference database for identification.
- The technique also reduces significantly the time spent in the field and can be replicated.
- The data can be utilized in biomonitoring especially where only parts of organisms are available.
- The DNA technology can be used to monitor biodiversity in different disciplines. E.g. pest control in agriculture, forest health etc.

Course Outline:

Day 1	Day 2	Day 3	Day 4	Day 5
<ul style="list-style-type: none"> ➤ Opening Ceremony (Louis Leakey Auditorium) ➤ Sample collection ➤ Sample sorting & Imaging 	<ul style="list-style-type: none"> ➤ DNA Quick extraction & dilution ➤ COI amplification ➤ PCR electrophoresis 	<ul style="list-style-type: none"> ➤ Pooling and cleaning ➤ End prep-ligation ➤ DNA library loading 	<ul style="list-style-type: none"> ➤ Exploring sequence data ➤ matching sequence data to plate wells, handling fasta files ➤ Quality check, ➤ Editing ➤ Analysis 	<ul style="list-style-type: none"> ➤ Sequence data publishing-Available platforms, meta data requirements ➤ Training survey ➤ Awarding of certificates & closing

Background reading & Reference: <https://dx.doi.org/10.17504/protocols.io.rm7vzy974lx1/v1>

What to bring:

- Lab coats
- Laptops if available



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Students will:

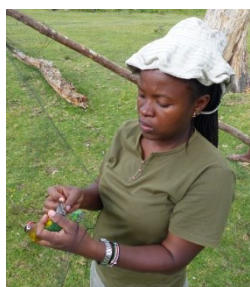
1. Be expected to fill a simple training survey form
2. Do a brief training report at the end

FACILITATOR PROFILES:



Dr Ann Mwaura

Ann is Senior Scientist and the Head of the Molecular Genetics Section, CBD department at NMK. She holds a PhD degree in Genetics. Her research interests are in Biodiversity and population genetics, DNA barcoding for identification and verification, forensic science and application of sequencing technology to study populations and contribute to agriculture and conservation. She is keen in building the capacity of young upcoming scientists and trains in Molecular Biology, DNA barcoding/metabarcoding and Nanopore sequencing. She has extensive knowledge in molecular biology and genetics.



Esther Mwangi

Esther is a Research Scientist at the Zoology Department under the Directorate of National Repository and Research, NMK. She holds an MSc. In Bioinformatics and is currently pursuing a PhD in Biotechnology. Her main research interest is in using genetics to study the relationships of different species in the wild. She is currently studying the effect of hybridization in two sister species of birds and how this interaction affects the genetic diversity of the less abundant species.



Gilbert Kosgei

Gilbert is a Research Scientist at the Ichthyology Section, Zoology Department, National Museums of Kenya. He holds MSc degree in Biology of Conservation. His main focus is in freshwater fish taxonomy and systematics. Phylogenetics come in handy to aid in solving taxonomical challenges often experienced while using traditional morphometric characters.

A brief introduction of National Museums of Kenya

NMK is a State Cooperation established by the Museums and Heritage Act. It is a registered Multidisciplinary Research Institution and a center of excellence in heritage research, conservation and management. The Directorate of National Repository and Research (DNRR) coordinate research at NMK and manage the National Scientific Reference Collections. DNRR collaborates with National and International institutions in implementing its mandate, and has a mission to collect, preserve, study,



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document and present Kenya's past and present cultural and natural heritage. The vision of DNRR is to be a center of excellence in heritage management and research for posterity. The directorate has various departments whose mandate is research and dissemination through publications, exhibitions, industrial attachments and trainings. The institution has one of the best equipped molecular biology laboratory that has capacity of running majority of molecular techniques that includes and not limited to microbiology, DNA barcoding, population genetics, wildlife forensic analysis and nanopore sequencing. The reference data generated from this laboratory analysis is utilized in various research areas across the globe.