

AIBBC WORKSHOPS 2023

Program booklet



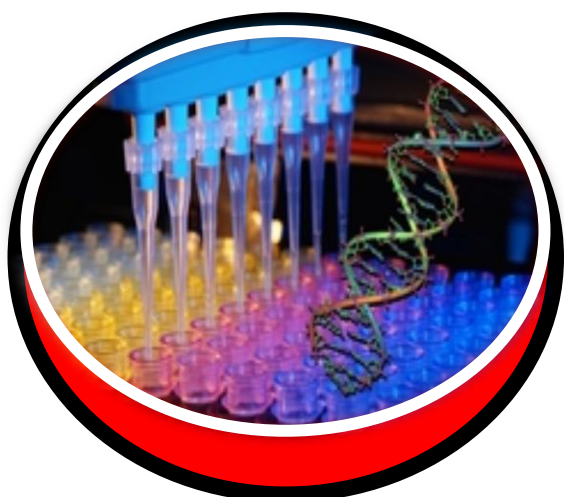
Oct. 30th – Nov. 4th 2023

**6th Africa International Biotechnology
& Biomedical Conference**
AIBBC 2023



Advancing Science & Technology for Sustainable Development in Africa

**Venue: Lake Naivasha Resort and KALRO Dairy Research Institute,
Naivasha Kenya**



www.aibbc-society.org

WELCOME

We extend to you a hearty welcome to AIBBC 2023 workshops. Our instructors and organizers have worked hard to put together a comprehensive program that is rich in scientific content. We have courses offering both lectures and hands-on practical sessions. The lectures are diverse and immersive, with contents ranging from basics to advanced topics in biomedical and biotechnology. Practical session will provide you with the opportunity to experience and engage in hands-on experimentation. Altogether, for the next three days of the workshops, we believe that you will have a wonderful experience interacting with science, making new friends, and building new capabilities in science and technology. More importantly, we hope that AIBBC 2023 will enrich your scientific growth and help you to be better prepared to serve your community in your different capacities.

Once again welcome to the AIBBC 2023 workshops and we look forward to your active participation and contributions.

Sincerely,

AIBBC ORGANIZING COMMITTEE

NAME	AFFILIATION
Prof. Collins Ouma (General Chair)	Maseno University, Kenya
Prof. J Paul Robinson (Mentor, organizer)	Purdue University, USA
Dr. Rosemary Bateta (Host Organizer)	Biotechnology Research Institute, KALRO, Kenya
Dr. Winnie Okeyo (Host Organizer)	Biotechnology Research Institute, KALRO, Kenya
Dr. Kennedy Okeyo	Purdue University/JAX, USA
Dr. Benson Nyambega	Maseno University, Kenya
Dr. Eddy Odari	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya
Dr. Stephen Ger	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya
Dr. Celestine Makobe	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya
Dr. Josiah Kuja	Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya
Dr. Lucy Ochola	Institute of Primate Research (IPR), Kenya
Ms. Dawn Maranga	Institute of Primate Research (IPR), Kenya



HITACHI
Inspire the Next

Innovating Healthcare, Embracing the Future

For a society where all can enjoy a secure, safe, healthy way of life,
Hitachi delivers digital technology and innovation
for implementing healthcare services tailored to individuals.

 **Hitachi High-Tech Corporation**
www.hitachi-hightech.com

Empowering Your Immunology Research For 20 Years

For over two decades, our scientists have focused on creating unique products for the scientific community—empowering you with antibodies and reagents to find answers for your immunology research. We are constantly innovating to ensure you have the tools needed to make legendary discoveries.

Discover how our 29,000 reagents can make a difference in your lab:

- **Fluorophore-antibody conjugates:** dyes for conventional and spectral flow cytometry
- **TotalSeq™:** reagents for multiomic applications
- **LEGENDplex™:** bead-based immunoassays for cytokine detection
- **MojoSort™:** magnetic cell separation system for cell isolation and enrichment
- **Ultra-LEAF™ & GoInVivo™ antibodies:** ideal for functional assays like blocking or stimulation assays
- **GMP recombinant proteins:** for research and *ex vivo* cell bioprocessing applications

Discover the difference at [biolegend.com/en-us/immunology](https://www.biolegend.com/en-us/immunology)

World-Class Quality | Superior Customer Support | Outstanding Value

BioLegend products are manufactured in an ISO 13485:2016-certified facility to ensure the highest quality standards. BioLegend is a registered trademark of BioLegend, Inc. All other trademarks are the property of their respective owners.

[biolegend.com](https://www.biolegend.com)

08-0116-04

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

PROGRAM AT A GLANCE (Note: Where there is a difference, please follow your course program)

Date	Time	Event	Venue
Sunday Oct 29	Latest by 8 pm	Hotel check-in	Assigned hotels
Monday Oct 30	8:00-8:30	Opening Ceremony	Lake Naivasha Resort, MAIN HALL
	8:30-12:30	WORKSHOPS	Respective rooms
	10:00-10:30	Break/Refreshment	
	10:30-12:30	WORKSHOPS	Respective rooms
	12:30-14:00	LUNCH	
	14:00-16:00	WORKSHOPS	Respective rooms
	16:00-16:30	Break/Refreshment	
	16:30-18:30	Workshops	Respective rooms
	18:30 END	Back to hotel	Respective hotels
Tuesday Oct 31	8:00-8:30	Announcements/Start of program	Respective rooms
	8:30-12:30	WORKSHOPS	Respective rooms
	10:00-10:30	Break/Refreshment	
	10:30-12:30	WORKSHOPS	Respective rooms
	12:30-14:00	LUNCH	
	14:00-16:00	WORKSHOPS	Respective rooms
	16:00-16:30	Break/refreshments	
	16:30-18:30	WORKSHOPS	Respective rooms
	18:30 END	Back to hotel	Respective hotels
Wednesday Nov 1	8:00-8:30	Announcements/Start of program	Respective rooms
	8:30-10:00	WORKSHOPS	Respective rooms
	10:00-10:30	Break/Refreshment	
	10:30-12:30	WORKSHOPS	Respective rooms
	12:30-14:00	LUNCH	
	14:00-16:00	WORKSHOPS	Respective rooms
	16:00-16:30	Break/refreshments	
	16:30-17:30	Workshops	Respective rooms
	17:30-18:30	Workshop closing ceremony (Lake N. Resort, Main Hall)	
	18:30-19:30	Stakeholders meeting (Prof. Collins Ouma)	

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

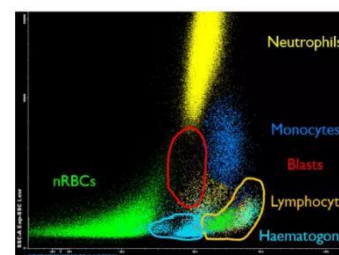
PROGRAM FOR FLOW CYTOMETRY WORKSHOP

Venue: Lake Naivasha, Resort

Objective: To train selected participants on methods of Flow Cytometry

Aims:

1. To provide an in-depth knowledge on the principles of flow cytometry and applications in health and disease
2. To learn about the impact of the technology on informatics, automation and clinical diagnostics, as well as quality control and instrumentation differences across all current commercial technologies
3. To offer an active, collaborative and hands-on experience on the most frequently performed flow cytometry assays
4. To teach skills in data analysis of flow cytometry data analysis



Instructors:

- Prof. J. Paul Robinson, SVM Professor of Cytomics and Professor of Biomedical Engineering, Purdue University, USA.
- Mr Gert Swanepoel, Senior support specialist, Beckman Coulter, South Africa.
- Dr Paul Ogongo, Postdoctoral scholar, University of California, San Francisco, USA.
- Dr Woodvine Otieno, Postdoctoral scholar, University of California, Los Angeles, USA.
- Dr Robert Krause, Research Associate, Africa Health Research Institute, Durban, South Africa.
- Dr. Lucy Ochola, Senior Scientist, Department of Infectious Diseases, Institute for Primate Research, Kenya.

Workshop Program

Date	Time	Presentations
Day 1: 30 th October, 2023	0800-0815	Introductions and housekeeping- <i>Paul Robinson & Lucy Ochola</i>
	0815-0915	Flow cytometry Journal Club <i>Lucy Ochola</i>
	0915-1015	Introduction to flow cytometry <i>Paul Robinson</i>
	1015-1045	TEA BREAK
	1045-1145	Principles of flow cytometry <i>Paul Robinson</i>
	1145-1300	Introduction to flow cytometer(s) <i>Gert Swanepoel</i>
	1300-1400	LUNCH
	1400-1700	BECKMAN EQUIPMENT- get to know the instrument, <i>Gert Swanepoel</i>
Day 2: 31 st October, 2023	0800-0830	GUEST LECTURE I- <i>Dr Paul Ogongo</i>
	0830-0930	Fluorescence, data acquisition <i>Paul Robinson</i>
	0930-1030	Data analysis and compensation <i>Gert Swanepoel</i>
	1030-1100	TEA BREAK
	1100-1200	GUEST LECTURE II: Advanced data analysis <i>Robert Krause</i>
	1200-1300	BECKMAN COULTER INSTRUMENTATION (old and new) <i>Gert Swanepoel</i>
	1300-1400	LUNCH
	1400-1700	DEMO- Actual staining (whole blood) <i>Gert Swanepoel</i>
DAY 3: 1 st November, 2023	0800-0830	GUEST LECTURE III- <i>Woodvine Otieno</i>
	0830-0930	High parameter and spectral flow cytometry <i>Paul Robinson</i>
	0930-1030	Advanced flow cytometry <i>Gert Swanepoel</i>
	1030-1100	TEA BREAK
	1100-1200	DEMO- Acquisition, analysis <i>Gert Swanepoel</i>
	1200-1300	Hands on experience for trainees <i>Gert Swanepoel</i>
	1300-1400	LUNCH
	1400-1700	Data analysis and discussion (Group Presentations) <i>ALL</i>

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

Program for Point-of-Care Diagnostics for Resource-Limited Settings Workshop

Theme: POC at resource limited settings with focus on capacity building

POC Workshop Theme; Course Trainers

Prof. Aman Russom; Dr. Ines Pinto; Prof. Linnés Jacqueline; Prof. Tamara Kinzer-Ursen;

MSc. Lucy Teclé. Dr. Martin W. Sifuna and Prof. Orlando Hoilett

DAY		Time	Topic	Speaker
Day 1; Monday (30/10/2023)	Morning	08.30 am - 09:00 am	Introduction to the workshop	Prof. Aman
		09.00 am - 10:00 am	Introduction to Microfluidics	Prof. Aman
		10.00 am - 10.30 am	Tea break	
		10.30 am - 12.00 pm	POC platforms	Prof. Aman
	Afternoon	12.00 am - 13.30 pm	Lunch break	
		13:30 am - 16:30 pm	Practical	Dr. Ines
		16:30 am - 17:00 pm	Tea break	
		17.00 pm - 17.30 pm	Feed, Questions and answers	Dr. Ines
Day 2; Monday (31/10/2023)	Morning	08.30 am - 10:00 am	Introduction to bioimpedance	Dr. Sifuna
		10.00 am - 10.30 am	Tea break	
		10.30 am - 12.00 pm	Bioimpedance practical	Dr. Sifuna
	Afternoon	12.00 am - 13.30 pm	Lunch break	
		13:30 am – 16:30 pm	Application of Wireless device	Pro. Orlando
		16:30 am - 17:00 pm	Tea break	
		17.00 pm - 17.30 pm	Feed, Questions and answers	Pro. Orlando
Day 3; Monday (01/11/2023)	Morning	08.30 am - 10:00 am	Introduction to Nucleic acid detection/paper microfluidics	Profs. Lucy, Jacky and Tami
		10.00 am - 10.30 am	Tea break	
		10.30 am - 12.00 pm	Introduction to paper microfluidics	Profs. Lucy, Jacky and Tami
	Afternoon	12.00 am - 13.30 pm	Lunch break	
		13:30 am – 16:30 pm	Related practical or demonstration	Profs. Lucy, Jacky and Tami
		16:30 am - 17:00 pm	Tea break	
		17.00 pm - 17.30 pm	Feed, Questions and answers	Profs. Lucy, Jacky and Tami

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

PROGRAM FOR MOLECULAR DIAGNOSTICS WORKSHOP

Instructors

Prof. Masood Kamali-Moghaddam, Uppsala University, Sweden

Dr. Radiosa Gallini, Uppsala University, Sweden

MSc. David Mwaura, Primate Research Institute, Kenya

TIME	MONDAY October 30	TUESDAY October 31	WEDNESDAY November 1
8:30 AM	Proximity Assays introduction	Proximity Assay practical training session I	Proximity probes quality control
9:00 AM			
9:30 AM			
10:00 AM			
10:30 AM	Caffe break	Beads preparation Standard dilution of calibrator	Gel electrophoresis and gel staining
11:00 AM	Protocol introduction: immunoassays, qPCR and molecular tools		
11:30 AM			
12:00 PM			
12:30 PM	Lunch break	LONG DAY! (participants are recommended to wear comfortable shoes and clothing)	Lunch break
1:00 PM			
1:30 PM	Protocol introduction: immunoassays, qPCR and molecular tools	Proximity Assay practical training session II	Data analysis - interactive training (participants are recommended to bring their computers)
2:00 PM			
2:30 PM			
3:00 PM	Preparation of Proximity Assay probes	Antigen target capture PLA probes binding Ligation and qPCR	Q&A and Summary
3:30 PM			
4:00 PM	DBS and preparation of Samples	LONG DAY! (participants are recommended to wear comfortable shoes and clothing)	Workshop presentations
4:30 PM			
5:00 PM	Q&A		

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

WORKSHOP PROGRAM FOR NEW INSIGHTS INTO HIV/EMERGING VIRAL INFECTIONS

DAY	Time	Topic	Speaker	Time Allocation
DAY ONE				
HIV and emerging viral diseases				
Monday 30 th October	9 Am -9.30 Am	Opening Remarks	Prof. Elizabeth Bukusi	30 Minutes
Morning Session	9.40 Am -10.10 Am	HIV, general introduction and historical perspectives	Prof. Guido Poli	30 Minutes
	10.10 Am -10.40 Am	Advances in HIV cure research current state and future prospects	Prof. Guido Poli	30 Minutes
	10.40 Am -11.00 Am	TEA BREAK		20 Minutes
	11.20 Am - 12.00 PM	HIV treatment and preventions, Pre-Exposure Prophylaxis and other prevention tools (Revolutionizing prevention efforts) Community-led interventions: reaching key populations for effective HIV prevention	Dr. Colette Aoko	40 Minutes
Afternoon Session	12.00 Pm - 12.30 Pm	Mental health support and quality of life for PLWH (Understanding disparities and tailoring care)	Dr. Janice Litunya & Dr Colette Aoko	30 Minutes
	12.30 Pm - 13.30 Pm	LUNCH BREAK		
	13.40 Pm - 15.40 Pm	Emerging and reemerging viral infections I. Chronicles of Major Human Coronavirus Pandemics: A 40-Year Journey into Understanding Emerging Viruses II. Comparing and Contrasting the HIV and SARS-CoV-2	Elisa Vicenzi	120 Minutes

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

		Pandemics: Similarities and Differences III. Drawing Lessons from the Past to Secure the Future in Emerging Infection Preparedness		
	15.40 Pm-16.00 Pm	HEALTH BREAK		20 Minutes
	16.00 Pm-16.30 Pm	Studying BSL-3 Pathogens in the Lab: A SARS-CoV-2 Workup	Isabel Pagani	30 minutes
	16.30 Pm-17.00 Pm	IV. Investigating BSL-2 Arboviruses in the Lab: A Zika Virus Study	Isabel Pagani	30 minutes
	17.10 pm -17.30 Pm	SUMMARY OF THE DAY		20 Minutes
DAY TWO				
Tuesday 1 st November 2023	Emerging Cancers			
Morning Session	9.40 am -10.10 am	Cancers of proliferating concern (HPV,HCV)	Prof. Han Jiali	30 Minutes
	10.10 am -10.40 am	Cancer Screening programs in bridging gaps and increasing access	Prof. Han Jiali	30 Minutes
	10.40 am -11.00 am	TEA BREAK		20 Minutes
	11.00 am - 11.30 am	HPV prevention strategies	Prof. Han Jiali	30 Minutes
	11.30 am - 12.00 am	Fostering inclusivity in HIV, HCV,HPV, and cancer prevention efforts	Dr. James Ayieko	30 Minutes
Afternoon Session	11.40 pm - 12.30 pm	Strengthening healthcare systems integrating HIV and cancer services for comprehensive care	Dr. Marilyn Nyabuti	50 Minutes
	12.30 pm - 13.30 pm	LUNCH BREAK		1 hour
	13.30 pm - 15. 30 pm	Key Populations as a bridge to comprehensive health in HIV, HPV and HCV I. HCV, HPV, and HIV among key populations	Dr. Felix Mogaka	120 Minutes

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

		<ul style="list-style-type: none"> II. Strategies for integrated prevention and treatment approaches III. Innovations in Harm reduction and disease prevention IV. Scaling up access to PrEP, PEP, and Vaccinations V. Leveraging technology for harm reduction programs 		
	15.30 pm – 16.00 pm	SUMMARY OF THE DAY		30 Minutes
MENTORSHIP PROGRAM	16:30-18:00 FREE DISCUSSIONS AND MENTORSHIP WITH PROF. JIALI HAN (Anyone can attend, no reservations-Just remain in the room)			
DAY THREE				
Wednesday 2 nd November 2023	Tuberculosis diagnosis, treatment and prevention			
Morning Session	9.40 am -10.10 am	Global Tuberculosis situation	Nellie Mukiiri	30 Minutes
	10.10 am -10.40 am	TB situation and the current state of TB diagnosis	Nellie Mukiiri	30 Minutes
	10.40 am -11.00 am	TEA BREAK		20 Minutes
	11.00 am -11.30 am	Implementation of Isoniazid (INH) and new TB drug therapy benefits for TB Prevention	Dr. Ayieko	30 Minutes
	11.30 am – 12.00 am	Integrated approaches and challenges in tackling TB-HIV co-infection, strengthening TB services and Linkage to care	Dr. Marilyn Nyabuti	30 Minutes
Afternoon Session	12.00 pm – 12.30 pm	Community-based TB prevention, digital tools for TB management	Dr. Colette Aoko	30 Minutes
	12.30 pm - 13.30 pm	LUNCH BREAK		
	14.30pm – 15.40 Pm	Novel diagnostics and approaches for TB diagnosis	Cirillo Daniela	70 Minutes
	15.40 pm – 16.00 Pm	SUMMARY OF THE DAY		20 Minutes

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

PROGRAM FOR CONTROL AND ELIMINATION OF PARASITIC INFECTIONS AND ZOOSES

COURSE OUTLINE

Parasitic infections, caused by a diverse array of organisms ranging from protozoa to helminths, pose a significant threat to human and animal populations worldwide. These insidious invaders often exploit both human and animal hosts, creating complex webs of transmission that necessitate interdisciplinary collaboration for effective control and prevention. Zoonoses, infectious diseases that can be transmitted between animals and humans, are particularly relevant in an era of increasing human-animal interactions. The close proximity between humans and animals, whether in agricultural settings, urban environments, or through the rise of exotic pets, has heightened the risk of zoonotic spillover events, demanding a comprehensive understanding of the interplay between wildlife, domesticated animals, and human health. This workshop will serve as a platform to explore the latest research, innovative strategies, and best practices in diagnosing, treating, and preventing parasitic infections and zoonoses through a collaborative, multidisciplinary and interactive training approach.

COURSE PROGRAM

Day 1 Venue: Lake Naivasha Resort

Session 1: 0900 - 1030hrs	Introduction to parasitic infections and zoonoses	Presenter
09:00 – 10:00	Overview of parasitic infections and zoonotic diseases Importance of controlling and eliminating parasitic infections and zoonoses	Dr. Kennedy Ogolla
10:00 – 10:30	Introduction to biology of arthropod disease vectors of medical and veterinary importance and the pathogens they transmit.	Dr. Paul Mirej
10:30-11:00	Tea Break	
Session 2: 1100 – 1300hrs	Epidemiology and cultural aspects of malaria and trypanosomiasis	
11:00-11:30	Introduction to and Epidemiology of malaria Overview of the current malaria situation in Kenya.	Dr Achyut / Dr Jesse Gitaka

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

11:30-12:00	Epidemiology, transmission, and lifecycle of trypanosomiasis	Dr. Winnie Okeyo
12:00-12:30	Cultural anthropological aspects of malaria control/elimination Community acceptance and access to innovative tools for malaria prevention, diagnosis and treatment. Contribution of cultural anthropology to the path towards malaria elimination.	Dr. Makoto Nishi
12:30-14:00	Lunch break	
Session 3: 14.00 – 16.00hrs		
14:00-14:30	Economy aspects of malaria control/elimination Analysis of the link between malaria and economics on both individual level and population level. Overview of our interventional study on behavioral change which utilizes behavioral economics.	Prof. Tomoya Matsumoto, Dr. Masaru Nagashima
14:30-15:00	Biology of arthropod disease vectors of medical and veterinary importance and the pathogens they transmit. Entomology of malaria vectors Current situation of malaria entomology. Designing method of field interventional study.	Prof. Noboru Minakawa
15:00-16:00 (20 min each)	Entomology of trypanosome vectors Vector Ecology, and parasite immunity/ vector/host/pathogen interactions (Erick) Tsetse genetics (Winnie) Symbiosis (Winnie) Olfaction (Mireji)	Drs Erick Awuoche, Winnie Okeyo, and Paul Mireji
16:00-16:30	Health break	
Session 4: 1630 – 1800hrs	Novel vector control measures	
16:30-17:00	Mosquito control measures, such as ceiling nets	<u>Dr Kagaya Wataru</u>

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

17:00-17:30	Novel tsetse control	Dr. Paul Mireji

Day 2 Venue: Lake Naivasha Resort

Session 1: 08:30 - 1100hrs	Computational biology and genomics	
08:30-09:00 (30 mins)	Predicting disease prevalence using Bayesian analysis	Dr. Evariste Tshibangu-Kabamba
09:00-09:30 30 min	Malaria Disease modelling	Dr Yura Ko
09:30-10:00 (30 mins)	Tsetse population genetics	Dr. Rosemary Bateta
10:00-10:30	Health break	
10:30-11:00 (30 mins)	Genomics of parasites, vectors and humans Cutting edge analysis of genomics including NGS and single-cell RNAseq, which is applicable for and give us a huge advantage on analysis of wide range of organisms	Prof. Taane Clark, Dr. Mtakai Ngara
Session 2: 11:00 - 1300hrs	Diagnosis and therapeutics	
11:00-11:30 (30 mins)	Trypanosomiasis diagnoses and treatments Human and animal trypanosomiasis diagnosis strategies Previous and novel trypanosomiasis therapeutics, and drug resistance	Dr. Kennedy Ogolla
11:30-12:00 (30min)	Malaria diagnosis and treatment from the basics to advanced knowledge. Novel malaria diagnostic systems	Dr. Jesse Gitaka

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

	Discussion of mass therapeutic strategies based on field research.	
12:00-12:30 (30min)	Pharmacogenetics of antimalarials Antimalarial drug resistance	Prof. Masahiro Hiratsuka
12:30-13:00 (30min)	Malaria in pregnancy	Dr Francis Kobia
13:00-14:00	Lunch break	
Session 3: 1400 – 1600hrs	Vaccines for parasitic diseases	
14:00-14:45 (45min)	Malaria vaccines development Recent Advances in Malaria Vaccine Candidates Challenges and Strategies for Malaria Vaccine Implementation Global Collaboration and Funding for Malaria Vaccine Development	Dr. Bernard Kanoi
14:45-15:30 (45 min)	Trypanosomiasis vaccine development Strategies for trypanosome vaccine development Current research in trypanosome vaccine development	Dr. Erick Awuoche
15:30-16:00 (30 mins)	Group discussion (plenary) - What they have learnt about arthropod vectored diseases/ questions	All
16:00-16:30	Health break	
Session 4: 1630 – 1730hrs	Disease eradication efforts	
16:00-16:30 (30 mins)	Malaria elimination and eradication with both historical and up-to-date data	Prof. Akira Kaneko
16:30-17:00 (30mins)	Trypanosomiasis elimination and eradication Review of successful vector/disease control programs in different regions	Dr. Rosemary Bateta

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

	Achievements from the control program Lessons learned from these programs	
--	--	--

Day 3 Venue: KALRO – Dairy Research Institute

	Practical sessions at KALRO – Dairy Research Institute	
Session 1: 8.30-10.00	Microscopy Diagnosis of malaria through microscopy (stained fixed slides) Diagnosis of trypanosomiasis through microscopy (stained fixed slides) Preparation for PCR/LAMP (malaria / trypanosomiasis) Malaria RDT	KALRO and MKU teams
10:00-10:30	Health break	
Session 2: 10:30 - 1300	Trypanosome and Plasmodium PCR Loop mediated amplification (LAMP) for point of care diagnostics Tsetse Behavioral assay (Y-tube and Wind-tunnel experiments) IMRS for rapid malaria diagnostics Malaria in pregnancy (Diagnosis of placental malaria)	KALRO and MKU teams
13:00-14:00	Lunch break	
Session 3: 1400 – 1600	Gel electrophoresis – running, visualization, and interpretation	KALRO and MKU teams
16:00-16:30	Health break	
Session 4: 16:30 +	Back to Lake Naivasha Resort for workshops conclusion.	

AIBBC 2023 Genomics and Bioinformatics Workshop

The schedule for each day is as follows:

1. Mornings (7-13): Five hours. of lectures and optionally short, well-defined exercises in and one hour of distributed breaks.
2. Afternoons (14-18): Open exercises/analysis of own data or given data sets using learned techniques, with student presentations, QA sessions, etc.

Daily schedule:

Morning session: 7 -- 10.10
Morning break: 10.10 -- 10.30
Noon session: 10.30 -- 13
Lunch break: 13 -- 14
Afternoon session: 14 – 18

Instructors and Professors

Jakob Skou Pedersen, PhD
Andrea Cabibbe, PhD
Federico Di Marco, PhD
Simon Grund Sørensen, PhD
Steven Ger, Nyanjom, PhD
Flawrence Ngonga, PhD
Eunice Machuke, MSc
Seby Musundi, MSc
Josiah Kuja, PhD

DETAILED PROGRAM

Day 1:

07.00-08.30 Module 1.1

Welcome and workshop introduction (Dr. Steven Ger, Nyanjom).

1. Introduction (20 min)
 - a. Instructors and professors
 - b. Expected outcome of the course
2. Computational platform, Posit Cloud and Rstudio (Dr. Simon Grund Sørensen; 20 min)
3. R programming and data visualization (Dr. Simon Grund Sørensen; 50 min)

08.30-08.40 Break

08.40-10.10 Module 1.2

1. Data import, wrangling, and reformatting (Dr. Simon Grund Sørensen; 30 min)
2. Data visualization II (Dr. Simon Grund Sørensen; 30 min)
3. R-Markdown (Dr. Simon Grund Sørensen; 30 min)

10.10-10.30 Break

10.30-13.00 Module 1.3

1. Good practices in data project management (SG; 30 min)

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

1. Folder structure (Dr. Simon Grund Sørensen; 15 min)
2. Code documentation (Dr. Simon Grund Sørensen; 15 min)
2. Unsupervised learning
 1. Dimensionality reduction (Prof. Jakob Skou Pedersen; 60 min)
 2. Clustering (Prof. Jakob Skou Pedersen; 30 min)
3. Introduction of open-access data sets that can be used for workshop projects (Prof. Jakob Skou Pedersen, Dr. Simon Grund Sørensen, AC?; 30 min)

13.00-14.00 Lunch

14.00-15.00: Module 1.5 (60 min)

1. Importance of genomics for microbiology diagnosis and surveillance [**Andrea Cabibbe**]

15.00-15.10 Break

15.10-18.00 Module 1.4

1. Project introduction
2. Brief introductions of the students
3. Form groups of 1-4 people (optimally 2-3)
4. Select a data set and draft a project specification.
 1. Which questions would you like to ask the data?
2. Make an R-Markdown report that includes:
 1. Load the data.
 2. Data summaries
 3. Data visualizations
 4. Unsupervised inspection of inherent patterns in the data

Day 2:

07.00-08.30 Module 2.1

1. Welcome and recap of yesterday (20 min)
2. Supervised learning, I
 1. Linear models (70 min)
 1. Splitting test and training data
 2. Model specification
 3. Performance evaluation

08.30-08.40 Break

08.40-10-10 Module 2.2

1. Logistic regression models, classification (Prof. Jakob Skou Pedersen; 40 min)
 - a. Model specification

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

- b. Cross-validation
 - c. Performance evaluation
2. Sparse supervised learning II (Prof. Jakob Skou Pedersen; 50 min)
 - a. Regularization, Lasso and Elastic nets

10.10-10.30 Break

10.30-13.00 Module 2.3

1. Random Forests (Prof. Jakob Skou Pedersen; 45 min)
2. Bulk RNA seq analysis (105 min)
 - a. Lecture (Prof. Jakob Skou Pedersen; 60 min)
 - b. Exercises (Dr. Simon Grund Sørensen; 45 min)

13.00-14.00 Lunch

14.00-15.15: Module 2.4 (75 min)

Overview of bioinformatic pipelines and tools for microbiology [**Federico Di Marco**]

15.15-15.25 Break

15.25-18.00: Module 2.4 (155 min):

1. Continue projects and data analysis.
 1. More open-ended and data-set-specific questions, which the students come up with themselves as far as possible.
 2. Learn several models on the data and compare performance metrics.
 3. Interpret and visualize relevant aspects of the learned model and the underlying data.
 4. Include analysis in the R-markdown sheet from day 1 which should now be taking the shape of a report.
 5. Prepare a ~7 min project presentation for day 3.

Day 3:

07.00-08.30 Module 3.1

1. Welcome and recap of yesterday (Prof. Jakob Skou Pedersen; 20 min)
2. Genomics (70; min)
 1. Genomes and evolution
 2. Sequencing technologies
 3. Assembly and mapping
 4. Variant calling

08.30-08.40 Break

AIBBC 2023 WORKSHOPS ON ADVANCED BIOMEDICAL TECHNOLOGIES

08.40-10.10 Module 3.2

1. Cancer genomics (Prof. Jakob Skou Pedersen; 20 min)
2. Variant functional impact evaluation (Dr. Simon Grund Sørensen; 25 min)
3. Omics data resources and genome browsers (JSP, Dr. Simon Grund Sørensen; 45 minutes)

10.10-10.30 Break

10.30-11.30: Module 3.3 (60 min)

1. Importance of genomics for microbiology diagnosis and surveillance [**Andrea Cabibbe**]

11.30-11.45: Break

11.45-13.00: Module 3.4 (75 min)

1. Overview of bioinformatic pipelines and tools for microbiology [**Federico Di Marco**]

13-14 Lunch

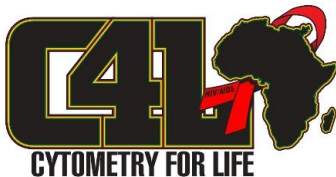
14-16: Module 3.5 (120 min)

1. Coordinate project presentations (30 min)
 1. Finalize data analysis
 2. Prepare 7 min presentation
2. Present in two tracks (approx. four in each), ~10 min per project depending on number of groups (60 min)
3. Course summary (30 min)
 1. Evaluate what students found the most interesting
 2. How do the students think they will be able to use these skills in their own work in the future?

AIBBC 2023 sponsors



Diagnostics



SampleFacts



AIBBC acknowledges support by Fogarty International Center, National Institutes of Health through Maseno University and KALRO, Kenya