

# Current Biotechnology Research at Centre for Biotechnology and Bioinformatics and its impact on the Biological & Toxin Weapons Convention (BWC)



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**2<sup>nd</sup> Annual: Global Forum on Scientific Advances Important to the Biological and Toxin Weapons Convention: 2<sup>nd</sup>-3<sup>rd</sup> December, 2019**



**Center for Health Security**



**CENTRE FOR BIOTECHNOLOGY & BIOINFORMATICS  
UNIVERSITY OF NAIROBI**

# Who we are

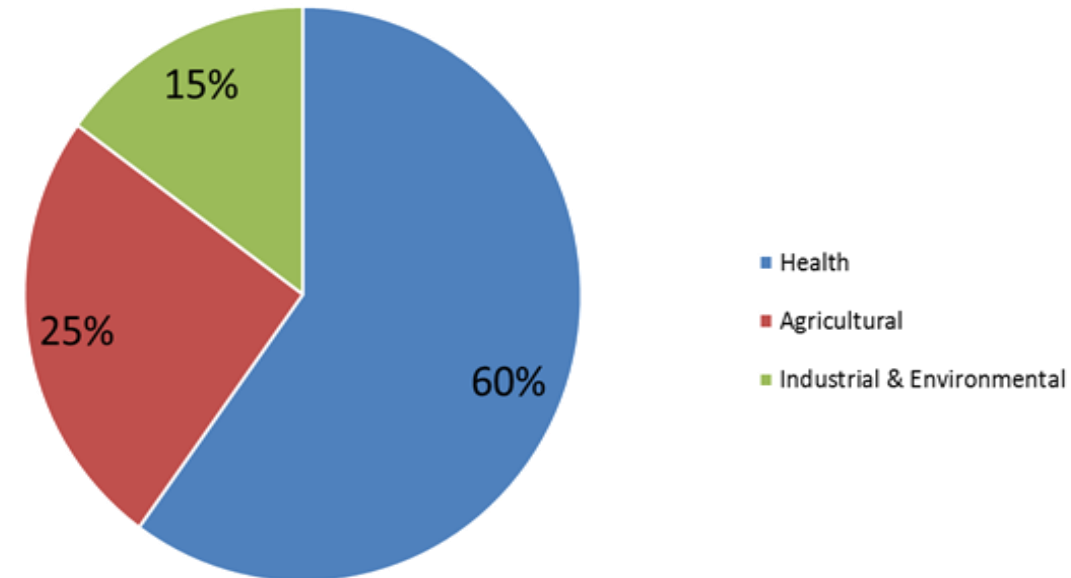
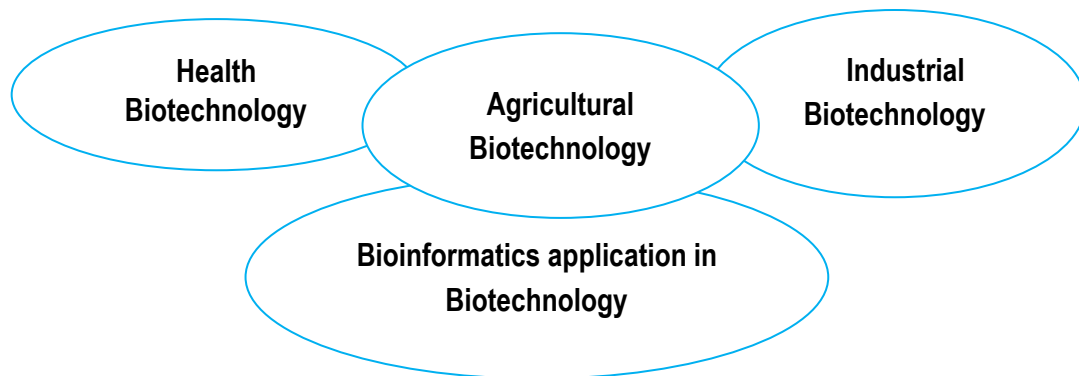
- Founded in 2005 as a virtual centre for Research and Postgraduate Training (MSc & PhD)
- Thin core staff at the Centre
- Faculty drawn from Schools and Departments within the University and collaborating Institutions
- Based at the University of Nairobi, Kenya



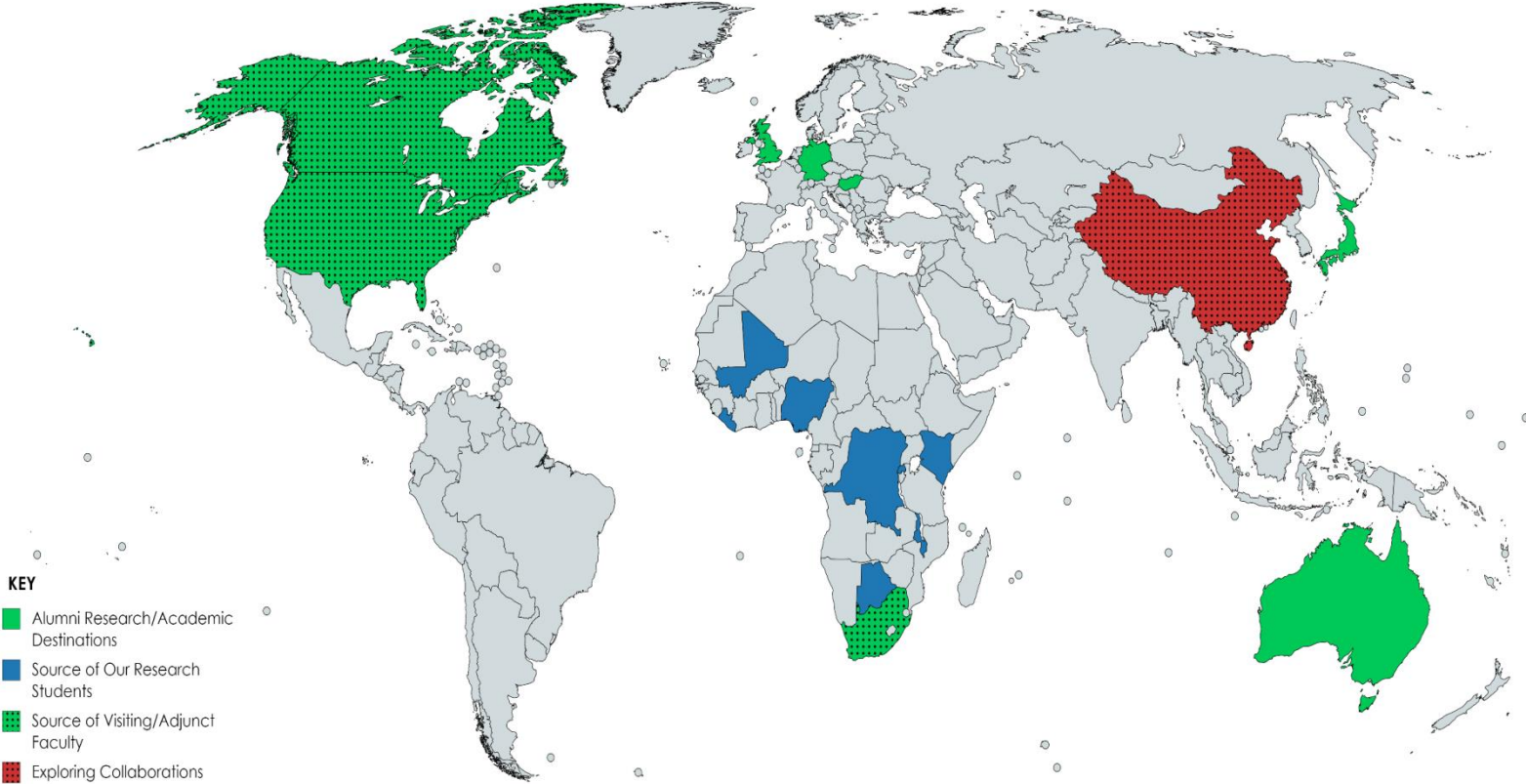
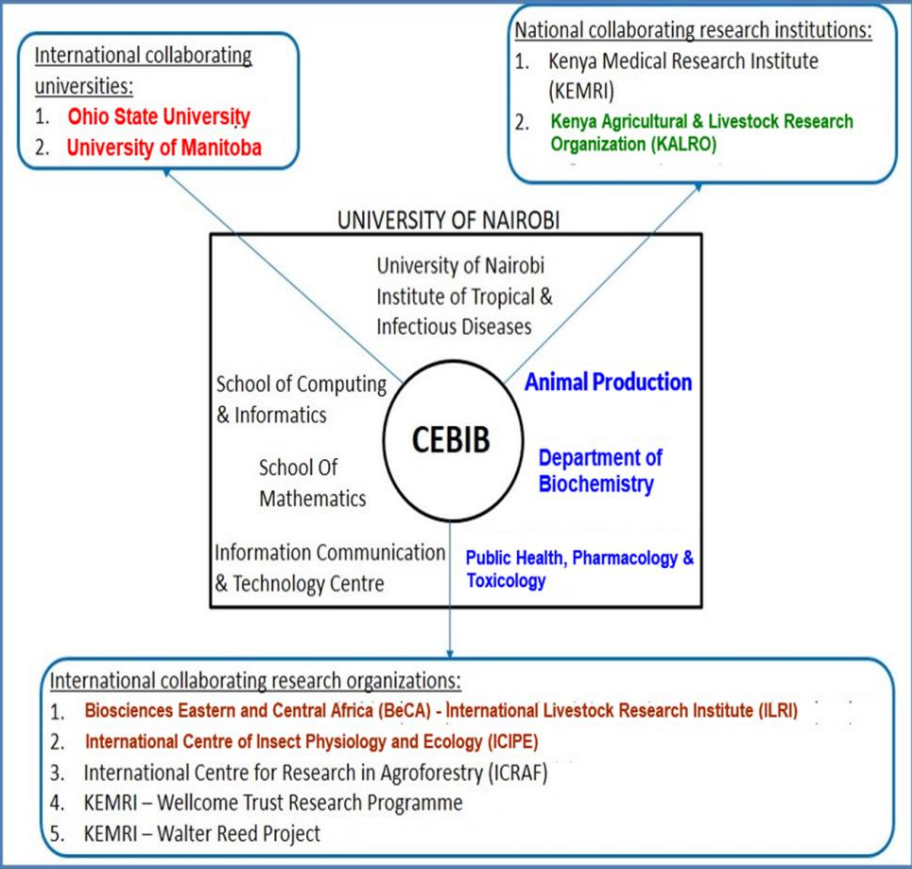
## Our Core Functions

- ❖ Teaching and Learning
  - ❖ Research
    - ❖ Consultancy
      - ❖ Community Service

## Thematic Research Areas



# Global challenges: Is there Need for Local and International collaborations ?



# Some of the major challenges

Are there Biotechnology solutions for the above challenges?



## How safe is Kenya's ugali?

Inadequate drying and storage in damp conditions provide the right condition for mould.

1w ago | [BBC NEWS](#) | [Africa](#)

For Kenya, aflatoxin contamination is a long-standing problem. The country is considered a world hotspot, with incidents of acute toxicity recorded in 2004 and 2010.

Ugali is traditionally eaten with your hands  
Image: [REUTERS Image](#)

Several well-known brands of maize flour have been taken off supermarket shelves in Kenya, after a warning about unsafe levels of a poisonous substance known as aflatoxin.



## WHO sounds alarm on Ebola due to Congo insecurity

Islamist militiamen killed at least 19 people in eastern Democratic Republic of Congo

5d ago | [REUTERS](#) | [Africa](#)



## DR Congo workers made impotent by pesticides - HRW

Feronia and its local subsidiary employ thousands of workers

2d ago | [BBC NEWS](#) | [Africa](#)

# Pathway towards Research / Solving the challenges

- Government Regulator
  - National Biosafety Authority
    - National Commission for Science, Technology and Innovation

- Institutional Research Policy
  - Institutional Biosafety Committee

- Project/Research

## Student Development Cycle



Evans Kataka,  
PhD, TUM, Ger



Tania Bishola, PhD,  
Heidelberg, Germany



Reuben Mangi,  
PhD, KCL, UK

# Need for optimised Microbial industrial processes using fermentation technology



State-of-the-art 5L twin Braun Biostat B with controlled parameters being used to scale-up liquid fermentation process from shake flasks

## Bioprospecting for microbial biocatalysts for Integrated Process Technologies in using agricultural wastes

Dan Ojwang, Francis Mulaa, George Obiero, Jacob Midiwo, Moses Makoyoto



# Aflatoxin Testing and Research in Human Food and Animal feed

Aflatoxin Proficiency Testing Training in collaboration with relevant stakeholders and Counties



- The main fungi are *Aspergillus flavus* and *Aspergillus parasiticus*
- Test for toxins from microbial sources



ViceChancellor,UoNBI

@vcuonbi

Follow

The newly accredited @uonbi mycotoxins laboratory has been used by world agencies like WFP, in testing food safety before distribution to hunger stricken areas.



4:23 AM - 21 May 2019

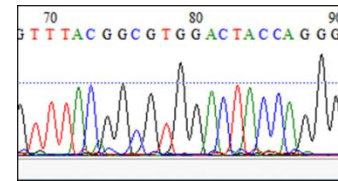
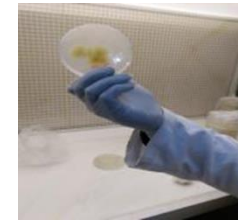
6 Retweets 18 Likes



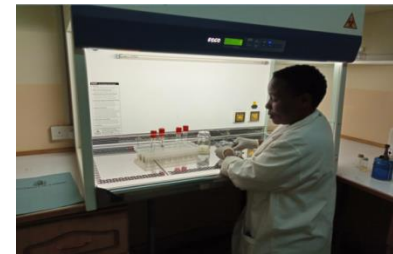
# Solving Reduced Plant Yields Using Biotechnology Tools

## Mutagenomic analysis of groundnut RNA viruses in Western Kenya using high throughput sequencing technologies

Dennis Obonyo<sup>1</sup>, Damaris Odeny<sup>2</sup>, Rachel Ikawa<sup>3</sup>, George Ouma<sup>4</sup>



## Tissue culture laboratory –Transformation of yams towards drought resistance



Collaborative research done at



# Featured Animal Research Using Biotechnology Tools

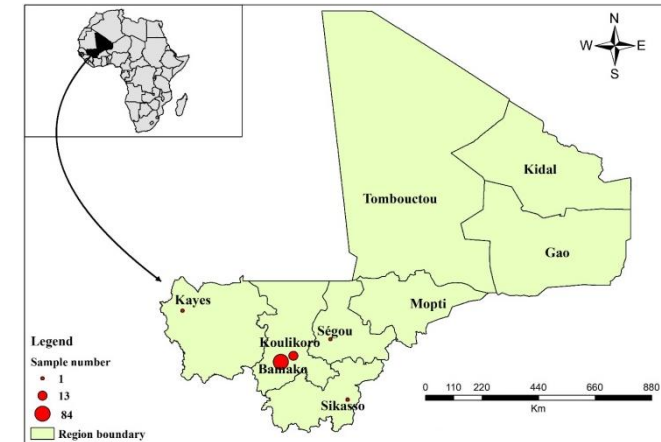
**Tetracycline and Methicillin Resistance Phenotypes and Genotypes of *Staphylococcus aureus* isolated from Bovine Mastitis in Kenya.**  
Gunga Patrick, Dr. George Obiero, Dr. Gabriel Aboge)



**Molecular Epidemiology of Foot and Mouth Disease Virus circulating in the African buffalo and Cattle population in eastern RWANDA**  
Udahemuka Jean Claude, Gabriel Aboge, George Obiero, Pihyani Lebea



**Use of Molecular and other rapid diagnostic methods for detecting and evaluating Rabies Viruses circulating in Mali.**  
Mounirou Camara, Gabriel Aboge, George Obiero, Ousmane Koita



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journal homepage: [www.elsevier.com/locate/foodcont](http://www.elsevier.com/locate/foodcont)

ELSEVIER

Antimicrobial resistant *Escherichia coli* isolates detected in raw milk of livestock in pastoral areas of northern Kenya

Catherine Ngaywa<sup>a,c,\*</sup>, Gabriel O. Aboge<sup>b,c</sup>, George Obiero<sup>c</sup>, Isaac Omwenga<sup>a,b</sup>, Nicholas Ngwili<sup>a</sup>, George Wamwere<sup>a</sup>, Martin Wainaina<sup>a</sup>, Bernard Bett<sup>a</sup>

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# Institutional management of risks associated with Biological Research - A case of CEBIB

- **University research policy document in place to guide safe research**
  - Institutional Biosafety Committee in place
- Reviewing of curricula at all levels to promote ethical science
  - Curriculum with aspects on biosecurity for post graduate course in place
- **Capacity building, Staff enrichment and Journalism club for students**
  - Staff active in relevant regulatory Technical committees
  - Biosafety and Biosecurity issues during student orientation
- **Collaboration with other Institutions**
- Strengthening the teaching of biosciences at the formal education level.
- **Developing scientific and related infrastructures.**
- Attracting and retaining talent in biosciences.
- **Spearheading formal and informal public education and awareness creation programs.**

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# Centre for Biotechnology and Bioinformatics (CEBIB)

## ➤ Collaborating institutions

- KEMRI-Wellcome Trust, KEMRI, KEMRI-CDC, International Centre of Insect Physiology and Ecology (ICIPE), International Livestock Research Institute (ILRI), Ohio State University, University of Manitoba

