12th Molecular Approaches to Clinical Microbiology in Africa Course

31st August – 8th September 2024

South Africa

wellcome connecting science

Molecular Approaches to Clinical Microbiology in Africa

- More than 200 participants 2009 – 2023:
  - the training team has a majority of African scientists;
  - former participants are now part of the training team or invited speakers.

- Eleven previous courses, including 1 virtual, four physical venues:
  - Blantyre, Malawi (3);
  - Nairobi, Kenya (4);
  - Cape Town, South Africa (2);
  - Banjul (Fajara), The Gambia (1).

Genomics and Diagnostics Meeting
31st March – 2nd April 2003
Hinxton Hall Conference Centre, Hinxton, UK

Monday 31st March

17:00	Arrival and registration	*Conference Centre*
18:30	Introduction and Welcome *Dr Karen Kennedy*	*James Watson Pavillion*
	A global overview of the disease burden where diagnostics can make a difference *Sir David Weatherall, University of Oxford*	
19:30	Pre-dinner drinks	*Hall Foyer*
20:00	Dinner	*Restaurant*

Tuesday 1st April

0830 – 1030	**Session I: 'Setting the scene: Where are we today?'** **Chair - Professor Martin Maiden**	*James Watson Pavillion*


MLW
THE COLLEGE OF MEDICINE
Malawi - Liverpool - Wellcome Trust
wellcome trust

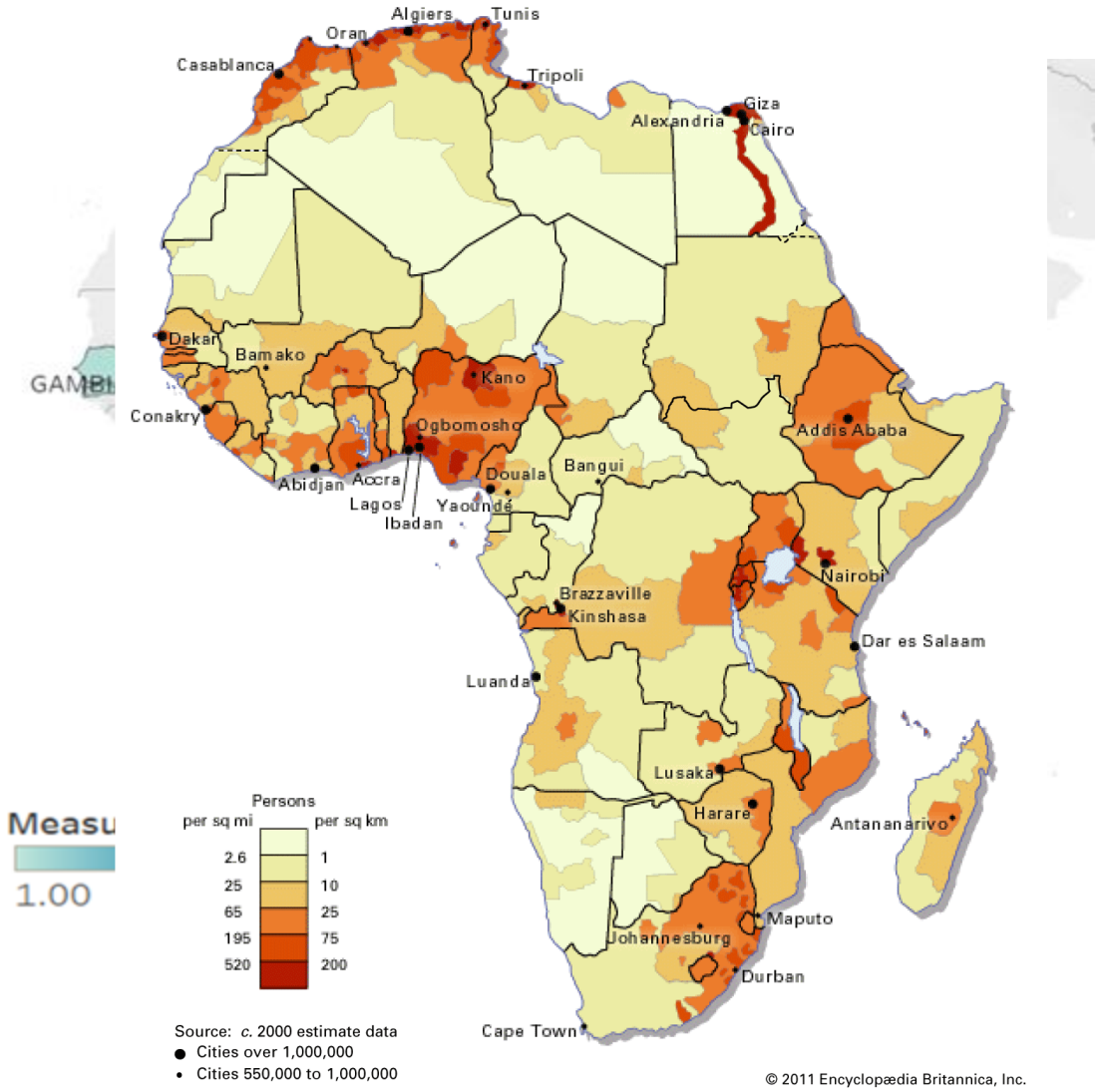
2009, Malawi


Class of 2014
South Africa


Class of 2017
South Africa

2023, Kenya

Geographical representation of participants



Countries:

Nigeria, 40; Kenya, 21; South Africa (Zuid Afrika), 18; Malawi, 16; Cameroon, 14; Ghana, 13; Ethiopia, 9; Tanzania, 8; Uganda, 7; The Gambia, 6; Sudan, 6; Zimbabwe, 6; Cote D'Ivoire, 3; Egypt, 3; Gabon, 3; Mali, 3; Senegal, 3; Benin, 2; Botswana, 2; Democratic Republic of Congo, 2; Madagascar, 2; Burkina Faso, 1; Morocco, 1; Mozambique, 1; Namibia, 1; Rwanda, 1; Togo, 1; Zambia, 1.

Impact – Course Heroes

- Abdi Mohamed, Kenya.
- Chismo Msefula, Malawi.
- Kanny Diallo, Mali, Cote d'Ivoire.
- Glennah Kerubo, Kenya.
- Brenda Kwambana, The Gambia, Malawi.
- Tapfumanei Mashe, Zimbabwe.

…and many more.

Glennah Kerubo

Current Role: Lecturer at Kenyatta University, School of Medicine, Nairobi, Kenya

participant and an assistant trainer has increased my networks regionally and in some cases contributed to grant applications. Ultimately, I have successfully published my work on determination of drug resistance patterns of Mtb strains obtained from pulmonary TB patients."

Location: Africa

Course:

- Molecular Approaches to Clinical Microbiology in Africa

Tapfumanei Mashe

Current Role: Research Scientist – Ministry of Health and Child Care, Zimbabwe

"I was thrilled to be surrounded by highly skilled and knowledgeable trainers who are leaders in their respective fields…I have been able to employ the bioinformatics skills and molecular techniques I learnt, with profound results…All my expectations were met, and in many instances exceeded".

Location: Africa

Courses:

- Working with Pathogen Genomes, Cape Town, South Africa (2018)
- Molecular Approaches to Clinical Microbiology, Nairobi, Kenya (2018)

Dr Brenda Kwambana-Adams

Current Role: Senior Research Fellow in Bacterial Pathogenesis and Genomics, at University College London

"Through participating in the WCS Global Training Programme, I have managed to forge important networks and collaborations which have proved critical to my own career progression."

Location: UK

Dr Brenda Kwambana-Adams

Course philosophy

Wellcome Genome Campus Connecting Science Advanced Courses:

- Free;
- Intensive;
- High faculty/participant ratio;
- ‘Train the trainers’.

VERY oversubscribed.

Aims and objectives

- To provide an overview the application of molecular approaches to clinical microbiology, focussed on Africa:
  - demystify molecular and genomic technologies;
  - explain the theoretical and practical foundations of the approach;
  - explore exemplar applications.

- A one-week course cannot be exhaustive, but we shall cover core skills and knowledge, facilitating their application in your home institutions:
  - please share what you have learned widely.

Course personnel & their roles

- Wellcome Connecting Science:
  - logistics and organisation.

- Instructors and assistants:
  - lectures;
  - practical sessions;
  - hands-on demonstration and assistance;
  - discussions.

Course structure

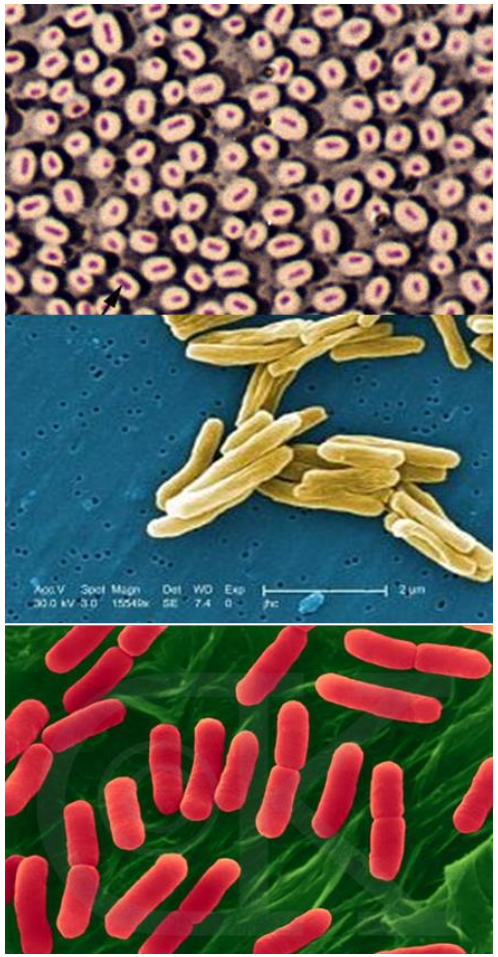
- Practical sessions:
  - Hands-on opportunities to perform and to see demonstrated a range of molecular techniques.
  - Laboratory & bioinformatics practical classes.

- Lectures, covering:
  - techniques;
  - concepts;
  - applications.

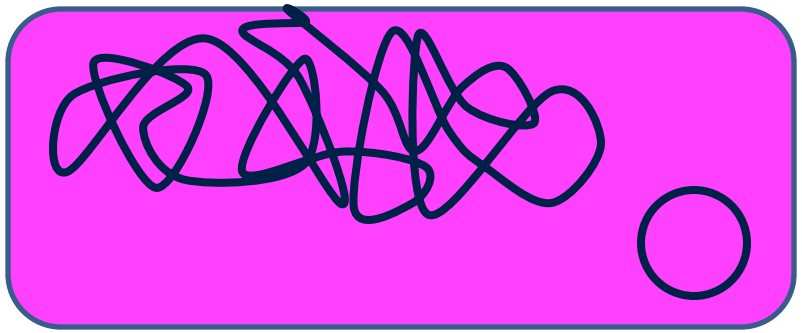
Course content overview

Pathogen Themes

- Encapsulated bacteria.
- *Mycobacterium tuberculosis.*
- Enteric bacteria.
- Bioinformatics and genomics.



Microbial DNA and what we do with it



Whole Genome Sequencing (WGS)

Gel Electrophoresis (with or without digestion)

DNA Purification

Direct Analyses

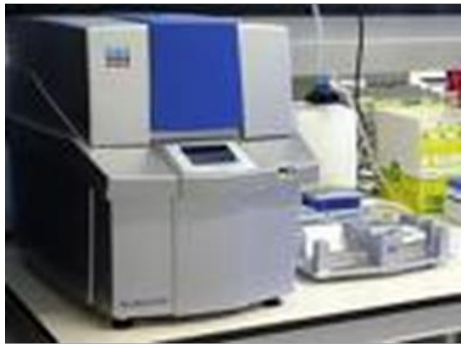
DNA Sequence detection/determination (single gene or multi locus)

Amplification (PCR)

Gel Electrophoresis

Key Technologies

- Sample preparation and extraction.
- Target detection and characterisation.
- Genomic analysis and future perspectives.



Four take home messages from the course

1. The clinical/public health question is all important.
   - What is the end point that you wish to achieve?
2. DNA is a very useful source of information.
   - What is the most appropriate technology?
3. Bacteria are very diverse.
   - Don’t expect that ‘one size fits all’.
4. Population structure varies among different bacteria.
   - Horizontal gene transfer (HGT) affects typing and interpretation;
   - How clonal is my pathogen?


Make new friends and enjoy the course!
2016, The Gambia