

Bioinformatics Workshop on Introduction to Bacterial Genomics

The Noguchi Memorial Institute for Medical Research – University of Ghana (NMIMR-UG) in collaboration with the Department of Veterinary Medicine – University of Cambridge, are organizing a five-day intensive bioinformatics workshop entitled Introduction to Bacterial Genomics.

Theme: Building capacity in bacterial genomics for the next generation of applied bioinformaticians

Dates: 3rd to 7th February 2025

Venue: Conference facility, NMIMR-UG

Registration opens: 4th December 2024 | **Registration closes:** 31st December 2024

Notification date: 10th January 2025 (*Only shortlisted applicants will be contacted*)

Application:

Interested individuals should complete an application through <https://bit.ly/bacterialgenomicsgh2025> on or before 31st December 2024.

You will be required to upload an application letter of not more than 1 page.

In your letter, please include a scientific outline of your current research, justification for attending the workshop and how you plan to apply the knowledge gained in your current or future research.



Target participants:

The targeted participants include research assistants, post-graduate students at both masters and doctoral levels, post-docs and young investigators from backgrounds such as biology, bioinformatics and biochemistry or any related disciplines with the aim of applying the tools learnt to enhance their current or near-future research activities. Participants should be in Ghana by the time of the workshop to participate physically.

NB. Priority will be given to individuals working with bacteria who plan to apply the knowledge sooner rather than later.

Prerequisite:

No prior knowledge in the use of the command line is required. However, selected participants will be required to go through related materials/resources prior to the workshop to enable them to gain the most from the workshop. All participants are required to bring along their personal laptops.

Workshop Fee, Lodging and Transportation:

There will be no workshop fee for participants.

The workshop will provide lodging/accommodation for a limited number of participants. Opportunity for lodging will be presented only to participants staying outside of Accra. However, all participants already residing in Accra will be given some allowance to aid their transportation to and from the workshop venue for the period. Meals will be provided throughout the week at the workshop location. The workshop will not cover the cost of travel to and from Accra.

Funders:

Cambridge – Africa ALBORADA Research fund

Purpose and objectives:

Studying the bacterial genome to understand the pathogen has several benefits which aid public health interventions. The benefits derived from genomic knowledge facilitate several scientific processes including being able to accurately identify the disease using appropriate diagnostic tools; isolating the causative organism through microbiology techniques; obtaining their genetic material (DNA) through molecular biology techniques; bioinformatics analysis to detect transmission patterns and identify drug resistant markers to inform appropriate drug therapy. Without the use of bioinformatics to aid in better understanding pathogenic diseases and hence identifying appropriate control measures, these bacterial pathogens will continue to cause much harm to mankind. There is currently limited local capacity for bacterial bioinformatics. Consequently, this workshop aims to meet the needs of young scientists who are gradually gaining deep interest in genomics to help them develop their bioinformatics learning, knowledge and skills in the context of working with bacterial genomes.

Our main objectives are to:

- 1) Introduce participants to the genesis and current applications of bioinformatics.
- 2) Inculcate and increase confidence in the use of the command line and application of bioinformatics to solve biological problems towards achieving their future goals.
- 3) Increase participants' knowledge of sequencing technologies, application of phylogenetics, genotyping and antimicrobial-resistance prediction to aid control of bacterial diseases.

Scope:

The workshop will focus on participants having hands-on experience of bacterial genomic data analysis and it aims to cover the following topics:

- History of bacterial genomics
- Introduction to sequencing technologies
- Introduction to UNIX command line including text manipulation and writing simple scripts
- Understanding available file formats
- Sequencing quality control, short read mapping, variant calling and genome visualisation
- Managing software: introduction to virtual environments and containers
- Introduction to and use of workflow managers and pipelines
- Genome assembly and annotation
- Introduction to phylogenetics
- Genotyping and antimicrobial resistance (AMR) prediction
- Introduction to high performance computing (HPC)

Expected outcome and Impact

The workshop will provide a comprehensive introduction to analysing bacterial genomes using best-practice bioinformatics tools to early career researchers in Ghana. This will enable the participants to go away with a better understanding of how to analyse their own genomic and epidemiological datasets to solve critical biological problems as well as build local capacity in bioinformatics.

Trainers:

Dr. Andries van Tonder

Department of Veterinary Medicine, University of Cambridge

Dr. Prince Asare

Bacteriology Department, NMIMR-UG

Facilitators:

Kwasi Agyenkwa-Mawuli

Bioinformatics core facility, NMIMR-UG

Theophilus Afum

Bacteriology Department, NMIMR-UG

For further enquiries contact: pasare@noguchi.ug.edu.gh