



DHR SPONSORED TRAINING PROGRAM



DHR

स्वास्थ्य अनुसंधान विभाग
DEPARTMENT OF
HEALTH RESEARCH
Ministry of Health and Family Welfare
Government of India

ADVANCED BIOINFORMATICS TRAINING

FOR

INFECTIOUS DISEASE RESEARCH

Empowering Research | Enhancing Skills | Strengthening Health Security



DATE

1st JULY TO
30 SEPTEMBER 2026



MODE

HYBRID
(Online + Offline)



PROGRAM OBJECTIVE

To build advanced bioinformatics skills and research capacity in infectious disease research through hands-on training, mentoring and interdisciplinary learning.

KEY TRAINING MODULES



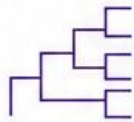
1. NGS & GENOME SEQUENCING ANALYSIS

Quality control, assembly, annotation



2. PATHOGEN GENOMICS & VARIANT ANALYSIS

Variant calling, comparative genomics



3. PHYLOGENETICS & MOLECULAR EPIDEMIOLOGY

Evolutionary analysis, lineage tracing



4. TRANSCRIPTOMICS & HOST-PATHOGEN INTERACTION

RNA-Seq analysis, differential expression



5. METAGENOMICS & MICROBIOME ANALYSIS

Shotgun metagenomics, AMR profiling



6. AI/ML & DATA INTEGRATION

Machine learning, predictive modeling, data visualization

HANDS-ON SESSIONS • REAL DATASETS • CASE STUDIES • PROJECT WORK • MENTORING

PROGRAM HIGHLIGHTS

- ✓ Expert-led interactive sessions
- ✓ Hands-on training with latest tools (Galaxy, QIIME2, Nextflow, R, Python, etc.)
- ✓ Access to high-performance computing
- ✓ Mentoring by leading researchers
- ✓ Certificate upon successful completion

WHO CAN APPLY?

- 👤 Students (PG/PhD)
- 👤 Early career Researchers
- 👤 Faculty members
- 👤 Veterinary/Medical Professionals
- 👤 Scientists
- 👤 Research Fellows

EXPECTED OUTCOMES

- 🎯 Skilled workforce in bioinformatics
- 📈 Strengthened research in infectious disease genomics
- 📄 Enhanced genomic surveillance and data-driven decision making
- 🤝 Networking and collaborations across institutions



INFORMATION BROCHURE

Download the information brochure using the following link:

https://drive.google.com/file/d/1F6l3Uc-52sxR3L1smBmloTBwmFIBrBkC/view?usp=drive_link

HOST

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Ministry of Health and Family Welfare, Government of India

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ADVANCED BIOINFORMATICS TRAINING FOR INFECTIOUS DISEASE RESEARCH

(1st July to 30th September 2026)

**Building Capacity in Genomics, Bioinformatics, and One Health for Addressing
Emerging Disease Challenges**

**A Three-Month Hybrid Training Programme
(Two Months Online + One Month Intensive Hands-on Training)**

Organized by

Department of Animal Biotechnology
Faculty of Veterinary Science
Assam Veterinary and Fishery University (AVFU)
Khanapara, Guwahati, Assam, India

ABOUT THE PROGRAMME

In recent decades, the world has witnessed an unprecedented rise in emerging and re-emerging infectious diseases, including zoonotic pathogens, antimicrobial-resistant microorganisms, and rapidly evolving viral threats. The COVID-19 pandemic highlighted the critical importance of genomic surveillance, bioinformatics, and data-driven approaches in understanding pathogen evolution, tracking disease transmission, and guiding public health interventions. Simultaneously, advances in next-generation sequencing (NGS), high-throughput omics technologies, artificial intelligence, and computational biology have transformed the landscape of infectious disease research, enabling scientists to generate and analyze vast amounts of biological data with remarkable precision.

Recognizing the growing need for skilled professionals capable of utilizing these technologies, the Department of Animal Biotechnology, Assam Veterinary and Fishery University, is organizing a comprehensive **Advanced Bioinformatics Training for Infectious Disease Research**. This intensive three-month hybrid programme is designed to provide participants with both theoretical understanding and practical expertise in modern bioinformatics tools and analytical workflows used in infectious disease investigations. The training will focus on the application of genomics, transcriptomics, proteomics, metagenomics, and computational approaches to address contemporary challenges in veterinary, medical, and public health research.

The programme is particularly relevant for Northeast India, a region characterized by exceptional biodiversity, extensive human-animal-environment interactions, transboundary movement of people and animals, and increasing risks of emerging zoonotic diseases. Strengthening regional expertise in bioinformatics and pathogen genomics is therefore

essential for enhancing disease preparedness, surveillance, and response capacities in the region and beyond.

TRAINING GOALS

The primary goal of this programme is to develop a highly skilled workforce capable of leveraging advanced bioinformatics and computational tools for infectious disease research and surveillance. Through a combination of lectures, demonstrations, hands-on exercises, case studies, and project-based learning, participants will gain practical experience in analyzing biological datasets and interpreting complex genomic information.

The programme aims to equip participants with the knowledge and skills necessary to independently perform next-generation sequencing data analysis, investigate pathogen evolution and transmission dynamics, identify antimicrobial resistance determinants, conduct microbiome and metagenomic studies, and apply artificial intelligence and machine learning techniques to biomedical data. In addition, the training seeks to foster interdisciplinary collaboration among researchers working in veterinary sciences, medicine, life sciences, biotechnology, and public health under the One Health framework.

WHY THIS TRAINING MATTERS

The future of infectious disease research increasingly depends on the ability to integrate biological sciences with computational and data sciences. Modern outbreak investigations, genomic surveillance programs, vaccine development initiatives, and antimicrobial resistance monitoring efforts all require advanced bioinformatics expertise. However, there remains a significant shortage of trained personnel capable of managing, analyzing, and interpreting high-throughput sequencing and multi-omics datasets.

This training programme addresses this critical gap by providing participants with practical, job-oriented, and research-focused skills that are directly applicable to academic research, public health laboratories, veterinary diagnostic facilities, biotechnology industries, and government disease surveillance programmes. Participants will learn not only how to use bioinformatics software and databases but also how to design robust analytical pipelines, interpret results scientifically, and translate findings into meaningful biological and epidemiological insights.

Furthermore, the programme aligns with national and global priorities related to pandemic preparedness, antimicrobial resistance containment, zoonotic disease surveillance, and One Health implementation. By strengthening technical expertise in these areas, the programme contributes to building resilient scientific and public health systems capable of responding effectively to future disease threats.

PROGRAMME STRUCTURE

The training programme is designed in a hybrid format to maximize flexibility and learning outcomes. During the first two months, participants will engage in online lectures, demonstrations, guided practical exercises, and interactive discussions delivered by leading experts from academia, research institutions, and industry. This phase will provide a strong foundation in bioinformatics concepts, computational biology, and infectious disease genomics.

The final month will consist of intensive hands-on training conducted at Assam Veterinary and Fishery University. Participants will work with real-world datasets generated from pathogens of veterinary, medical, and public health importance. Practical sessions will focus on data processing, genome assembly, annotation, phylogenetic analysis, metagenomics, transcriptomics, antimicrobial resistance prediction, and workflow automation. Participants will also undertake mentored mini-projects to apply the knowledge and skills acquired during the programme.

KEY TRAINING MODULES

The curriculum has been carefully designed to cover the complete spectrum of modern bioinformatics applications in infectious disease research. Major modules include:

Foundations of Bioinformatics and Computational Biology

Introduction to biological databases, sequence analysis, database mining, Linux operating systems, and command-line computing.

Programming for Biological Data Analysis

Practical training in Linux shell scripting, Python programming, R programming, statistical analysis, and scientific data visualization.

Next-Generation Sequencing and Pathogen Genomics

Sequencing technologies, quality control, genome assembly, genome annotation, comparative genomics, variant analysis, and pathogen characterization.

Transcriptomics and Functional Genomics

RNA-Seq analysis, differential gene expression studies, pathway analysis, and host-pathogen interaction investigations.

Phylogenetics and Molecular Epidemiology

Evolutionary analysis, phylogenetic reconstruction, genomic epidemiology, transmission network analysis, and outbreak investigations.

Antimicrobial Resistance Genomics

Identification of antimicrobial resistance genes, AMR surveillance, resistome analysis, and genomic prediction of resistance phenotypes.

Artificial Intelligence and Machine Learning

Applications of AI in infectious disease prediction, outbreak forecasting, biomarker discovery, and integrative multi-omics research.

One Health Genomics and Disease Surveillance

Integrated approaches for surveillance of zoonotic diseases, wildlife-associated pathogens, transboundary infections, and emerging disease threats.

DISTINGUISHED FACULTY AND EXPERT SPEAKERS

The programme will bring together a multidisciplinary team of eminent scientists, academicians, and industry professionals from premier national and international institutions. Experts specializing in genomics, bioinformatics, microbiology, virology, epidemiology, antimicrobial resistance, artificial intelligence, and One Health will deliver lectures and practical sessions.

The expert sessions will provide participants with valuable insights into current advances in pathogen genomics, infectious disease surveillance, microbiome research, computational biology, machine learning applications, and global One Health initiatives. Participants will have opportunities to interact directly with leading researchers and discuss emerging scientific challenges and future career pathways.

EXPECTED LEARNING OUTCOMES

Upon successful completion of the programme, participants will be able to independently analyze next-generation sequencing datasets, conduct pathogen genomic investigations, perform phylogenetic and molecular epidemiological analyses, identify antimicrobial resistance determinants, analyze microbiome and metagenomic datasets, and develop reproducible bioinformatics workflows.

Participants will also gain practical experience in utilizing advanced computational tools and integrating multi-omics data for addressing complex biological questions. These skills will significantly enhance their ability to undertake high-quality research, publish in peer-reviewed journals, contribute to disease surveillance programmes, and compete successfully for national and international research funding opportunities.

WHO SHOULD APPLY?

The programme is intended for postgraduate students, doctoral scholars, research fellows, faculty members, scientists, veterinarians, medical professionals, public health practitioners, and researchers from academia, government organizations, and industry who are interested in applying bioinformatics and genomics to infectious disease research.

Researchers working in areas such as microbiology, virology, immunology, epidemiology, biotechnology, veterinary sciences, biomedical sciences, and One Health will particularly benefit from this training.

HOW TO APPLY

Interested candidates are required to submit their applications online through the Google Registration Form available at the link provided below.

Application Procedure

1. Complete the online application form using the Google Form link.
2. Upload the required documents in PDF format:
 - Updated Curriculum Vitae (CV)
 - Student/Institutional Identity Card

- Recommendation Letter or No Objection Certificate (if applicable)
- 3. Submit a brief Statement of Purpose describing your research interests, motivation for joining the programme, and expected outcomes from the training.
- 4. Ensure that all information provided is accurate and complete before submission.

Registration Link

Google Form: <https://forms.gle/UEA5bsGurA46FsoB6>

QR Code:



CERTIFICATION

Participants who successfully complete all training modules, assignments, practical exercises, and project work will be awarded a **Certificate of Advanced Training in Bioinformatics for Infectious Disease Research** by Assam Veterinary and Fishery University.

CONTACT

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Empowering the next generation of researchers through genomics, bioinformatics, and One Health innovation for global infectious disease preparedness and response.