



BIOINFORMATICS PROJECT TOPIC LIST

- Duration: 3,6 & 12
- Get Work Experience & Recommendation Letter With 12 Months project

INTRODUCTION

Dive into a comprehensive range of bioinformatics project topics designed to equip you with hands-on experience, foster learning, and help you publish impactful research papers. Whether you're interested in viral diseases, cancer research, neurodegenerative disorders, or drug discovery, our projects are tailored for durations of 3, 6, or 12 months, enabling you to gain valuable work experience while exploring cutting-edge areas like AI-driven biomarker discovery, personalized medicine, computational drug design, and genomic analysis.

These projects, mentored by experts like Dr. Elamathi, Mr. Prodyot Banerjee, and Dr. Nilofer Shaikh, cover emerging fields such as antimicrobial resistance, precision medicine, and computational biology. By participating, you'll develop advanced bioinformatics skills, contribute to groundbreaking research, and elevate your career in this dynamic field.

SELECT ANY OF THE FOLLOWING TO START YOUR PROJECT WORK

Viral Diseases

Mpox Virus

- Sequence alignment analysis of Mpox Virus - Dr. Elamathi
- Developing a Computational Model for Predicting the Emergence of New Mpox or SARS-CoV-2 Escape Variants with Enhanced Immune Evasion - Prodyot Banerjee
- Computational Drug Discovery Targeting Mpox: Virtual Screening and Molecular Docking Analysis of Potential Antiviral Compounds - Dr. Elamathi
- Utilizing Bioinformatics and CADD pipelines to Identify Novel Therapeutic Targets of Mpox - Prodyot Banerjee
- Ligand-Based Virtual Screening for Discovery of Novel Dengue Virus or Mpox Virus Entry Inhibitors - Prodyot Banerjee

- Design and Optimization of Novel Inhibitors for Dengue Virus NS3 or Mpox Virus Protease Using Structure-Based Drug Design - Prodyot Banerjee
- Identifying Potential Inhibitors of Mpox with Enhanced Pharmacological Profiles: An In-Silico Drug Discovery to Development Approach - Prodyot Banerjee

HIV

- Prediction of HIV Drug Resistance Mutations - Use supervised learning to identify mutations in HIV that confer drug resistance based on sequence data.
- AI-based Vaccine Design for HIV - Apply neural networks to predict epitopes for effective vaccine targets against HIV.
- Molecular Docking for HIV Inhibitor Screening - Use reinforcement learning algorithms to optimize molecular docking simulations for HIV drug discovery.
- HIV Subtype Classification Using Genomic Data - Use unsupervised learning to classify HIV subtypes based on sequence variations.
- Host-Pathogen Interaction Modeling for HIV - Develop machine learning models to study interactions between host immune factors and HIV proteins.
- Integrative Analysis of Transcriptomic Data in HIV Research - Use multi-omics approaches to understand gene expression changes during HIV infection.
- Network-Based Drug Repurposing for HIV - Use graph machine learning to identify existing drugs that may be repurposed for HIV treatment.



2. Cancer

General Cancer

- AI-based Biomarker Discovery for Early Cancer Detection - Utilize deep learning models to identify potential biomarkers for early-stage cancer from genomic and proteomic data.
- Prediction of Cancer Progression Using Multi-Omics Data - Combine transcriptomics, proteomics, and metabolomics data to predict cancer progression using ensemble machine learning models.
- Identification of Neoantigens for Personalized Cancer Vaccines - Use AI to predict cancer-specific neoantigens from tumor sequencing data to guide vaccine development.
- Prediction of Cancer Drug Resistance - Apply supervised learning techniques.
- Analysis of Tumor Microenvironment Using Single-Cell Data - Utilize unsupervised learning to identify cell populations and interactions in the tumor microenvironment.
- Gene Regulatory Network Analysis for Cancer - Use graph neural networks to infer and analyze gene regulatory networks in different cancer types.
- Drug Synergy Prediction for Combination Therapy in Cancer - Apply deep learning to predict effective drug combinations for cancer treatment.

Cervical Cancer

- Studying cervical cancer and its drug targets using multiple omics data analysis - Dr. Elamathi
- Investigating the role of cervical cancer and its drug targets using proteomics data analysis - Dr. Nilofer
- Exploring genomic variants in cervical cancer using a bioinformatics approach - Prodyot Banerjee

Breast Cancer

- Identification of Disease-Causing Mutations: A Bioinformatics Database Approach (Breast Cancer) - Prodyot Banerjee
 - Identification of early diagnostic biomarkers for breast cancer through bioinformatics analysis - Dr. Nilofer
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3. Neurodegenerative Diseases

- Uncovering Novel RNA Editing Sites in Neurodegenerative Diseases Using Machine Learning - Dr. Elamathi
 - Modeling Protein-Protein Interactions in Neurodegenerative Disease Using Structural Bioinformatics - Prodyot Banerjee
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4. Metabolic Disorders

Diabetes

- Personalized drug in type II diabetes using Pharmacovigilance approach - Dr. Elamathi
 - Decoding the genetic blueprint of type II diabetes through bioinformatics - Dr. Elamathi
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5. Autoimmune and Chronic Diseases

- Metagenomic Analysis of Gut Microbiota and Its Impact on Immune Response in Autoimmune Diseases - Dr. Elamathi
 - Bioinformatics Approaches to Identify Biomarkers for Early Detection of Chronic Kidney Disease - Prodyot Banerjee
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6. Rare and Genetic Diseases

- Designing Novel Therapeutic Strategies for Rare Genetic Diseases Using CRISPR-Based Functional Genomics - Dr. Elamathi
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7. Cardiovascular Diseases

- Exploring Epigenetic Modifications in Cardiovascular Diseases Through Computational Epigenomics - Dr. Elamathi
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8. Personalized and Precision Medicine

- Understanding efficacy of personalized medicine in Alzheimer's disease treatment: A Molecular docking approach - Prodyot Banerjee
 - Predictive Modeling of Drug-Drug Interactions in Personalized Medicine Using Network Pharmacology - Dr. Nilofer Shaikh
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9. Drug Discovery and Antimicrobial Resistance

- Bioinformatics approaches to investigate antimicrobial resistance in humans - Dr. Elamathi
 - Analyzing the Impact of Post-Translational Modifications on Protein Function in Disease States - Dr. Elamathi
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10. General Computational Biology and Bioinformatics Tools

- Sequence alignment and homology modeling - Dr. Elamathi
- Developing AI-Based Tools for Predicting Protein Function from Sequence Data - Prodyot Banerjee