HAFIZ MUHAMMAD ADNAN TARIQ

Bioinformatics | NGS | Metagenomics | Data Analysis

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EDUCATION

Master of Science in Bioinformatics **09/2022-08/2024**
National University of Sciences and Technology (NUST), Islamabad

Bachelor of Science in Bioinformatics **09/2017-08/2021**
National Center for Bioinformatics (NCB),
Quaid-i-Azam University (QAU), Islamabad, Pakistan.

RESEARCH EXPERIENCE

Individual Projects:

Identification of Key Taxonomic and Metabolic Players in the Gut Metagenome of T2D Patients, NUST University (MS-Thesis Project) **07/2023-08/2024**

- Identified key CAZyme proteins, and key Taxa associated with T2D and their role in disease and health.
- Employed NGS Techniques, Metagenome Analysis, Machine Learning, Linux & Bash Scripting, and Gene Family Prediction.

Projects In Collaboration:

Machine learning identifies microbial biomarkers of environmental antibiotic exposure in zebrafish gut metagenomes, Shanghai Jiao Tong University, China **10/2023-06/2024**

- Metagenomics Analysis, Machine Learning, and R to identify the environmental antimicrobial resistance genes in zebrafish gut metagenome.
- Research manuscript is currently in preparation.

Gut Microbial Strains - Non-Small Cell Lung Cancer Treatment: Decoding the Connection, NUST University **09/2023-07/2024**

- Developed statistical and machine learning models to associate microbial variants/strains with immunotherapy responses, achieving >90% prediction accuracy.
- Applied structural bioinformatics to assess functional impact of SNPs on protein stability and active-site interactions, contributing to biomarker discovery for personalized NSCLC treatment

Radiology Report Generation using Multimodal AI and Llama NUST, Islamabad, Pakistan **08/2024-06/2025**

- Built a RAG-based pipeline combining ResNet-50, Transformer, and LLaMA-2 for automated report generation from X-ray images.
- Used FAISS vector search to retrieve similar clinical cases, improving contextual relevance in outputs.

RESEARCH PUBLICATIONS

1. Tariq, H.M.A., Khan, N.Y., Manzoor, H., & Kayani, M.U.R. Exploring the Impact of Type 2 Diabetes and Glucose-Lowering Drugs on Gut Microbiome Dynamics. Springer Nature Discover Medicine. DOI: https://doi.org/10.1007/s44337-025-00241-9 **2025**
2. Raziq, M.F., Tariq, H.M.A., Khan, N., Manzoor, H., Rafiq, M., Rasool, S., Kayani, M.U.R., & Huang, L. Prioritizing gut microbial SNPs linked to immunotherapy outcomes in NSCLC patients by integrative bioinformatics analysis. Journal of Translational Medicine. DOI: https://doi.org/10.1186/s12967-025-06370-0 **2025**

SEMINAR AND CONFERENCES

Facilitator – Hands-On NGS Workshop: Metagenomics for Health and Disease NUST – Islamabad, Pakistan **02/2025**

- Co-facilitated a two-day practical workshop focused on Next-Generation Sequencing (NGS) and Metagenomics, attended by students and researchers from interdisciplinary backgrounds.

2 Days Hands-on Workshop on Complete Data Analysis of Single-Cell RNA-Seq **02/2024**

- Performed end-to-end single-cell RNA-seq analysis of case-control samples.

EMPLOYMENT HISTORY

Geneticist & Bioinformatician, Zarqa Genomics Lab – ZGL, Islamabad Pakistan. **07/2025-Present**

- Leading bioinformatics technical & research team and conducting clinical genetic analysis, variant interpretation, and bioinformatics for NGS-based diagnostics, including WES, WGS, and gene panels.
- Supporting genetic counseling and reporting for personalized patient care.

Machine Learning Trainee, Intelli Ware Tech, Islamabad, Pakistan. **09/2024-04/2025**

- Hands-on experience with **Bio Python** for biological data analysis
- Designed and implemented machine learning algorithms for real-world datasets
- Collaborated in a team-based environment, applying Python, NumPy, Pandas, and scikit-learn to develop ML pipelines

Admin In charge, The British School and Academy, Islamabad, Pakistan. **10/2021-10/2022**

- Managed administrative tasks, academic scheduling, and staff coordination in a school setting.
- Maintained records and communication, strengthening organizational and leadership skills.

INTERNSHIPS

Research Intern Computational Biology Lab, National Centre for Bioinformatics – QAU Islamabad, Pakistan. **2021-2021**

- Conducted in silico analysis of bioactive compounds targeting disease-related pathways
- Investigated RNA-binding protein inhibition as a therapeutic strategy for kidney disorders

Internship Nishtar Medical University, Multan, Pakistan **2019**

- Assisted in sample preparation and testing using laboratory equipment.
- Gained hands-on experience in biochemistry, microbiology, and virology laboratory techniques.

LANGUAGES

URDU	Native Language	
ENGLISH	B2 (IELTS)	**05/2025**

HONORS AND AWARDS

Best Director of the Year **2022-2023**
NBPK - National University of Sciences and Technology, Islamabad, Pakistan.

Speech Declamation **2018**
National Accountability Bureau (NAB), Pakistan.

PEEF Scholarship **2009-2010**
Government of Punjab, Pakistan.

RESEARCH INTERESTS

- Computational Genomics & Metagenomics
- Machine Learning & AI in Bioinformatics
- Microbiome & Human Health
- Big Data & Cloud Computing in Bioinformatics

TECHNICAL SKILLS

- NGS & Omics Analysis: MetaPhlAn, HUMAnN, Kraken2, StrainPhlAn2, Single-cell RNA-seq
- Big Data & Cloud Computing: HPC, AWS, Multi-omics data integration
- Programming & Data Analysis: Python, R, Bash Scripting, Linux
- Machine Learning & AI: sci-kit-learn, Tensor Flow, Statistical modeling, LLMs

COURSES AND CERTIFICATES

Interpreting Genomic Variation: Overcoming Challenges in Diverse Populations **2025**
Wellcome Connecting Science

Introduction to Genomic Technologies, Coursera **2023**
Johns Hopkins University.

Python For Genomic Data Science, Coursera **2023**
Johns Hopkins University.

Algorithms For DNA Sequencing, Coursera **2023**
Johns Hopkins University.

VOLUNTEER SERVICES

Lead Outreach **01/2024-12/2024**
International Society for Computational Biology (ISCB) Student Council – RSG-Pakistan

Director Outreach **03/2022-03/2023**
NUST Bazm – e – Pakistan, Islamabad, Pakistan

REFERENCES

Dr. Masood Ur Rehman Kayani (Supervisor)

Associate Professor,

National University of Sciences & Technology (NUST),

Islamabad, Pakistan.

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National University of Sciences & Technology (NUST), Islamabad, Pakistan.

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