DANISH ASLAM

✉ danish2101125@st.jmi.ac.in | LinkedIn | +91-7906243758 | ResearchGate

SCFBio* Lab, 3rd floor, Synergy Building, IIT Delhi, Hauz Khas, New Delhi, 110016, India
Supercomputing Facility for Bioinformatics & Computational Biology

Education

Jamia Millia Islamia (JMI) — *New Delhi, India*
MS in Bioinformatics — October **2021** – June **2023**
GPA: *9.61/10.00*

Thesis title: ***"Development of an Intron-Exon Boundary Junction Prediction software using Physico-chemical DNA features"***
Thesis advisor: **Prof. B. Jayaram**, Co-advisor: **Prof. Rafat Parveen; Grade: A+**

Coursework: *Introduction to Bioinformatics, Computing Fundamentals, Comparative and Functional Genomics, Chemoinformatic and Chemogenomics, Systems Biology, Biochemistry, Essential Mathematics & Biostatistics, Database Management System, NGS Data Analysis, Structural Bioinformatics and Drug Design, Machine Learning in Bioinformatics*

University of Delhi (DU) — *New Delhi, India*
BS in Life Science — July **2018** – May **2021**
GPA: *8.848/10.00*

Relevant Coursework: *Medical Diagnostics, Physiology & Biochemistry, Genetics & Evolutionary Biology, Bioinformatics, Animal Biotechnology, Immunology, Analytical Techniques in Plant Sciences, Communication Skills*

Research and Training Experience

Indian Institute of Technology (IIT), Delhi, India — January **2023** – **Present**
Supervisor: **Prof. B. Jayaram (Computational Genomics Group, SCFBio Lab, IITD)**

Role: **Project Scientist**, June 2024 – Present

(a) Genome Workbench Development. [Underway]
- Sequence to structure and dynamics to function was an established adage in protein sciences. Our results from the last two research projects demonstrate that this is true for nucleic acids as well. Building on this, we are working on the development of a universal platform for identification/prediction of various genic/regulatory elements using structure/energy landscapes within these regions.

(b) Biophysical fingerprinting (profiling) of eukaryotic genome elements using physicochemical properties of DNA. [Completed]
- Working with the hypothesis that genomic DNA sequences must convey their functional roles through their biophysical properties, we characterized eight genomic sites including; *Coding Sequences, Promoters, Gene boundaries, Exon-Intron boundaries, Start/Stop Codons,* ~4.6 million in number to establish a novel structural and energetic framework for genome annotation.

Role: **Jr. Project Assistant (Tech)**, March – May 2024; **Scientific Administrative Assistant**, December 2023 –February 2024; **Research Intern**, January – November 2023

(c) Development of an Intron-Exon Boundary Junction Prediction tool using physicochemical DNA features (Backbone, Base Pair (BP)-Axis, Intra BP, Inter BP, Energetics). [Completed]
- Demonstrated proficiency in working with bash scripting.
- Performed a thorough literature review for the project.
- Utilized Python programming language to train/test/evaluate machine learning/deep learning (ML/DL) models and developed an exhaustive prediction pipeline.
- Displayed aptitude in large-scale data handling and transformation, ensuring accurate and reliable Benchmarking results.
- Helped build the user-interactive command line utility, at GitHub.

(d) **Investigation of a codon-usage-bias-based physicochemical characterization of gene/non-gene sequences. [Completed]**

- Collaborated closely with a senior research fellow to mentor a final year student's M.Tech. (Molecular engineering, Chemical Synthesis and Analysis) dissertation (June 2023 – June 2024).

Jamia Millia Islamia (JMI), New Delhi, India July **2022** – July **2023**

Supervisors: **Dr. Khalid Raza** (Computational Intelligence and Bioinformatics Lab) & **Prof. Rafat Parveen** (Department of Computer Science)

Role: **Research Trainee**

(a) A Gene to Drug insight into a multitargeted inhibitor search against Alzheimer's disease.

- Designed and worked on a multitargeted gene-to-drug study with APP, BACE1, APOE, GSK3B, MAPT, PSEN1 in the center of it, supported by a thorough Literature Review to support their inclusion..
- Supported a comprehensive systematic review on Lung Cancer, providing valuable insights and assistance.
- Made significant contributions to two book chapters, exploring the applications of ML Learning in various disease domains, including treatment, drug discovery, and disease progression.
- Demonstrated proficiency in utilizing Next Generation Sequencing (NGS) pipelines on a Linux OS, ensuring efficient and accurate RNA-seq data analysis.

(b) Investigation on the BACE1 gene and its regulatory neighbors to investigate their contribution to the progression of Alzheimer's Disease.

- Developed and implemented custom Python/R pipelines to extract and preprocess essential datasets sourced from GEO and SRA.
- Utilized the extracted datasets to perform meticulous analyses, gaining deep insights into the role of the genes-of-interest in Alzheimer's Disease.
- Employed statistical and computational methods to analyze the data, drawing significant conclusions.

Professional Development

Mentor **September 2023**

Mentored a student in a project for motif identification in promoter regions of *Oryza sativa* (rice) and validation using a genome-wide identification of genes of interest by expression analysis under abiotic stresses (Drought, Salinity, etc.).

Mentor, *Computational Genomics Group*, SCFBio Lab **September 2023 – July 2024**

- *Mentored* a final year M.Tech. in Molecular Engineering, Chemical Synthesis, and Analysis student working as a Research Intern in the lab ***(September 2023 – May 2024)*.**
    - Supported with daily laboratory tasks such as bash scripting, data handling, and data analysis.
    - Assisted with the project reports and presentations submitted as "Major Project: Part 1 and 2" progress in mid-semester evaluation and final evaluation.
    - Helped write the final draft of thesis.
- *Mentored* a final year Master's (Bioinformatics) student for a two-month summer internship ***(June 2024 – July 2024)***, with large-scale genomic data extraction and analysis.

Peer-Review Activities, *Computational Intelligence and Bioinformatics Lab* **May 2024**

- Explainable AI in Genetics: A Case Study. In: Raza, K. (eds) Deep Learning in Genetics & Genomics. Elsevier.
- Transformer Networks and Autoencoders in Genomics and Genetic Data Interpretation: A Case Study. In: Raza, K. (eds) Deep Learning in Genetics & Genomics. Elsevier.

Resource Person, *Computational Genomics Group*, SCFBio Lab **February 2024**

Participated as the Resource Person in **"7-Days Hands-on Bioinformatics Workshop for Genomic and Proteomic Analysis"**, organized by School of Allied Sciences, DEV BHOOMI UTTARAKHAND UNIVERSITY, INDIA.

- Demonstrated Phylogenetic Analysis covering selection of sequences, distance matrices, evolutionary distance determination (multiple sequence alignment, tree building algorithms, and their evaluation;
- And a hands-on session on the in-house tools, Chemgenome, Seq2Str, and TmPredictor

Certificates

Certificate of Appreciation for sharing valuable knowledge and expertise as a ***resource person*** in "7-Days Hands-on Bioinformatics Workshop for Genomic and Proteomic Analysis", organized by School of Allied Sciences, DEV BHOOMI UTTARAKHAND UNIVERSITY, INDIA, sponsored by DST-SERB under Karyashala Scheme, 29th January to 4th February 2024. **2024**

Certificate of Excellence for Poster Presentation titled "Marine Debris: A Man-made Curse" in the ***National Seminar*** sponsored by ICSSR held on March 8th-9th, 2019. **2019**

Certificate of Appreciation for scoring the ***highest marks in Biology*** (95/100), District level. **2016**

Certificate of Excellence for securing a ***10.00/10.00 CGPA*** in the CBSE Board Examination. **2014**

Certificate of Appreciation for securing ***299th International Rank,*** Science Olympiad. **2013**

Certificate of Appreciation for securing ***1st School Rank,*** International English Olympiad. **2013**

Publications

a) Book Chapters

- Siddiqui, F., **Aslam, D.**, Tanveer, K., Soudy, M. **(2024)**. ***The Role of Artificial Intelligence and Machine Learning in Autoimmune Disorders.*** In: Raza, K., Singh, S. (eds) Artificial Intelligence and Autoimmune Diseases. Studies in Computational Intelligence, vol 1133. Springer, Singapore. https://doi.org/10.1007/978-981-99-9029-0_3
- Ahmad, S., **Aslam, D.**, Ansari, A., Bhat, A. M., & Raza, K. **(2024)**. ***Deep learning in computer-aided drug design: a case study.*** In: Raza, K., Barh, D., Singh, D., Ahmad, N., (eds) Deep Learning Applications in Translational Bioinformatics. Elsevier. https://doi.org/10.1016/B978-0-443-22299-3.00012-8

b) Under Consideration/In Preparation

- Sharma, D., **Aslam D.**, Sharma K., Mittal A., & Jayaram B. **(2024)**. ***Exon-Intron Boundary Detection Made Easy by Physicochemical Properties of DNA.***

  Description: Accurate identification of the Exon-Intron boundaries is crucial for understanding gene expression and splicing. However, current methods for predicting exon-intron junctions have limitations due to the lack of a robust consensus sequence and reliance on experimental datasets. To address these challenges, a novel method called **ChemEXIN** has been developed. It utilizes a deep learning architecture along with structural and energetic parameters based on tri- and tetra-nucleotides. This approach takes advantage of the function-dependent local signals in structure and energy of DNA. *(Status: In Peer Review)*

  GitHub: https://github.com/rnsharma478/ChemEXIN
  Preprint DOI: https://doi.org/10.21203/rs.3.rs-4359229/v1

- Sharma, D., **Aslam D.**, Mittal A., & Jayaram B. **(2024)**. ***Biophysical Signatures as Markers for Differentiation of Diverse Genomic Elements across Eukaryotic Kingdoms.***

  Description: DNA is a dynamic molecule with various regulatory elements that are crucial for regulating gene expression, maintaining genome stability, and facilitating various cellular processes. We analyzed key genomic sites such as Coding Sequences, Promoters, Gene boundaries, Exon-Intron boundaries, Start/Stop Codons; ~4.6 million in number to uncover critical physicochemical profiles. Finally, we established a novel framework that leverage structural and energetic features to precisely annotate genomic elements with unprecedented accuracy. *(Status: In Peer Review)*

- **Aslam, D.**, Ahmad S., & Raza K. **(2024)**. ***Gene to Drug: In-silico analysis for a multi-targeted inhibitor against Alzheimer's disease.***

  Description: Centered around a cluster of genes identified through a semi-automated literature mining approach at the NCBI, we worked on a multi-targeted gene-to-drug strategy firmly rooted in their direct involvement in the progression of Alzheimer's disease. To bolster our findings, we concurrently conducted validation through molecular dynamics-based simulation studies, and molecular fingerprinting. *(Status: Manuscript in Preparation)*

Academic & Community Service

Member, Global Association of Economics Education **2021 – 2023**
Formulated and edited content for the GAEE, Jamia Millia Islamia Chapter's social media accounts.
Link: 1, 2

Volunteer, Recover Media **2021**
Worked as an editorial & networking volunteer in a student-led initiative to discuss the contemporary gaze on gender, politics, sexuality, health, art, and culture.

Student Representative, Internal Complaints Committee, SAC (M), DU **2020 – 2021**
Worked alongside college administration during my undergraduate studies regarding issues related to harassment/violence within the campus.

Member, SAGE (The Debating Society), SAC (M), DU **2018 – 2021**
- Appointed as the *Editorial & Graphics Head*, 2020-2021.
- Formulated write-ups, and graphics for the social media accounts.
- Performed and wrote original thematic pieces and won inter-college slam poetry competitions.

Member, SAMVEDNA (The Gender Sensitization Forum), SAC (M), DU **2019 – 2021**
- Appointed as the *Research & Editorial Head*, 2020-2021.
- Started and published three issues of my ***passion project***, "Lagniappe", a student led initiative to educate and discuss important issues with unique expressions of poetry, write-ups, and more.
- Ensured the newsletter addressed timely and relevant topics, fostering discussions on gender sensitization and other critical issues.
- Moderated book discussions and other events.

Member of School's Cabinet **2014 – 2016**
- Served as the *Academic Captain* of the school in twelfth grade, participating in discussions regarding academic activities and editing write-ups for the school's annual magazine (prospectus).
- Actively participated in the School's English Club discussions and activities.
- Assisted two classmates as the *Student Mentor* and helped them with daily classwork and academic development.
- Secured first position in Problem Solving Assessment (PSA) across the school.
- Volunteered in the organizing committee for several intra- and inter-school competitions.
- Participated in various debates, quizzes, and group discussions.

Skills

Programming: C/C++, Python and Biopython, R, HTML, PHP, Bash Scripting
Laboratory: Linux, MYSQL, Systems Biology and Advance Bioinformatics Tools, Drug Design + NGS
Research and Development: Machine learning/deep learning (ML/DL) model architecture handling, Benchmarking, Technical writing, Large Scale Data Handling/Analysis
Others: Technical Writing, Copy-editing/reviewing, Detail-oriented, Leadership, Teamwork