Derrin Bright

Bioinformatics | Biotechnology | AI in Healthcare

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Education

Vellore Institute of Technology (VIT) **CGPA: 8.69** Vellore, India

Bachelor of Technology in Biotechnology *2022-Present*

- **Relevant Courses:** Bioinformatics, Genomics and Proteomics, Molecular Biology, Cell Biology, Genetic Engineering, Biochemistry, Immunology, Biology, Probability and Statistics, Linear Algebra, Calculus
- **Relevant Certifications:** ML A-Z, Python for Data Science, AI & Development, Bioinformatic; Bulk RNA-Seq Data Analysis, Advanced Bioinformatics, Bioinformatics; Learn Docking & Molecular Dynamics Simulation, Single-Cell RNA-Seq Data Analysis using R & Python, Oracle Cloud Infrastructure Generative AI Professional Certificate

Technical Experiences

Research Intern at IIT Bombay, Mumbai, India *May 2025 - Present*

- Conducting differential expression analysis and Weighted Gene Co-expression Network Analysis (WGCNA) to identify key gene modules associated with autoimmune disease progression, followed by Gene Set Enrichment Analysis (GSEA) and Protein-Protein Interaction (PPI) network construction using NetworkAnalyst to uncover dysregulated pathways and functional gene relationships.
- Implementing predictive models to classify disease vs. healthy states based on gene expression, enhancing biological interpretability through integrated network and machine learning approaches.

Research Intern at Ashoka University, Delhi, India *January 2025 - March 2025*

- Analyzed five assembled E. coli genomes for carbapenem and beta-lactam resistance using BLAST and RGI-CARD to identify mutations, and correlated genotype-phenotype relationships through AST report analysis.
- Evaluated Penicillin-Binding Protein status by performing Multiple Sequence Alignment (MSA) against a reference wild-type to detect conserved mutations and confirm resistance mechanisms.
- Automated genomic data processing by developing a custom script to systematically rename and organize FASTA files, creating a structured dataset necessary for phylogenetic analysis using the PhaME tool.

Biotech Team Lead at NovaLinks, Vellore, India *February 2025 - April 2025*

- Led a project integrating miRNA analysis and histopathological imaging with machine learning to enhance lung cancer subtype classification and improve diagnostic precision.
- Conducted research on miRNA biomarkers specific to lung cancer and provided biological insights to support the development of an accurate classification model for distinguishing adenocarcinoma from squamous cell carcinoma.

Biotech Intern at NovaLinks, Vellore, India *December 2024 - February 2025*

- Analyzed urinary and serum biomarkers for the detection of Urinary Tract Infections (UTIs) and evaluated their diagnostic potential in asymptomatic conditions, including Chronic Kidney Disease (CKD), Non-Alcoholic Fatty Liver Disease (NAFLD), Non-Alcoholic Steatohepatitis (NASH), and Acute Kidney Injury (AKI).
- Performed comparative analysis of optical sensor technologies (PMT vs CMOS) and finalized wavelength ranges and strip flushing techniques to enhance detection accuracy and device efficiency.

Data Science Intern at Teachnook, Bangalore, India *September - October 2024*

- Developed and implemented machine learning models, including Random Forest, SVM, and ResNet, to analyze plant detection and defect detection tasks based on image inputs and specifications.
- Gained proficiency in Python, NumPy, and Pandas, alongside essential data visualization techniques, and foundational concepts on machine learning and deep learning.

Bioinformatics Intern at Bversity, Vellore, India *February 2024*

- Conducted drug discovery research using computational tools like KNIME for molecular similarity searches and AlphaFold for protein structure prediction.
- Worked on targeted antiviral and antibacterial drug screening projects, gaining insights into therapeutic targeting and molecular interactions in infectious diseases.

Vice Chairperson at Alpha Bio Cell, VIT University, Vellore, India *January 2024 - December 2024*

- Led several biotechnology and bioinformatics-related events, including hackathons, workshops, and quizzes, enhancing the club's engagement.
- Mentored junior core members and applied leadership, technical, and project management skills to ensure successful event planning and execution.

Technical Projects

Comparative Transcriptomic Analysis of HPV-Associated Cancers Using Co-Expression Network Modeling

- Extracting and analyzing transcriptomic data from TCGA for HPV-positive cervical and oropharyngeal cancers to perform both differential expression analysis and WGCNA, identifying key genes and co-expression modules.
- Constructing a PPI network in Cytoscape from a core gene set, and further analyzing these genes with functional enrichment in R to determine their shared biological roles.

Identification of Conserved Functional Modules and Unique Hub Genes across Autoimmune Disorders

- Conducting an integrative transcriptomic analysis across four autoimmune diseases (T1D, RA, AS, SLE), combining results from Differential Expression, WGCNA, and GSEA to define a curated list of implicated genes.
- Constructing and analyzing Protein-Protein Interaction networks to identify the core genes and biological processes shared across these diseases, while also characterizing the molecular signatures unique to each condition.

Computational Identification of Antimalarial Leads through Fingerprint Similarity Analysis

- Screened a library of antimalarial molecules against a query (chloroquine drug) by generating molecular fingerprints and computing Tanimoto similarity coefficients using KNIME and RDKit nodes.
- Extracted molecular data from the Protein Data Bank (PDB) and visualized pairwise similarity scores as a heatmap to identify high-similarity candidates for antimalarial drug development.

In Silico Analysis of Binding Mode and Affinity for the 3DTC/CEP-6331 Complex using Molecular Docking

- Implemented a molecular docking simulation using AutoDock Vina to model the interaction between the 3DTC kinase and the CEP-6331 inhibitor, achieving a predicted binding affinity of -12.23 kcal/mol.
- Analyzed the top binding pose to identify the specific amino acids responsible for the stable interaction, including key hydrophobic (ILE180, LEU274) and polar (LYS228, ASP284) residues.

Single-Cell Transcriptomic Profiling of the B16 Melanoma's Microenvironment

- Processed raw single-cell transcriptomic data from a B16 melanoma model using R (Seurat), applying quality control, normalization, and clustering to map the tumor's cellular heterogeneity.
- Characterized the resulting cell clusters by annotating fourteen distinct cell types within the tumor microenvironment and performed differential expression analysis to identify their unique gene signatures.

Data-Driven Machine Failure Detection *GitHub Link*

- Developed an automated solution for machine failure prevention by analyzing key metrics such as operating temperature, proximity measurements, electrical current, and environmental factors like air quality and pressure.
- Employed a Random Forest model, achieving a 2.116% performance improvement over a baseline logistic regression model through feature engineering.

Asthma Risk Prediction using Machine Learning *GitHub Link*

- Optimized asthma risk prediction by developing multiple machine learning models, including Random Forest, SVM, and Gradient Boosting, and finetuning hyperparameters using Grid Search Cross-Validation to maximize accuracy.
- Enhanced model accuracy and reduced data dimensionality by applying Recursive Feature Elimination (RFE) to identify the most predictive features.

Technical Skills

Computational Biology Tools	BLAST | AlphaFold | AutoDocK | GROMACS | MGLTools | Bioconductor | OpenBabel | Cytoscape
Data Analysis Tools	Neo4J | KNIME | NetworkAnalyst
Programming Tools	R | Bash
Machine Learning Tools	TensorFlow | Keras | NumPy | Pandas | Matplotlib

Honors and Achievements

First runner-up in the Biomimicry Innovation Challenge and Showcase, Vellore Institute of Technology, 2024
Top 10 Winner of Bio-Inspired Design Fest (BIDFEST) Ideathon, Vellore Institute of Technology, 2024

Extra-Curricular

Volunteer | **National Service Scheme, NGO**
Conducted sessions in government schools on career opportunities and the importance of joining the armed forces.

Volunteer | **Becoming I Foundation, NGO**
Taught science, math, and english in government schools, supporting underprivileged communities.

Event Coordinator | **BioSummit, School of Biosciences and Technology**
Organized a flagship event connecting academia and food industries, managing food distribution and ensuring smooth execution.